



Innovative Teaching and Learning During COVID-19: An Exploratory Study of Teachers and IB Communities

Final Report

inflexion

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Abstract

This study investigated teacher and school experiences with digital teaching and learning during the pandemic through the lens of ***appreciative inquiry, narrative, and story-based methodologies***. By gathering data from educators who navigated the challenges of digital learning, this study aimed to illuminate the rarely explored ***positive innovations*** and enhanced learning experiences that emerged during this challenging period. This report defines innovation and explores school journeys to digital learning during the pandemic. Additionally, this report uses a problem-solution framework to organize the main problem areas schools encountered during the pandemic and the key solutions/innovations they used to solve these problems. While this study focused on the significant transformation of schools during the pandemic, it also identified a potential "boomerang effect" due to educator weariness and a desire to return to normalcy.

Executive Summary

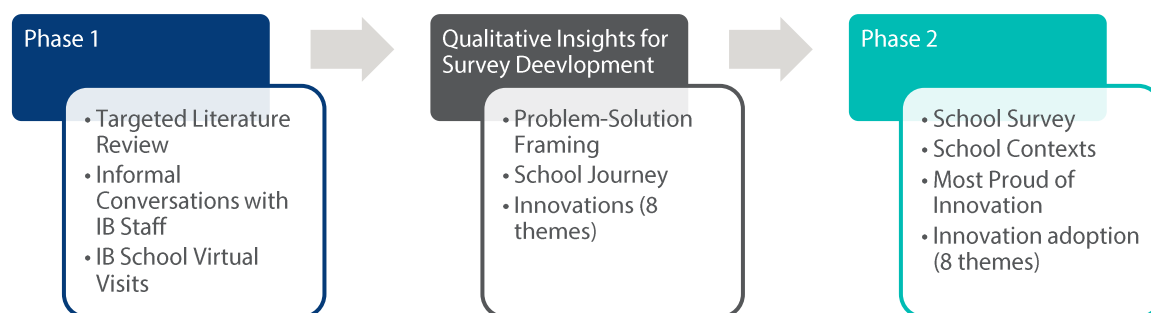
During the COVID-19 pandemic, the education system underwent a rapid transformation as schools worldwide shifted to remote learning. This sudden change posed significant challenges for school administrators, teachers, students, and parents. Teachers faced technical obstacles, limited training opportunities, and resource constraints, while students struggled with adapting to online learning due to limited access to devices and stable Internet connections, leading to feelings of isolation and reduced motivation. Despite these difficulties, the pandemic provided an opportunity to observe innovative practices in teaching and learning, where educators, students, and parents creatively adapted to the challenges and explored new ways of facilitating learning and engagement.

In response to the limited focus on positive innovations in education during the pandemic, the International Baccalaureate (IB) Organisation commissioned a study to explore innovative teaching and learning practices that emerged during this challenging period. Conducted by Inflexion beginning in February 2022, the investigation aimed to shed light on the rarely explored positive outcomes of the transition to digital learning. The study purpose included the following goals:

- understand the journey of schools and teachers in adopting digital teaching methods,
- identify effective and scalable learning engagements and teaching strategies, and
- uncover future-focused approaches that could be beneficial for schools and classrooms in the post-pandemic era.

Approaches to Gathering Information

This exploratory study used appreciative inquiry and narrative methodologies to investigate teacher and school experiences with digital teaching and learning during the pandemic (Reed, 2006; Ye & Oxendine, 2019). As shown in the figure below, the research was conducted in two phases.



Phase 1 aimed to understand the changing digital landscapes of schools during the pandemic and capture descriptive details about successful approaches; it also included a targeted literature review, informal conversations with IB staff, and virtual school visits to selected IB schools. The literature review included 202 articles relevant to this study and an additional 41 documents from a targeted search of websites from selected organizations. The informal conversations consisted of 12 semi-structured individual and group interviews with 21 key IB staff, covering a range of roles and

responsibilities. The conversations with IB staff also resulted in the selection of school sites with which virtual school visit interviews were conducted. The virtual site visits included semi-structured individual and group interviews with 103 IB educators (12 heads of schools and other administrators, 15 programme coordinators, and 76 IB teachers) across 7 participating schools.

Phase 2 validated Phase 1 findings through a survey focusing on innovative teaching practices and contextual factors influencing adoption in IB schools. The Phase 2 survey was administered to a randomly selected sample of 1,300 IB schools that offered at least one IB programme (PYP, MYP, DP, or CP) during the pandemic; special attention was given to representation across different strands, regions, programmes, and languages of instruction. The schools varied in size, governance (state-funded versus private), number of IB programmes, and length of involvement with the IB. A total of 782 respondents from 223 schools completed the survey for a school-level response rate of 17.6%.

Defining Innovation

To assist researchers in framing conversations about innovation and to provide nuance to the innovations schools described, the research team asked IB staff (through the informal conversations) and schools staff (through virtual site visit interviews) about their definitions of innovation. Insights from IB site visit schools served as the primary source of information, supplemented by input from IB staff. Three main characteristics of what makes something innovative emerged from the discussions.

- **Uniqueness of Purpose:** Innovation entails the creation of something new or the unorthodox combination of already existing parts. It should have a clear goal to address issues, remove obstacles, and/or close educational disparities.
- **Technology as a Tool:** IB schools perceive technology more as a facilitator than as the inspiration for innovation. The goal is to transform pedagogy and enhance the learning experience, and technology is a tool for doing so.
- **Importance of Understanding Context:** What is regarded as innovative is heavily influenced by context. Different countries, regions, and educational institutions have diverse levels of technology availability, resources, and experience, which affects how innovation is viewed and used. However, it's crucial to push limits and know when it is time to take risks and/or think outside the box.

School Journeys to Digital Learning

One goal of this study was to capture the journey of schools and teachers in adopting digital teaching and learning during the pandemic. School journeys were explored in detail in the virtual site visit interviews with IB schools, and the Phase 2 survey queried respondents about their journey of transitioning to digital learning during the pandemic. Five key takeaways emerged across data sources related to school journeys:

- **Rapid Transition:** Schools faced a sudden and unplanned transition to digital learning, causing initial chaos and challenges. The lack of preparation time and sudden shift to remote teaching presented significant hurdles for educators.

- **Shift in Pedagogy:** Successful digital learning required a shift in mindset and pedagogical approaches. Teachers had to adapt their teaching methods to suit the online environment, moving away from traditional classroom practices and finding effective ways to engage students virtually.
- **Technology Integration:** Schools needed to ensure access to technology and provide support for both teachers and students. Technology became a critical tool for delivering instruction, facilitating communication, and managing online learning platforms. Schools had to address issues related to technology access and equip educators with the necessary skills to use digital tools effectively.
- **Adaptability and Resilience:** Educators demonstrated adaptability and resilience throughout the digital learning journey. They had to quickly learn and navigate new technologies, experiment with different instructional strategies, and adjust their teaching based on feedback and student needs. The ability to adapt and persevere was crucial to ensuring educational continuity.
- **Importance of Collaboration:** Collaboration among teachers, administrators, students, and parents played a significant role in the success of digital learning. Schools fostered collaborative environments where educators shared resources, best practices, and strategies for effective online instruction. Collaborative efforts also involved engaging parents as partners in the learning process and supporting students' social and emotional well-being.

Characteristics of Successful School Transitions

Information about characteristics of schools that were more successful with the transition to digital teaching and learning emerged from virtual school visit interviews with IB schools and should be considered preliminary given the proximity to the return to in-person learning for many schools. The success of schools in transitioning to digital learning during the pandemic was dependent on a combination of factors including the following:

- External regulations (e.g., stipulations on allowed screen time for students),
- School-level resources,
- School culture,
- Professional development,
- Existing technology use,
- School leadership,
- Teacher characteristics, and
- Student and parent characteristics.

Facilitators and Barriers to Innovation

Throughout our **virtual school visit interviews**, educators reported facilitators such as clear communication and support from school leadership and IT departments, flexibility in trying new strategies, instructional support, and increased online communication and feedback from parents. Barriers included fatigue, overwhelming options, assessment difficulties, student engagement, and

variations in parent availability for support. **These areas were further confirmed through the survey** where respondents were given an opportunity to share the factors that both facilitated and hindered their ability to innovate during the pandemic.

Innovations in Teaching and Learning During the Pandemic

Another primary charge of this study was to explore the diverse experiences and solutions implemented during this transformative period. Using information from the Phase 1 literature review, discussions with IB staff, and information acquired from virtual site visit interviews, the research team developed a problem-solution framework, used to thematically identify the main problem areas schools encountered during the pandemic. The problem areas were then organized by solutions/innovations into eight different themes to condense the abundance of information gathered. **These themes have been organized in order of their prevalence based on the frequency of comments coded into each theme from the survey results.** The identified themes with the key takeaway innovative solutions within each are as follows:

Technology

- Understanding and problem-solving how technology acted as an obstacle to and essential tool for remote learning
- Methods to increase technology access and training for educators, students, and parents
- Use of new platforms for teaching, learning, and communication

Student Engagement

- Increased use of a multimedia approach to instruction
- Student interest and enjoyment in gamification of learning
- Importance of providing collaborative activities to increase social interaction

Classroom/Learning Environment

- Importance of educator flexibility and adaptability to new circumstances
- Establishing clear communication and expectations
- Prioritizing building online relationships and community

Instructional Strategies and Delivery

- Extensive use of apps and social media for instruction and communication
- Educators approach to using varied activities to design and deliver instruction, using synchronous and asynchronous methods
- Increased and innovative use of digital tools

Assessment Practices

- Emphasis on formative assessment to understand student growth and learning
- Rise of project-based assessments
- Offering multiple modes of assessment
- Use of technology-enabled assessment

- Increased personalization and flexibility in assessment approach

Teacher Collaboration

- Increased overall teacher collaboration.
- Participation in professional learning and teacher groups
- Increased resource sharing
- Desire for continued collaboration and networking post-pandemic

Parent Engagement

- Regular, transparent communication and collaboration between educators and parents
- Enhanced methods of communication
- Parents and families acting as instructional collaborators
- Educator support of parent and student well-being

Student Agency

- Opportunities for the development of student agency
- Increased personalized learning and individual goal-setting
- Increased autonomy and choice for students
- Recognizing the significance of the role of educator support for the continued development of student agency

While this study emphasized the transformation schools underwent during the pandemic, it also identified a potential "boomerang effect" due to educator weariness and a desire to return to normalcy. Generally, IB educators reported they used several innovations during the pandemic; however, the overall trend indicated many of the innovations would not continue post-pandemic. This suggests that schools may be inclined to revert to a "business as usual" approach without fully considering what they have learned and gained from the pandemic.

Conclusions

By embracing the lessons learned from this unprecedented and challenging global event, and through an exploration of successful experiences and innovative practices, this study sought to highlight for school administrators, teachers, and other stakeholders the factors that optimized the advantages realized from digital education, ensuring quality learning experiences for all students. Ultimately, the data revealed valuable insights and practical strategies to maximize the potential of digital innovations in education. By celebrating the triumphs achieved during these testing times, the hope is to inspire a collective commitment towards harnessing the positive transformations that can be found in teaching and learning online that have emerged from the pandemic, potentially revolutionizing education and fostering a brighter future for students around the globe.

Introduction

The COVID-19 pandemic forced the global education system to adapt quickly to a new reality as schools around the world shifted to remote learning almost overnight. This shift placed an enormous responsibility on school administrators and teachers to navigate uncharted territories of virtual classrooms and digital instruction, while managing student and teacher well-being and parental and community partnerships. This shift also necessitated swift adaptation and mastery of digital tools and technology. Teachers grappled with technical hurdles, limited access to training, and a shortage of resources. For students, the pandemic disrupted their familiar learning routines, replacing physical classrooms with digital interfaces. Students encountered obstacles in adapting to online learning, including limited access to devices and stable Internet connections. The absence of direct interaction with teachers and peers left them feeling isolated and lacking motivation.

This rapid change proved to be an immensely challenging time for students, teachers, and parents alike. Simultaneously, it provided a unique opportunity to see how the education system would respond to adversity and to observe the **emergence of innovations** in teaching and learning. In this case, innovation refers to the creative and effective solutions that educators, students, and parents developed to navigate the challenges posed by disruptions to the traditional education system. By adopting new technologies, pedagogical approaches, and problem-solving strategies, educators, students, and parents found alternative ways to facilitate learning, maintain engagement, and ensure continuity in education. These innovations not only addressed immediate obstacles but also have the *potential* to reshape the future of education.

Although there is a large amount of grey literature resulting from the pandemic on use of digital platforms, distance learning, blended instruction, and teachers' technological pedagogical content knowledge, most of this work has focused on the challenges that schools experienced and the negative impact on student learning. Less widely shared have been the **positive innovations** resulting from teachers' experiences with teaching and learning during the pandemic. As we transition to a post-pandemic era, of particular interest is learning directly from school leaders and educators how the transition to digital learning changed their approaches to teaching and learning in the short and long term. This study represents an effort to explore, summarize, and build on innovative teaching and learning practices emerging from the pandemic.

The Current Study

In February 2022, the International Baccalaureate (IB) Organisation commissioned Inflexion to investigate innovative teaching and learning during the COVID-19 pandemic. By gathering data from school leaders and educators who navigated the challenges of digital learning, this study aimed to illuminate the rarely explored **positive innovations** and enhanced learning experiences that emerged during this challenging period. It sought to capture (a) the journey of schools and teachers to adopt digital teaching and learning during the pandemic; (b) the learning engagements and teaching strategies for teachers, students, and schools that *could* be investigated further for scalability, transferability, and effectiveness; and (c) the future-focused strategies and promising practices that

could be considered for schools and classrooms post-pandemic. See Appendix A for the specific research questions for this study.

Approach to Gathering Information

This study investigated teacher and school experiences with digital teaching and learning during the pandemic through the lenses of **appreciative inquiry** and **narrative** and **story-based methodologies** (Reed, 2006; Ye & Oxendine, 2019). The research was conducted in two phases (see Figure 1). Phase 1 aimed to understand the state of schools' digital landscapes and how these changed during the pandemic, and to capture descriptive details about what worked well and why. It consisted of three primary components: a targeted literature review, informal conversations with IB staff, and virtual visits to selected IB schools. The targeted literature review provided an overview of digital teaching and learning practices; informal conversations with IB staff and virtual visit interviews with selected schools offered insights into perceptions, experiences, and innovative practices. Phase 2 sought to expand and validate Phase 1 findings through a survey focused on innovative teaching and learning practices and the contextual factors influencing their adoption. See Appendix B for the Technical Research Methods.

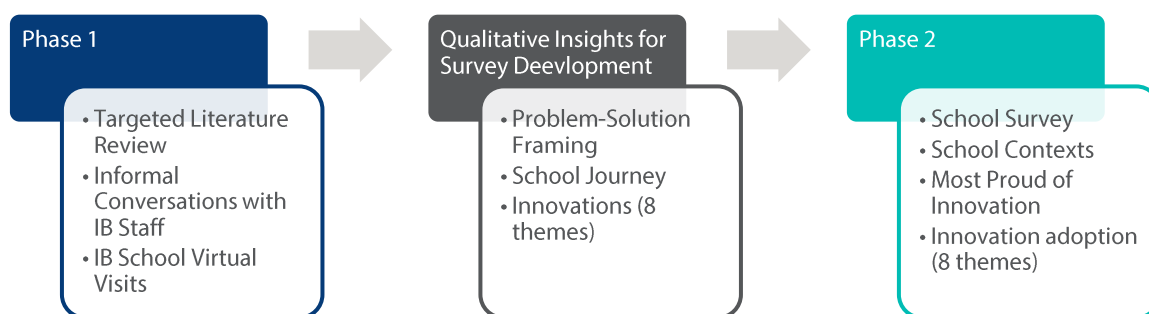


Figure 1. Research design visualization.

Targeted Literature Review

To capture the range of innovative teaching and learning practices during the COVID-19 pandemic, the research team conducted a targeted literature review of academic and grey literature. Researchers started with six broadly defined primary search terms and followed up with a secondary set of 15 search terms that focused on specific aspects of teaching and learning in a digital environment. Key terms were defined in a manner that considered the perspectives being centered and allowed for variability in innovations (e.g., what is innovative in Asia may not be in Europe). This resulted in 16,435 unique articles for review. Researchers excluded articles that were not explicitly related to digital innovations or the COVID-19 pandemic, resulting in 202 articles for inclusion in the study. Additionally, a targeted search of grey literature from 59 organizations was conducted, yielding

Key Search Terms*

- Education
- Innovation
- Teaching
- Instruction
- Lessons Learned
- Silver Linings

**All searches included the terms COVID, corona, or pandemic to limit results to the most relevant articles.*

41 documents for inclusion in the review. The main types of documents or webpages from the organizational search included lessons learned and recommendations from the experiences of educators, schools, and governmental organizations in education during the COVID-19 pandemic.

Informal Conversations with IB Staff

To gather insights into innovative teaching and learning definitions and practices, informal interviews were conducted in March and April 2022 with 21 key IB staff members. These interviews covered a range of roles and responsibilities within the IB organization and explored perceptions of innovation, examples of innovative practices, and lessons learned from the transitions, especially to the digital environment (see Appendix C for the protocol). Additionally, IB staff who worked directly with schools were asked to recommend up to 10 schools from their portfolio for inclusion in the virtual school visits that they considered to be the most innovative during the pandemic. Conversations with IB staff were intended to assist in identifying schools that were exemplars of innovative practices during the pandemic and to frame our thinking about innovative pandemic-era teaching and learning. These conversations were not intended to be a primary source of information for the study; thus, their data are not incorporated into the results below. For a summary of the conversations with IB staff, see Appendix D.

IB School Virtual Visits

The research team conducted virtual site visits of seven schools recommended by IB staff as exemplars of innovations in teaching and learning during the pandemic. To select schools for participation, the researchers started with the list of schools provided through conversations with IB staff and collaborated with IB staff to identify and select key school characteristics and unique educational contexts that may affect innovations during the pandemic. School characteristics included IB region, IB strand, school type, language of instruction, programmes offered, and years since authorization. Although not included as specific selection criteria, researchers also examined variables related to country dimensions, gross domestic product, electricity quality and supply, digital quality, Internet affordability, and Internet quality. Schools identified by more than one IB staff member were prioritized for inclusion in the study. Figure 2 displays a map of the schools included as part of the virtual school visits; each star represents one school. Given the exploratory nature of this study, the research team prioritized the collection of quality data from responsive schools and conducting a rigorous analysis to derive meaningful insights and findings rather than striving for a comprehensively representative sample. We acknowledge and accept there are notable gaps in the representation.



Figure 2. Map of participating school sites.

Note. Each star represents one participating school (N = 7).

During the virtual school site visits, held in May and June 2022, researchers conducted individual or small group interviews via Zoom or Microsoft Teams. Participants were asked to share their perceptions on characteristics of innovations in teaching and learning, their journey to digital learning during the pandemic, successful strategies and practices, and how they plan to leverage their experiences moving forward. See Appendix E for the IB School Staff Interview Protocol. To analyze the data, the research team collaboratively employed a qualitative coding scheme informed by the literature review and consisting of broad topics and specific themes within each topic. See Appendix F for a summary of school interview data. To organize and bring coherence to the data, researchers applied a **problem-solution framework** (Young, 2014). This approach allowed the research team to thematically identify the key problem areas schools experienced during the pandemic and to group the various innovations schools used to address the problem across all Phase 1 data sources. The framework provided a systematic way to analyze and understand the Phase 1 data and provided structure to the collection of Phase 2 data, enhancing the overall understanding and applicability of the research findings and enabling the research team to draw more meaningful conclusions.

IB School Survey

In December 2022, researchers designed and administered a comprehensive survey of programme coordinators and teachers to collect data on innovative teaching and learning practices. The survey was designed based on the Phase 1 literature review, informal conversations with IB staff, and virtual visits to IB schools. It explored school and teacher experiences with teaching and learning during the pandemic organized around the eight problem areas that emerged from Phase 1, teachers' innovative approaches, and future-focused strategies for post-pandemic classrooms. The IB School Survey can be found in Appendix G of this report.

The survey was administered to a randomly selected sample of 1,300 IB schools that offered at least one IB programme (PYP, MYP, DP, or CP) during the pandemic; special attention was given to representation across different strands, regions, programmes, and languages of instruction. A total of 782 respondents from 223 schools completed the survey, resulting in a school-level response rate of 17.6%. Data were analyzed to identify response patterns and distributions overall and across different regions, strands, and programs. Open-ended questions were thematically coded to uncover key themes and insights. Appendix H presents a summary of the IB School Survey data.

Defining Innovations

Given the focus of this study to understand innovations in teaching and learning during the pandemic, it was extremely important to first define what is meant by *innovation*. In simple terms, **innovation means solving a real problem in a new way**. Specific to education, an innovation is the creation, development, and/or implementation of a new or adapted/modified process or practice with the aim of improving efficiency, effectiveness, and/or achieving greater learning outcomes. Educational innovations can encompass a wide range of developments across different contexts. For some, it may involve leveraging digital tools and online platforms to facilitate remote learning and ensure educational continuity (UNESCO, 2020a). Others may focus on creating innovative strategies to address equity gaps and ensure vulnerable learners are not left behind (OECD, 2020). Additionally, innovations may emerge in the form of creative pedagogical approaches, flexible curriculum designs, or community partnerships that support holistic student well-being (Darling-Hammond, Flook, Cook-Harvey, Barron, & Osher., 2020).

Key Characteristics of Innovations

To assist researchers in framing conversations about innovation and to provide nuance to the innovations schools described, the research team asked IB staff (through the informal conversations) and schools staff (through virtual site visit interviews) about their definitions of innovation. While IB staff conversations were not intended to serve as primary data source, IB staff perceptions of what makes something innovative had a bearing on which schools they recommended for inclusion in the virtual site visit interviews. Additionally, IB educator perceptions of what makes something innovative was important because it influenced what they chose to share during their interviews. As such, insights from IB site visit schools serve as the primary source of information, supplemented by input from IB staff.

According to IB schools, three key characteristics define innovation:

1. Innovation involves doing **something new or improving** upon existing practices in novel ways. It encompasses both major projects and smaller, everyday initiatives undertaken by teachers.
2. Innovations should **address problems, lead to better outcomes**, fulfill needs, or **provide tangible benefits** to students and the learning process.
3. Innovations should be **sustainable over time**, extending beyond passing trends or fads.

Supplementing the insights from IB schools, IB staff provided additional perspectives on innovation. They concurred with the characteristics identified by schools, emphasizing the importance of *uniqueness*. Two IB staff members characterized this by saying,

In education, we are always combining things in different ways, and this can feel innovative even though we aren't doing anything real. ~IB Staff Member

There has to be an element of uniqueness... lots of things that are branded as innovative but it's just the same thing repackaged. ~IB Staff Member

IB schools emphasized that innovations need not be drastic or revolutionary. Instead, they recognized the significance of "big I" and "little i" innovations (Budden & Murray, 2022), with equal importance placed on the transformative projects and the smaller, incremental changes that teachers make daily. These incremental changes contribute to a culture of continuous improvement and innovation within schools. IB staff agreed innovation does not always have to be extensive and noted schools may not even recognize what they did as innovative.

Role of Technology: Technology's role in innovation, as noted by IB schools, is viewed as a facilitator rather than the driving force behind innovation. Digital technologies are recognized for their affordances in supporting inclusive and personalized learning environments. They provide opportunities for students to access resources at their own pace, demonstrate their learning in diverse ways, and engage in collaborative activities. However, IB schools stress **it is the affordances of technology, rather than its mere presence, that enable innovation in the classroom**. Further, technology's role, as acknowledged by IB staff, aligns with the views expressed by schools. Technology is seen as a tool that can facilitate innovation when used with innovative pedagogy. The innovative aspect lies in transforming the learning experience; enhancing student engagement; and fostering meaningful interactions among learners, teachers, and content.

Role of Context: Both IB schools and IB staff recognize context plays a crucial role in determining whether something is considered innovative. IB schools recognize the influence of **diverse factors**, such as **government requirements, regulations, resources**, and **individual experiences with technology**. These contextual factors shape the perception of innovation and the extent to which it can be implemented. However, some schools caution against using context as an excuse to avoid innovation, emphasizing the need to push boundaries and explore innovative practices regardless of contextual constraints.

Role of Subject: When considering the role of subject areas in innovation, IB schools agree **all disciplines have the potential for innovation**. Although some subjects may have a more established history of using technology, innovation primarily focuses on transforming pedagogy and instructional approaches. It involves adopting new teaching methods, incorporating different types of analysis, and exploring alternative modes of student expression. Innovation transcends the content itself by incorporating new approaches to teaching and learning.

Defining Innovations Key Takeaways

Uniqueness and Purpose: Innovation involves creating something new or combining existing elements in unique and unconventional ways. It should have a clear purpose to solve problems, remove barriers, and/or fill gaps in education.

Technology as a Tool: Although technology is seen as a tool that can support innovation, IB schools view it as a facilitator rather than the driving force behind innovation. The focus is on transforming pedagogy and improving the learning experience, with technology serving as a means to achieve those goals.

Context Matters: Context plays a significant role in determining what is considered innovative. Different regions, countries, and schools have varying access, resources, and experiences with technology, which shape the perception and implementation of innovation. However, it is important to push boundaries and explore innovative practices despite contextual constraints.

School Journeys to Digital Learning During the Pandemic

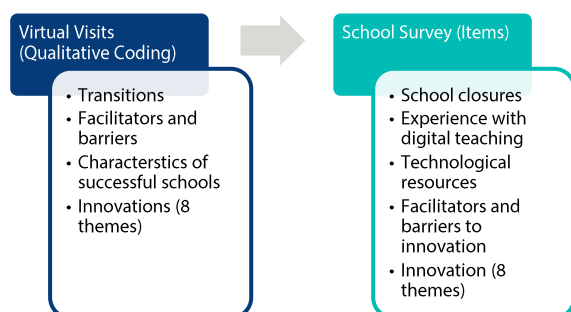


Figure 3. Synthesis of data sources for school journeys.

One goal of this study was to capture the journey of schools and teachers in adopting digital teaching and learning during the course of the pandemic. As shown in Figure 3, IB school journeys were explored in detail in the virtual site visit interviews. Further, the Phase 2 survey queried respondents about their journey of transitioning to digital learning during the pandemic. These survey questions allowed the research team to validate and quantify schools' experiences.

The Transition to Digital Teaching and Learning

During the COVID-19 pandemic, schools worldwide faced the sudden and unexpected challenge of transitioning to the digital environment. **The rapid shift to remote learning** created a chaotic environment for both teachers and students, as they were thrust into a digital landscape without sufficient preparation or training. Teachers had to quickly adapt to new technologies, such as Zoom and Microsoft Teams, and learn how to deliver their curriculum online. As described in the **Phase 1 virtual school visit interviews**, the transition took between two days and two weeks depending on the school, and schools and teachers generally characterized this as a difficult time. Given how quickly schools had to transition, there was limited time for planning. Additionally, schools were required to change protocols frequently to meet new guidelines and emerging needs and demands, and

transitioned among virtual, hybrid, and in-person formats with little notice. Further, it was unclear how long lockdowns and quarantines would last. Based on **Phase 2 survey** responses, there was substantial variation in the length of time schools were closed (see Table 1), with more than a third reporting they were closed for 6 or fewer months and another third reporting they were closed for 10–18 months.

Table 1. Number of Months Schools were Physically Closed During the Pandemic

| | N | % |
|---------------------|-----|-------|
| Less than 3 months | 115 | 14.7% |
| 4 – 6 months | 184 | 23.5% |
| 7 – 9 months | 85 | 10.9% |
| 10 – 12 months | 123 | 15.7% |
| 13 – 18 months | 161 | 20.6% |
| 19 - 24 months | 62 | 7.9% |
| More than 24 months | 10 | 1.3% |
| No Response | 42 | 5.4% |

Schools took different approaches to teaching and learning in the digital environment. Some tried to replicate the face-to-face classroom experience online, while others recognized the need for a different approach. The hours-long classroom sessions were not feasible in an online environment, and teachers had to find new ways to engage students and manage their classes. **Successful schools acknowledged that teachers could not simply mirror their in-person teaching methods in the digital environment.** As one administrator characterized it,

It's not just moving your regular teaching to an online environment, but you need to adapt the lesson as a whole to this new environment. ~ Administrator, Private National, Brazil, Multiple Programmes

Transitioning to digital learning required a paradigm shift for the education system globally. Teachers struggled to reimagine their roles and adapt their teaching methods to the online setting. As one IB teacher noted,

I found that the lack of having to be a manager, the classroom management was so different. It allowed me a lot of time to really not have things get in the way of relationships. So, it was a very different teaching perspective. ~ IB Educator, Public (U.S.), USA, PYP

The majority of educators and students had some familiarity with technology and Internet access but using these tools as the primary vehicles for teaching and learning was a significant adjustment. As shown in Table 2, Phase 2 survey respondents' 5.25 ratings of their level of experience in teaching in a

digital environment increased substantially from ($SD = 2.60$) at the beginning of the pandemic to 7.59 ($SD = 1.82$) three years later on a 10-point scale ranging from *Novice* (1) to *Expert* (10).

Table 2. Level of Experience Teaching in a Digital Environment

| Experience in a Digital Environment | N | M | SD |
|-------------------------------------|-----|------|------|
| Prior to the Pandemic | 755 | 5.25 | 2.60 |
| Three Years into the Pandemic | 774 | 7.59 | 1.82 |

Note. Level of experience teaching in a digital environment was rated on a scale of 1 (Novice) to 10 (Expert).

Although published literature suggests Internet access was a major struggle globally, the IB schools in this study generally reported technology and Internet access to not be significant issues. Many schools had already implemented a common platform before the pandemic or adopted one shortly after transitioning online. Administrators played a crucial role in ensuring teachers had access to necessary technology and in rallying staff around a common platform. Schools with sufficient resources and support were able to navigate the transition more smoothly.

We've been a one-to-one school for a long time and we're quite a privileged school in that we have a big technology budget and kids have wi-fi at home. We're not talking about a disadvantaged school in terms of access to digital learning. ~ Administrator, Private International, Germany, Multiple Programmes

This was also confirmed by the Phase 2 survey responses. As shown in Table 3, schools generally reported moderate overall resource levels ($M = 6.99$ on a 10-point scale from *Poorly Resourced* to *Well Resourced*) before the pandemic. Additionally, most teachers (83.74%) and students (80.52%) had access to technology (e.g., computers, software, Internet) at home.

Table 3. School's Pre-Pandemic Resources and Access to Technology

| | N | M | SD |
|---|-----|-------|-------|
| School's Overall Resource Levels Pre-Pandemic | | | |
| Overall Resource Levels | 736 | 6.99 | 2.32 |
| Percentage with Access to Technology (e.g., Computers, Software, Internet) At Home | | | |
| Teachers | 740 | 83.74 | 20.69 |
| Students | 736 | 80.52 | 23.47 |

Note. Resource levels were rated on a scale of 1 (Poorly Resourced) to 10 (Well Resourced). Access to technology was rated on a scale of 0% to 100% of teachers/students.

Teachers faced challenges in learning new technologies and determining which tools to use among the abundance of options available. They relied on trial and error and learned as they went along, often seeking support from colleagues and sharing resources. Although some teachers were already

familiar with using technology in their classrooms, others experienced significant growth and improvement in their technological skills. IB educators characterized this challenge by saying,

It was a steep learning curve that was both stimulating and stressful at times... but we all grew about 10 years in the first five minutes. ~ IB Educator, Private International, China, Multiple Programmes

We didn't have time. We went back on a weekend and from next week Monday onwards, we just had to start Zoom teaching and Zoom learning. Everything went online within two days. It was like being thrown into the deep side of the pool even when you haven't learned how to swim. It was always trial and error. ~ IB Educator, Private International, India, Multiple Programmes

Some teachers were already using technology in their classes... For those teachers, the gap was a bit shorter. It was easier for them to adjust. For some teachers, we knew that they had a very hard time working. Creating a PowerPoint presentation wasn't easy for them. With those teachers, we saw enormous growth. ~ Administrator, Private National, Brazil, Multiple Programmes

School staff briefly commented on the transition for students:

I think some students really thrived, and some students maybe didn't. And so, there was a real need to personalize, and a real need to connect with learners, and really support their social and emotional learning. ~ IB Educator, Private International, China, Multiple Programmes

IB schools also noted students adapting at varying rates, with younger students generally adjusting more quickly than older ones. Parents also faced challenges with the transition and required support from school coordinators. Educators characterized the transition for parents, saying,

It was a big adaptation that took some time... The families had lots of trouble. Our coordinators worked even more than us because they were talking to parents on the phone and teaching them how to do stuff. ~ IB Educator, Private National, Brazil, Multiple Programmes

I think our teachers did a tremendous job... The feedback that we got from our parents. They would constantly tell us that teachers are doing an amazing job. We would get a lot of feedback, positive feedback from our parents about how hard it is and how difficult it is to get students focused for such long hours. ~ IB Educator, Private International, India, Multiple Programmes

Characteristics of Successful School Transitions

The success of schools in transitioning to digital learning during the pandemic was dependent on a combination of factors including external regulations, school-level resources, school culture, professional development, existing technology use, school leadership, teacher characteristics, and

student and parent characteristics. **These characteristics emerged from virtual school visit interviews with IB schools and should be considered preliminary.** Characteristics of successful school transitions were not explored in the Phase 2 survey and are not presented in a specific rank order. Instead, they are presented in a progression from the broadest external impact on the learner to the most direct internal impact on the learner.

External Regulations: Local regulations played a significant role in the transition to the digital environment. Regulations regarding online hours for students and camera requirements during online classes affected the implementation of teaching and learning strategies. Additionally, contextual factors such as access to computers and stable Internet connections, limited preparation time, varying levels of student technology familiarity, and supportive parents influenced the success of the transition.

School-Level Resources: Well-resourced schools with access to technology and support from IT departments had a smoother transition to digital learning. Having pre-existing resources facilitated the adoption of digital tools and platforms. In addition to these resources, schools needed to address their unique contextual factors, such as student access to technology and resource availability.

School Culture: A positive school culture that fostered teacher and student agency and well-being, growth mindset, and trust enabled schools to be more adaptable to innovation and experimentation in the digital environment. A culture of inquiry and value for innovation provided a context that contributed to a smoother transition.

Professional Development: Schools that prioritized professional development, offered early sessions, and supported online professional development empowered teachers to effectively use digital teaching and learning strategies. This included addressing contextual factors like limited preparation time, which required early professional development sessions to ensure teachers were prepared for the transition.

Existing Technology Use: Schools with prior experience in using digital tools had a less burdensome transition compared to schools starting from scratch. Established technology platforms made it easier to innovate with students. However, the level of student technology familiarity and access to technology were additional contextual factors that needed to be considered.

School Leadership: Strong leadership support from heads of schools and program coordinators was essential for success. Leaders who encouraged innovative thinking and viewed teachers as partners created a supportive environment that enabled experimentation and adaptation. Leadership also played a role in addressing contextual factors such as local rules, access to technology, and resource availability.

Teacher Characteristics: Teachers' comfort with the content area, familiarity and confidence with technology, willingness to experiment, responsiveness to students' needs, and ability to use data-informed successful teaching and learning in the digital environment. Teachers needed to consider

contextual factors such as varying levels of student technology familiarity and access to computers and stable Internet connections.

Student and Parent Characteristics: Students with self-management skills, agency, and familiarity with technology were better prepared for digital education. Parental support and availability to assist children in online learning also played a significant role. However, schools should be aware that parents may have varying levels of availability and familiarity with online learning, which are contextual factors that need to be investigated and supported.

Facilitators and Barriers to Innovation

Throughout virtual school visit *interviews*, educators reported facilitators such as clear communication and support from school leadership and IT departments, flexibility in trying new strategies, instructional support, and increased online communication and feedback from parents. Barriers included fatigue, overwhelming options, assessment difficulties, student engagement, and variations in parent availability for support. These areas were further confirmed through the *survey where respondents were given an opportunity to share the factors that both facilitated and hindered their ability to innovate during the pandemic*. Overall, 384 respondents provided a total of 465 comments to the item regarding facilitating factors, and 365 respondents provided a total of 406 comments regarding factors hindering innovation.

In terms of facilitators to innovation (see Table 4), the access to the tools needed to participate in online teaching and learning (e.g., computers, Internet access, video cameras) and the applications for instructional delivery (e.g., Microsoft Teams, Zoom, video, etc.) was the most reported facilitator by survey respondents. The professional development training and collaboration activities offered or identified by respondents' schools were also noted as effective facilitators to implementing innovative practices during the pandemic. Finally, educators' own perceptions of their experience, creativity, and work ethic were reported as characteristics that allowed them to successfully innovate skills and practices to confront pandemic-related challenges.

Table 4. Top Facilitators and Barriers to Innovation During the Pandemic

| Top Facilitators (N = 465) | Top Barriers (N = 406) |
|--|---|
| Access to technology tools and resources (22%) | Issues with using or accessing technology (29%) |
| Professional development training and collaboration activities (17%) | Teacher and student well-being (14%) |
| Educator experience/ Persistence/Creativity (14%) | Student motivation and engagement (12%) |

Note. N = total comments received for the category. Percentages indicate percent of comments from the total for that specific facilitator or barrier.

In terms of barriers to innovation (see Table 4), by far the most reported category of issues that hindered the implementation of innovation during the pandemic was using or accessing technology needed to participate in online teaching and learning. Educators also noted the strained (physical,

emotional, and mental) well-being of both educators and students had an adverse effect on the participation in and sustainability of online education. Further, the lack of student motivation and engagement was perceived as a significant deterrent to implementing innovative teaching and learning practices to support students in online learning during the pandemic.

School Journey Key Takeaways

Rapid Transition: Schools faced a sudden and unplanned transition to digital learning, causing initial chaos and challenges. The lack of preparation time and sudden shift to remote teaching presented significant hurdles for educators.

Shift in Pedagogy: Successful digital learning required a shift in mindset and pedagogical approaches. Teachers had to adapt their teaching methods to suit the online environment, moving away from traditional classroom practices and finding effective ways to engage students virtually.

Technology Integration: Schools needed to ensure access to technology and provide support for both teachers and students. Technology became a critical tool for delivering instruction, facilitating communication, and managing online learning platforms. Schools had to address issues related to technology access and equip educators with the necessary skills to use digital tools effectively.

Adaptability and Resilience: Educators demonstrated adaptability and resilience throughout the digital learning journey. They had to quickly learn and navigate new technologies, experiment with different instructional strategies, and adjust their teaching based on feedback and student needs. The ability to adapt and persevere was crucial to ensuring the continuity of education.

Importance of Collaboration: Collaboration among teachers, administrators, students, and parents played a significant role in the success of digital learning. Schools fostered collaborative environments where educators shared resources, best practices, and strategies for effective online instruction. Collaborative efforts also involved engaging parents as partners in the learning process and supporting students' social and emotional well-being.

Characteristics of Successful School Transitions: The success of schools in transitioning to digital learning during the pandemic was dependent on a combination of factors including external regulations, school-level resources, school culture, professional development, existing technology use, school leadership, teacher characteristics, and student and parent characteristics.

Key Facilitators and Barriers: Facilitators to innovation during the pandemic included access to necessary technology tools and professional development training, while barriers included challenges in using or accessing technology and the strained well-being of educators and students.

Innovations in Teaching and Learning During the Pandemic

In addition to defining innovations and exploring schools' journeys with the transition to digital teaching and learning, another primary charge of this study was to explore the diverse experiences and solutions implemented during this transformative period. Given the challenges that arose with the sudden shifts in education, schools were given extensive opportunities for innovation as they sought to quickly find solutions to those challenges. The research team conducted a comprehensive analysis, drawing upon the Phase 1 literature review, informal conversations with IB staff, and data gathered through virtual site visit interviews. **To distill the wealth of information collected, a problem-solution framework (see Appendix I) was used to thematically identify the key problem areas schools experienced during the pandemic and organized the identified solutions/innovations into eight distinct themes.** In the following section, we explore the key problems schools experienced as well as the range of solutions with which they experimented and supplement those results with information from the Phase 2 survey, highlighting the innovative approaches that emerged as educators and schools navigated the complexities of digital learning. **These themes have been organized in order of their prevalence based on the frequency of comments coded into each theme from the survey results** (see Figure 4).

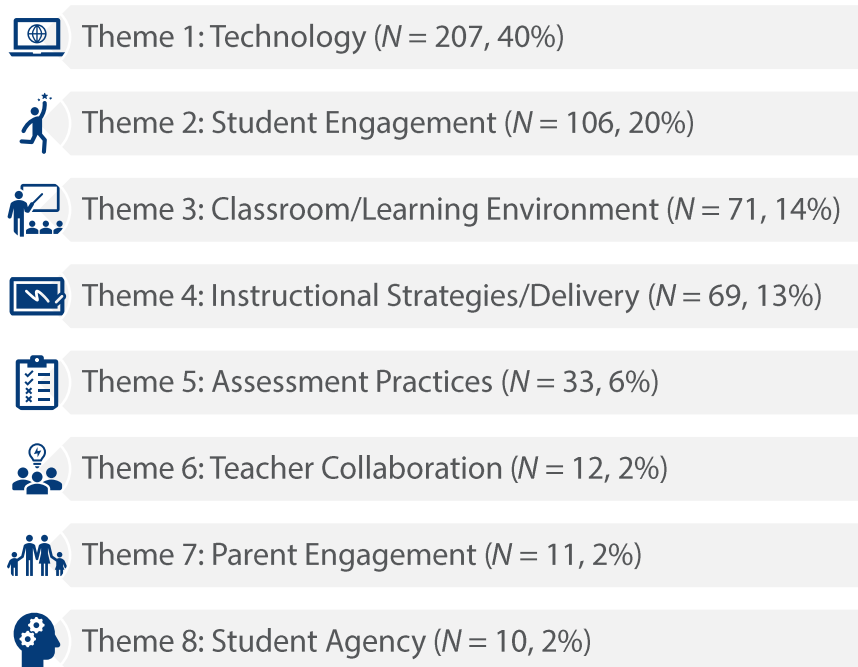


Figure 4. Eight categories of innovations in teaching and learning during the pandemic.

Note. Survey respondents were asked to describe one innovation they would consider the best example of which they were proudest during the pandemic. This open response question was coded for the 8 themes and then rank ordered in this figure. N is the number of respondents who indicated this theme, and the percent is the percentage of those respondents of the total respondents

The sections below are organized by theme. Each section follows the same structure, first presenting the literature review findings, then the virtual site visit interviews, and then the Phase 2 survey. The sections conclude with a key takeaways box that synthesizes the main findings across all data collection sources.

Theme 1: Technology

Technology was both a tremendous obstacle to teaching during the pandemic and, simultaneously, a rich resource that enhanced teaching and learning among those schools that were able to quickly mobilize hardware and software for both teachers and students. Not surprisingly, technology—be it a barrier or a facilitator, an innovation or simply an unwanted but necessary platform for teaching—was discussed extensively throughout the data collection phases of this study. Technology was the foundation for teaching and learning, the vehicle for communication and collaboration, and a hub for assignments and assessments.

Perceptions of Technology from the Literature Review

Shift to Online Learning: One of the largest problems faced by public educators during the pandemic was the technology needed to support a sudden shift to remote or online learning (UNESCO, 2020). Many teachers and students had access to electronic devices such as smartphones, tablets, and computers, which they used for learning purposes. These devices became essential tools for conducting online classes, accessing educational resources, and communicating with teachers and peers (Dennen, Dickson-Deane, Ge, Ifenthaler, Murthy, & Richardson, 2022). To address the challenges posed by remote learning, educators worked tirelessly to provide remote instruction and distribute devices and Internet access to students. They also developed creative teaching strategies and implemented support systems for educators, students, and parents (Bozkurt et al., 2022). Professional development programs and training workshops were organized to equip teachers with the necessary skills and knowledge to navigate online platforms, use educational apps, and facilitate virtual interactions with students (Gibbons, 2021).

Structuring Remote Learning: As schools made the shift to remote learning, virtual classroom technologies such as Zoom, Microsoft Teams, and Google Meet played a significant role in replicating face-to-face engagement through video conferencing. Students could participate in real-time discussions, ask questions, and collaborate on group projects, bringing back a sense of connectedness and interaction. These platforms facilitated synchronous interactions and created virtual spaces for delivering instruction, collaborating with colleagues, and sharing educational resources (Joia & Lorenzo, 2021).

Instructional Delivery: At a higher level, learning management systems (LMSs) like Google Classroom, Moodle, and Canvas offered centralized platforms for organizing course materials, distributing assignments, and providing timely feedback. These platforms streamlined communication between teachers and students, ensuring access to essential resources and facilitating the submission of assignments. Digital assessment tools such as Quizlet, Kahoot, and Formative

revolutionized the student evaluation process, enabling online quizzes, automated grading, and immediate feedback. Teachers could create engaging and interactive assessments to gauge student understanding, further enhancing the remote learning experience (Arnett, 2021).

Importance of Digital Infrastructure: The integration of technology and digital innovations in education during the pandemic empowered schools to overcome the challenges posed by remote learning. It facilitated distance learning, enabled communication and collaboration, and provided access to educational resources. The efforts made by educators to leverage technology in innovative ways contributed to the continuity of education in an unprecedented situation, highlighting the importance of reliable and equitable digital infrastructure in supporting effective remote learning (Price, 2021).

Perceptions of Technology from the Virtual Site Visits

Shift to the Digital Environment: Many of the same themes unearthed from the literature review were confirmed through conversations during our virtual school site visit interviews. Educators elaborated on the extraordinary challenges they experienced as they grappled with the task of transitioning to a fully digital teaching and learning environment. However, despite the initial difficulties, schools demonstrated remarkable innovation in using technology to overcome the obstacles they faced. The abrupt shift to online learning required teachers to **develop and implement tools, strategies, and practices for various subjects and students**. It is important to note that many educators reported how the transition to class in a digital format happened during their break, or for some a weekend, which was time they used to prepare. One IB educator described the transformation, saying,

The true transformation came with the pandemic in which literally in 24 hours, we were teaching all the subjects online. ~ IB Educator, Private National, Mexico, PYP

This exemplifies the speed at which educators had to adapt and find effective solutions to continue providing quality education remotely. Although some schools did find the transition slightly less difficult because they already had some experience with remote/online instruction, the situation was more challenging for schools/teachers where there was less experience with online instruction. IB educators agreed that **being able to make the transition work, even with the initial difficulties and challenges, was an innovation in and of itself**.

Access to Technology: Generally, site visit schools noted that technology and access to the Internet were not substantial issues, and they received adequate support from their administrators and/or school boards. As one educator commented,

I'm very thankful for the [school] board because they were quite generous in their budgeting. So, whatever we needed as teachers whether it was electronic devices or updated versions of laptops or extension to Zoom... I think that way the board was very, very supportive in making sure that the teaching and learning did not stop for the students and teachers. ~ IB Educator, Private International, India, Multiple Programmes

Technological Upskilling: Additionally, the majority of these schools indicated they had implemented a common platform either before the pandemic or shortly after schools transitioned to the digital environment. However, even schools with limited experience in digital instruction rose to the occasion, **recognizing the opportunity to try new approaches**. The following comments highlight the tremendous growth and development educators experienced, rapidly acquiring the necessary skills to navigate the digital landscape effectively.

Everything was learning as you go and trying to fill a need as you saw what was happening online. I was building a plane as I was flying it. ~ IB Educator, Public (U.S.), USA, PYP

My personal pride and joy during the pandemic was really coming from zero to hero technology-wise. ~ IB Educator, Private International, China, Multiple Programmes

Use of Platforms: Online platforms and resources became invaluable tools for educators during this time. The adoption of **centralized communication and collaboration platforms**, such as Microsoft Teams, played a significant role in strengthening internal and external communication. Educators leveraged these platforms to facilitate organized communication and scheduling. Shared folders and documents enabled seamless collaboration and easy access to instructional materials. For example, at a Private International school in India, online weekly diaries were sent to students to provide structure and a sense of routine. Furthermore, the use of technology enabled educators to provide rapid feedback, as seen with the use of Google Docs for real-time work monitoring.

Strengthening Relationships: Technology also played a vital role in **strengthening the relationships among educators, parents, and students**. Schools implemented communication platforms to enhance engagement and provide parents with a better understanding of their children's educational experience. A Private National school in Brazil transformed its entire communication system to enable better communication among all stakeholders. Educators actively sought feedback from parents, fostering improved communication and visibility of teaching practices. For instances, a Private International school in India created an Excel spreadsheet to provide parents with a clear idea of their children's weekly assignments, facilitating conversations at home.

Shared Technological Journey: Despite the physical distance, **educators found themselves united through their shared technological journey**. As one IB educator expressed,

We were able to get stronger as a community by one helping the other, even though we were not physically together. ~ IB Educator, Private National, Brazil, Multiple Programmes

This sense of community and collaboration propelled educators forward, empowering them to navigate the challenges of digital learning with resilience and determination.

Perceptions of Technology from the Survey

Based on the synthesis from Phase 1 findings, survey respondents were presented with four specific innovations related to technology. More than half of respondents (51% to 53%) reported using *three of*

those four innovations during the pandemic, and about a third of respondents (32% to 35%) plan to continue using the top two of these innovations post-pandemic. Figure 5 displays the ranked technology innovations.

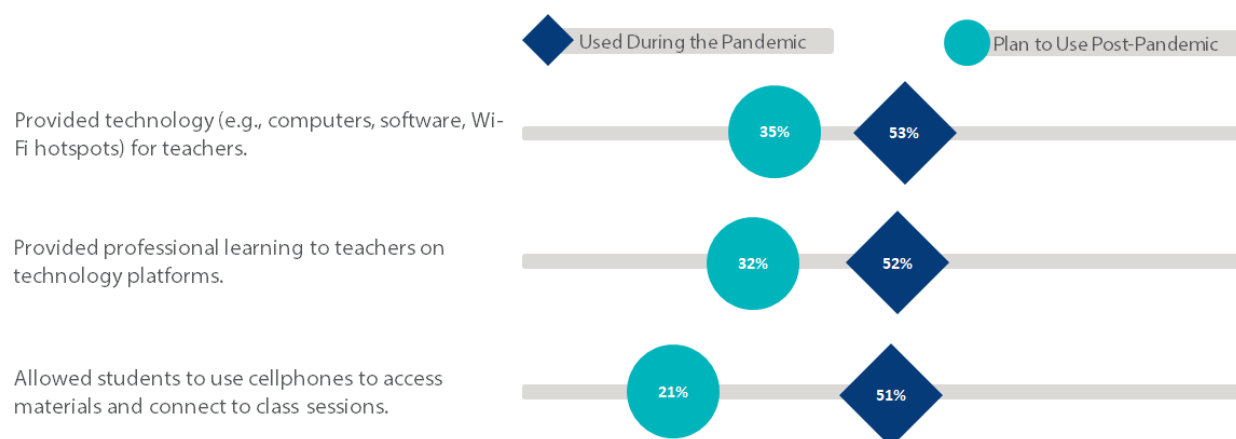


Figure 5. Most common innovative strategies related to technology.

Note. Percents are from total respondents to each innovation listed in the survey. See Appendix H for tables.

Respondents were also given an opportunity to share other technology-related innovations they used during the pandemic in an open-ended item. Overall, *nine* respondents provided comments to this open-ended question. As shown in Table 5 a total of *six* innovations emerged focused on providing access to technology to teachers and students. Notably among these responses is a focus on financial support and flexibility.

Table 5. Emerging Technology-Related Innovations

| Technology-Related Innovations |
|---|
| Allowed teachers and/or students to use their own technology. |
| Implemented a computer loan program for staff and/or students. |
| Provided financial scholarship for students to purchase technology for digital learning. |
| Provided reimbursement to teachers for their Internet bills. |
| Provided a space at school for teachers to work to ensure access to technology. |
| Provided flexible schedules for students who shared technology with other family members. |

Further, respondents were asked to share their **most innovative teaching and learning experience** (or the innovation of which they were most proud) during the pandemic. **Notably, the most commonly reported type of innovation related to technology, which included 40% of the responses.** Teachers shared how their schools were able to ramp up quickly to ensure teachers and students had hardware and software to meet learning needs, with many teachers paying for some applications themselves. In many schools, getting teachers and students trained in and quickly using

communication tools, such as Google Meet and Microsoft Teams, was a source of pride for teachers, demonstrating how quickly everyone pivoted to the online environment. Of the 211 survey respondents who described a technology-related innovation as one that they considered the best example at their school during the pandemic, 41.3% stated the innovation was completely or partially implemented and still in use at the time of survey completion.

Technology Key Takeaways

Dual Role of Technology: Technology served as both a significant obstacle and a valuable resource during the pandemic. It played a vital role in enabling remote learning, supporting effective teaching, and fostering resilience among educators and students during the pandemic.

Technology Access and Training: The sudden shift to remote learning highlighted the challenges faced by educators in terms of access to technology and necessary training. Efforts were made to provide devices, Internet access, and professional development to facilitate remote instruction, and educators rapidly adapted, acquired necessary skills, and embraced the opportunity to try new approaches.

Use of Platforms: Virtual classroom technologies like Zoom, Microsoft Teams, and Google Meet played a crucial role in replicating face-to-face engagement and fostering real-time discussions, questions, and group projects. Learning management systems (LMSs) such as Google Classroom, Moodle, and Canvas provided centralized platforms for organizing course materials, distributing assignments, and facilitating communication between teachers and students. Digital assessment tools revolutionized the evaluation process, allowing for online quizzes, automated grading, and immediate feedback.

Theme 2: Student Engagement

In the digital learning environment, educators dedicated themselves to creating a vibrant and engaging atmosphere that nurtured student involvement. By implementing innovative strategies, embracing technology, and personalizing the learning experience, educators successfully fostered student engagement, ensuring students thrived academically and remained connected with their peers and teachers. Educators became keenly aware that students' well-being and need for connection and belonging needed to be prioritized, along with instructional delivery. The adaptability and resilience demonstrated by both educators and students throughout this challenging period served as a testament to the power of collaboration and the unwavering dedication to education.

Perceptions of Student Engagement from the Literature Review

Building Engagement with a Multimedia Approach: In the transition to remote learning, educators faced the challenge of maintaining student engagement without the physical classroom environment. To address this, they employed various strategies and techniques to enhance motivation and sustain

interest in learning. One effective approach was the integration of interactive multimedia resources into online lessons (Muir, Wang, Trimble, Mainsbridge, & Douglas, 2022). Educational videos, simulations, and virtual field trips were incorporated to provide students with dynamic and immersive learning experiences. These resources used visual and auditory elements to engage students' senses and catered to different learning preferences. By presenting content in engaging formats, educators aimed to capture students' attention and deepen their understanding of the subject matter (Zhang et al., 2022).

Gamifying Instruction: Another strategy employed by educators was the implementation of gamification elements in the online learning environment. By incorporating game-like elements, such as digital badges, leaderboards, and virtual rewards, educators created a sense of excitement, competition, and achievement. These elements served as motivators for students, encouraging active participation and driving them to complete tasks and assignments. Gamification not only made learning more enjoyable but also provided students with a sense of accomplishment and recognition for their efforts (Jia et al., 2022).

Student Collaboration: Collaborative activities played a crucial role in fostering student engagement and social interaction in remote learning. Educators facilitated online group projects, virtual discussions, and peer feedback sessions to promote collaboration and peer-to-peer learning. These activities provided opportunities for students to interact with their peers, exchange ideas, and learn from each other's perspectives. By working together, students developed a sense of community and shared responsibility for their learning, leading to increased engagement and a deeper understanding of the subject matter (Bao, Chen, & Wang., 2021).

Supporting Student Well-Being: In the broader context of the literature review, it is evident that student engagement is a multifaceted concept encompassing both academic motivation and social and emotional factors. Educators recognized the importance of addressing students' social and emotional well-being in the remote learning environment (Albarado, Lauer-Leite, de Oliveira Carvalho, & Vieira, 2022). They sought to create opportunities for virtual socialization, community-building activities, and emotional support services. By nurturing a supportive and inclusive online learning environment, educators aimed to enhance student engagement, foster a sense of belonging, and ensure the overall well-being of their students (Green, 2021).

Perceptions of Student Engagement from the Virtual Site Visits

Student Adaptability and Engagement: Given the sudden transition to an entirely new mode of delivery and instruction for most students during the pandemic, educators marveled at the adaptability and engagement of their students during the challenges of remote learning. **Students embraced new learning methods and actively participated in online classes, demonstrating remarkable resilience and dedication to their education.** As one educator expressed,

I was very proud of the way the kids also pivoted, the way that they jumped in and would try new things. And they stayed engaged. ~ IB Educator, Public (U.S.), USA, PYP

Despite the initial difficulties, educators understood the importance of finding ways to help students navigate the new educational environment, demonstrating resilience and dedication to their education. As another educator noted,

You had to be innovative every single day to get your message across to engage your children and even to make sure that a small amount of learning is happening at the very initial stages because everything had to be revamped... from timetable to how long children could sit, what they could actually understand through a monitor and the teachers being on the other side of the monitor. ~ IB Educator, Private National, Colombia, Multiple Programmes

Strategies to Engage Students: To prioritize student engagement, educators employed various strategies in the online and hybrid learning environment. As much as possible, the online classroom included multimedia instructional materials, incorporating a combination of text, images, and videos to present instruction. **Educators noted that students were often excited to explore and use new online technologies, so they sought out applications and instructional games that would appeal to students.** One IB educator shared,

Having the worldwide web, the Internet, Google searches, I mean, just different platforms, it has opened up a plethora of things for the kids to experience. ~ IB Educator, Public (U.S.), USA, PYP

To combat the challenge of **maintaining student engagement**, a combination of multimedia instructional materials was employed, ensuring a dynamic learning experience. One educator characterized this by saying,

Every 20 minutes, I had to bring something different to keep their attention. ~ IB Educator, Private International, India, Multiple Programmes

Breakout rooms emerged as a valuable tool to foster collaboration and a sense of belonging. By using these virtual spaces, educators encouraged students to actively participate in group activities, discussions, and projects. The collaborative nature of breakout rooms was particularly effective in promoting engagement.

Daily routines provided structure and maintained connections between students and their classmates, fostering a supportive and connected learning environment. One example was offered by an educator,

In my room, we would do classroom job[s]. Each beginning of the day, for example, I'd have somebody present the news, somebody else present the weather or somebody else give a joke. ~ IB Educator, Private International, Germany, Multiple Programmes

These regular activities allowed students to share and connect with one another, maintaining a sense of community within the digital landscape. To further enhance student engagement, educators leveraged the interactive features of communication platforms like Microsoft Teams. The use of virtual backgrounds, engaging stickers, and emojis added an element of fun and excitement to online

interactions. This approach aimed to alleviate feelings of isolation and enhance student motivation. As one educator noted,

By embracing technology and personalizing the learning experience, we aimed to alleviate the sense of isolation and foster active participation among students. ~ IB Educator, Private International, China, Multiple Programmes

Student Well-Being: As the pandemic progressed, many schools began focusing more heavily on student support systems and mechanisms to maintain community and help keep students engaged in their schoolwork. Educators at one school were particularly proud of their work in this area, sharing,

A mentor will take care of the [student] check in every day. However, we also have at least one online video virtual mentoring talk with each student. If we notice any issues, we usually leave comments... to inform the subject teacher, the counselor, and learning support teacher, and some other grade level leaders. I think our student support system is being developed even better during digital learning. ~ IB Educator, Private International, China, Multiple Programmes

Perceptions of Student Engagement from the Survey

Six innovations related to student engagement emerged from Phase 1 work and were included on the Phase 2 survey. The top three innovations selected by respondents are presented in Figure 6. More than half of respondents (51% to 55%) reported using these top three innovations during the pandemic and more than a quarter (26% to 27%) of respondents reported they plan to use two of the innovations post-pandemic. Only a small percentage of respondents (12%) plan to continue to provide students with control of how to participate post-pandemic.

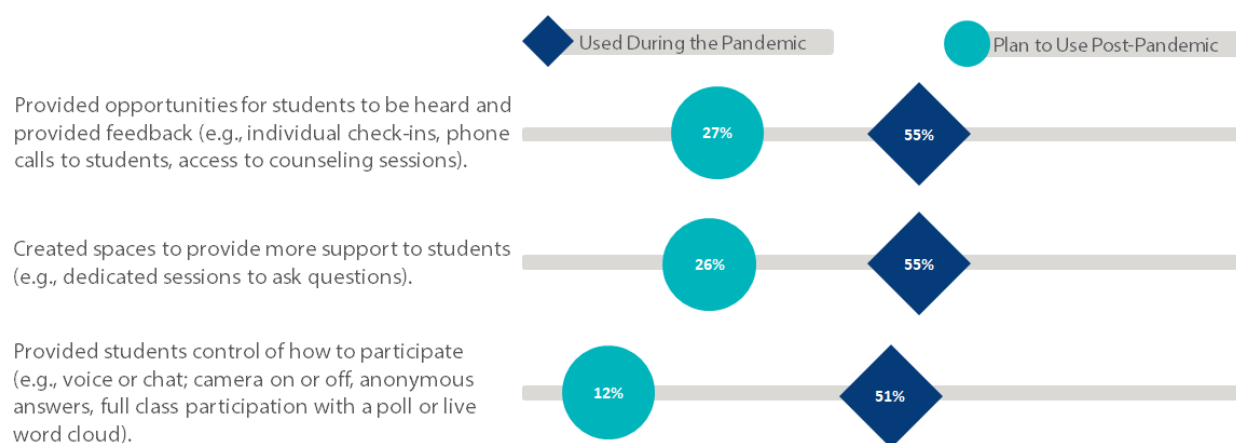


Figure 6. Most common innovative strategies related to student engagement.

Note. Percents are from total respondents to each innovation listed in the survey. See Appendix H for tables.

Respondents were given an opportunity to share other student engagement innovations they used during the pandemic. Overall, 12 respondents provided comments to this open-ended question. Many

of the comments focused on the challenges associated with students’ unwillingness to turn on their camera and microphone. Coupled with the student engagement-related innovations from classroom/learning environment and instructional strategies and delivery comments, *eight innovations emerged* designed to increase student engagement (see Table 6).

Table 6. Emerging Student Engagement Innovations

| Student Engagement Innovations |
|---|
| Use contests and friendly competition to encourage engagement with the content. |
| Allowed students to create and demonstrate classroom activities and games. |
| Provided students with multiple activities that they could do as their homework to review what they learned in class. |
| Provide time and space for students to engage with each other in non-class time (e.g., unstructured time during instruction hours, open breakout rooms during breaks and lunch). |
| Allowed students to develop their own afterschool and lunch clubs. |
| Incentivize attendance and participation (e.g., provided extra credit, allowed students to earn points to "purchase" a reward). |
| Provided opportunities for students to "teach" (e.g., give "how to" presentations on new technologies, host yoga sessions, give guitar lessons). |
| Created a systematic and intentional method for connecting with students and ensuring each student received individual attention (e.g., assigning each student a mentor teacher to discuss problems and get advice/support when needed, calling each student at least once every two weeks to connect). |

Student engagement was the second highest rated type of innovation, with 20% of respondents indicating that an innovation related to engaging students was the one of which they were most proud. Teachers tried in myriad ways to garner and maintain student engagement during remote instruction. Of the 106 survey respondents who described a student engagement-related innovation as one which they considered the best example or that they were most proud of implementing at their school during the pandemic, 60.4% stated the innovation was completely or partially implemented and still in use at the time of survey completion.

Student Engagement Key Takeaways

Multimedia Approach: Educators used a multimedia approach by integrating visual and auditory elements into online lessons. This approach involved the use of educational videos, simulations, and virtual field trips to create dynamic and immersive learning experiences. By presenting content in engaging formats, educators aimed to capture students' attention and deepen their understanding of the subject matter.

Gamification of Learning: Gamification elements were employed to make the online learning environment more engaging. Digital badges, leaderboards, and virtual rewards were used to create excitement, competition, and a sense of achievement for students. These elements motivated active participation and completion of tasks, making learning enjoyable and providing students with a sense of accomplishment.

Collaborative Activities: Collaborative activities played a crucial role in fostering student engagement and social interaction in remote learning. Educators facilitated online group projects, virtual discussions, and peer feedback sessions to promote collaboration and peer-to-peer learning. Through these activities, students had opportunities to interact with their peers, exchange ideas, and develop a sense of community and shared responsibility for learning.

Theme 3: Classroom/Learning Environment

During the pandemic, teachers made significant modifications to classroom and learning environments to accommodate remote and hybrid learning models. Physical classrooms were transformed into virtual spaces using video conferencing tools and learning management systems. Teachers created digital classrooms with organized online resources, assignments, and communication channels. They leveraged technology to deliver lectures, provide instructional materials, and facilitate discussions. Teachers also implemented new strategies to foster engagement and interaction, such as breakout rooms for group work, virtual whiteboards for collaboration, and chat features for real-time communication. These modifications aimed to create a supportive and interactive learning environment that effectively facilitated student learning for diverse populations of students in the face of unprecedented challenges.

Perceptions of Classroom/Learning Environment from the Literature Review

Navigating the New Classroom Environment: The shift to remote learning during the COVID-19 pandemic upended students' access to learning tools and supports. The educational resources required to access remote learning at home varied, with some facing barriers such as limited Internet connectivity, lack of devices, or inadequate learning environments (Bozkurt et al., 2022). The change in the classroom environment presented challenges for teachers, students, and parents alike, who found themselves working, teaching, and learning at home simultaneously. The blurring of boundaries between work and personal life increased the need for flexibility and understanding. Teachers had to

adapt their expectations and recognize the potential distractions or limited support students may have faced at home. Parents, on the other hand, had to juggle their own responsibilities while supporting their children's learning without the necessary training or resources (Carter, 2022). Clear communication channels between teachers, students, and parents became crucial in addressing these challenges and creating a supportive virtual classroom environment.

Structuring the Online Classroom: For teachers navigating the change from face-to-face to the virtual classroom, new ways of structuring a classroom to maximize student learning needed to be implemented. Many teachers employed a mix of synchronous (live) and asynchronous (self-paced) learning approaches to accommodate different schedules and learning needs (e.g., Baran & Baran, 2021; UNESCO, 2020b). This flexibility allowed students to access content at their own pace while still having opportunities for live interactions with teachers and peers. Teachers encouraged virtual collaboration and group work by using online tools and platforms that allowed students to work together on projects and assignments. This approach helped foster teamwork and peer learning despite the physical distance.

Supporting Inclusion in Online Learning: In addition, remote learning highlighted existing inequalities and the need to ensure inclusion for all students, including those with disabilities or special needs. Schools implemented accessibility features in digital tools and platforms to accommodate diverse learning needs (Nowicki, Keller, Bowman, Jaynes, & Squitieri, 2020). Teachers received training to adapt their teaching methods and materials to cater to a wider range of students (Heyworth, Brett, Houting, Magiati, Steward, Urbanowicz, Stears, & Pellicano, 2021).

Successful Strategies for the Online Classroom: The literature review suggests that establishing clear communication and expectations between all stakeholders was vital for establishing a successful online classroom. Successful online classrooms were led by teachers who effectively communicated schedules, assignment instructions, and guidelines for online behavior. Furthermore, providing comprehensive and ongoing professional development for educators was essential in supporting effective online instruction (Arnett, 2021). In the future, teacher professional development topics such as online pedagogy, technology integration, and digital classroom management should be offered to ensure teachers can deliver high-quality online education (Naveed, Muhammad, & Siddiqui, 2022).

Perceptions of Classroom/Learning Environment from the Virtual Site Visits

Adaption in the Digital Realm: The shift to the digital learning environment brought forth a wave of changes in the structure of class sessions. **Educators quickly realized that replicating the traditional classroom experience was not feasible, leading them to adapt their lessons and teaching methods accordingly.** The need for adaptation was emphasized by one administrator who stated,

It's not just moving your regular teaching to an online environment, but you need to adapt the lesson as a whole to this new environment. ~ Administrator, Private National, Brazil, Multiple Programmes

Classroom management dynamics underwent a transformation, prompting teachers to structure the time to focus on building meaningful relationships with their students. An educator reflected on this change, expressing,

The lack of having to be a manager, the classroom management was so different. It allowed me a lot of time to really not have things get in the way of relationships. So, it was a very different teaching perspective. ~ IB Educator, Public (U.S.), USA, PYP

Building Connections: Creating a positive and supportive classroom environment, even in the virtual realm, emerged as a significant accomplishment for educators. They prioritized relationship building and connections with students and helping them feel part of a larger community. One IB Educator highlighted their approach, stating,

Our approach was to make them feel safe [and] welcome. So, I think that is only possible whenever you are in a community, and whenever you feel like you're a part of something else... something bigger. ~ IB Educator, Private National, Mexico, PYP

This sense of belonging and care fostered a conducive learning environment, allowing students to thrive despite the challenging circumstances. Recognizing the importance of establishing clear guidelines for the new learning environment amid so much change, schools placed an emphasis on communication, expectations, and providing additional academic and social-emotional support. One Private National school in Colombia emphasized the crucial role of school management in facilitating this experience, with technology teams playing a significant part in educating both teachers and students.

Enhancing the Digital Landscape: Embracing technology, educators focused on **developing innovative online classes and incorporating new technologies into their instruction. Adapting to the digital learning landscape, teachers transformed their toolkit of classroom strategies to facilitate online and hybrid learning.** Virtual classrooms were created, serving as hubs for evaluation schedules, class meeting links, planners, and various resources. Virtual platforms, such as Flipgrid and Jamboard, were used to promote reflection and engage students actively. The availability of complete sets of classroom materials, including recordings and instructions, proved beneficial for absent students or during remote instruction. Educators recognized the flexibility provided by recording lessons, enabling students to interact with teachers and access learning materials at their convenience. One educator highlighted,

The virtual classrooms allowed us to structure and formalize student access to all the resources of our classes. ~ IB Educator, Private National, Colombia, Multiple Programmes

Rethinking the Physical Environment: The physical classroom environment underwent a metamorphosis as educators curated online exhibitions and used platforms such as Airmeeet to showcase student work. This approach empowered students to confidently present their work and engage in meaningful discussions with their peers. **Teachers and schools also leveraged technology in creating virtual gatherings and live-streamed events that involved students, parents, and the wider community, inviting them into the virtual classroom.** All-school meetings

were transformed into live-streamed events projected onto smart boards in classrooms, allowing everyone to participate from their respective spaces. Staff from two schools—the Public (U.S.) school in the USA and the Private International school in India—implemented hybrid events, such as award ceremonies, to accommodate parents' availability and COVID-19 protocols. These virtual and hybrid events fostered a sense of community and connectedness, ensuring parents could actively participate and be involved in school activities. The shift to online learning opened doors to virtual connections with experts and guest speakers, providing unique learning opportunities that may have been impossible in a traditional classroom setting. Virtual field trips, visits from professionals, and peer partnerships enhanced classroom instruction and fostered engagement. One educator from a Public (U.S.) school in the USA reported how their school invited Black business owners for Black History Month, scientists from the Grand Canyon, and writers from the Pulitzer Organization to visit them virtually, using their Microsoft Teams platform. Fifth-grade students at the same school also participated in a classroom exchange and peer-partnered with a school in Florida for writing "workshops."

Redefining Learning: The experience of digital teaching and learning also underscored the importance of in-person school experiences. Educators were reminded of the importance of interactions and relationships within the school community, and how critical they are for students' social and emotional well-being. This led them to find ways to emphasize the need to balance academic success with the overall well-being of students. **At the same time, educators also recognized that learning can take place beyond the physical building, expressing a desire to support student learning across multiple environments.** One IB educator shared a powerful insight, stating,

A school doesn't need a building... The definition of the school has to change because we were a school and we never came to the building. ~ IB Educator, Private International, Germany, Multiple Programmes

As educators continue to navigate the digital learning landscape, the lessons learned during the pandemic will shape their future practices. Adapting lessons, fostering relationships, creating inclusive environments, and leveraging technology will remain essential elements of the evolving classroom dynamics. By embracing these changes, educators can provide students with supportive and engaging learning experiences, regardless of the learning environment in which they find themselves.

Perceptions of Classroom/ Learning Environment from the Survey

Ten innovations related to the classroom and learning environment emerged from Phase 1 work and were included on the Phase 2 survey. The top three innovations selected by respondents are presented in Figure 7. Again, more than half of respondents (53% to 58%) reported using these top three innovations *during* the pandemic and more than a third of respondents (38%) reported they *plan to use* multiple activities to break up instruction post-pandemic.

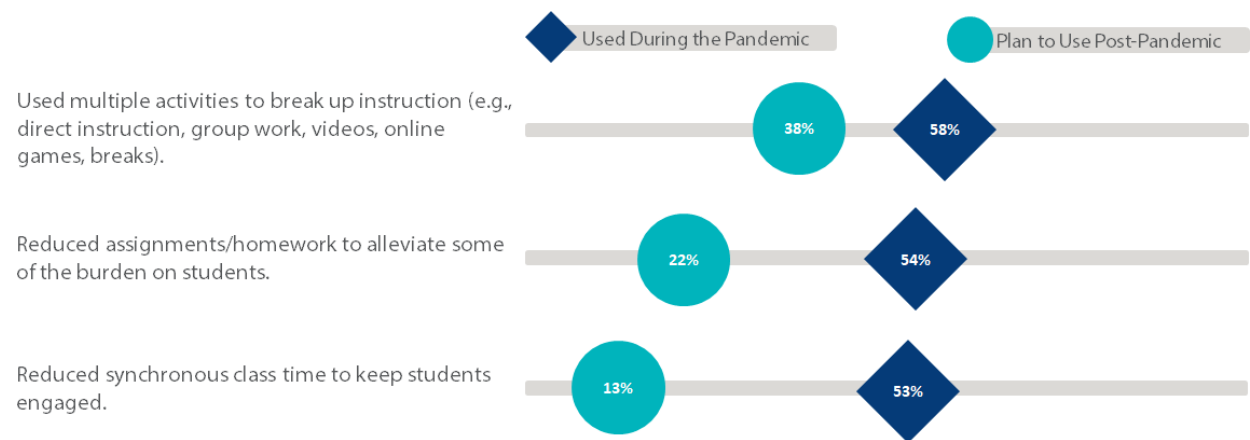


Figure 7. Most common innovative strategies related to classroom/learning environment.

Note. Percents are from total respondents to each innovation listed in the survey. See Appendix H for tables.

Additionally, respondents were given an opportunity to share other classroom and learning environment-related innovations they used during the pandemic. Overall, 12 respondents provided comments; however, most of the innovations shared were aligned with the theme of increasing student engagement (see student engagement section above). Two new innovations emerged from respondent comments (Table 7).

Table 7. Emerging Classroom/Learning Environment Innovations

| Classroom/Learning Environment Innovations |
|--|
| Tracked attendance by activity (rather than overall) using the same digital platform used by the teacher for other class activities. |
| Adjusted schedules, school hours, and office hours to better meet the needs of students. |

When asked about the innovation of which they were most proud, 14% of respondents named a practice relating to the classroom learning environment. Some teachers successfully tried to replicate the physical classroom online to the extent possible to prevent learning loss. Others were proud of their flexibility in breaking down large chunks of lecture time into manageable segments online to maintain student engagement. Of the 73 survey respondents who described an instructional strategy and delivery-related innovation as one which they considered the best example or of which they were most proud to implement at their school during the pandemic, 61.7% stated the innovation was completely or partially implemented and still in use at the time of survey completion.

Classroom/Learning Environment Key Takeaways

Flexibility and Adaptability: Teachers had to adapt their expectations and teaching methods to accommodate the challenges of remote learning. They employed a mix of synchronous and asynchronous learning approaches to cater to different schedules and learning needs. Online tools and platforms were used to foster virtual collaboration, group work, and peer learning, promoting flexibility and teamwork despite the physical distance.

Clear Communication and Expectations: Establishing clear communication channels among teachers, students, and parents became crucial during the transition to online learning. Successful online classrooms emphasized effective communication of schedules, assignment instructions, and guidelines for online behavior. Ongoing professional development for educators, focusing on online pedagogy and technology integration, was essential to support effective online instruction.

Building Relationships and Community: Educators prioritized relationship building and creating a positive and supportive classroom environment, even in the virtual realm. They focused on making students feel safe, welcome, and part of a larger community. Clear guidelines and additional support, both academic and social-emotional, were provided to enhance the learning experience. Virtual connections with experts and guest speakers, as well as virtual gatherings and live-streamed events, fostered a sense of community and engagement.

Theme 4: Instructional Strategies and Delivery

During the pandemic, teachers employed significant modifications to their instructional strategies and delivery to adapt to remote and hybrid learning environments. They incorporated digital tools to deliver content, engage students, and facilitate interaction. Asynchronous and synchronous methods were used to accommodate flexible schedules and ensure student participation. They developed creative approaches such as pre-recorded lessons, virtual discussions, multimedia presentations, and collaborative projects to ensure content delivery, as well as asking students and their families to use household materials as part of their teaching and learning routines. Furthermore, teachers used various communication channels to provide timely feedback, address questions, and offer individualized support. Their adaptability and innovation in modifying instructional strategies enabled them to meet the unique challenges of remote learning and maintain a meaningful learning experience for their students.

Perceptions of Instructional Strategies and Delivery from the Literature Review

Engaging with Technology: Educators worldwide faced the challenge of quickly adapting their instructional strategies and delivery methods to the remote learning environment during the COVID-19 pandemic. This necessitated the exploration and implementation of innovative approaches to ensure effective learning. Various communication apps and platforms were leveraged to improve the connectivity between teachers and students. For example, WhatsApp became a popular choice for

teachers to send assignments, share resources, and provide feedback to students (Lemay, Bazalais, & Doleck, 2021).

Social Media Usage: Social media platforms like Facebook, Twitter, YouTube, TikTok, and Instagram were utilized for educational purposes, enabling teachers to engage students through multimedia content, discussion forums, and collaborative projects (e.g., Khan, Ashraf, Seinen, Khan, & Laar, 2021; Wenzhi, Fang, & Yenchun, 2021). By leveraging these apps, teachers were able to deliver instruction, problems, and solutions to students asynchronously, allowing for flexible learning while maintaining remote guidance and feedback. Additionally, by using high-interest social media platforms, educators fostered student interest and participation, enhancing the learning experience in the remote setting. These platforms fostered communication, collaboration, and interaction among students and between students and teachers, promoting a sense of connectedness in the remote learning environment (Literat, 2021).

Alternate Methods of Instructional Delivery: The use of different media channels expanded the reach of remote instruction, reaching students who may have otherwise been left behind due to digital disparities. To bridge the digital divide and ensure equal access to education, lessons also were broadcast on television and radio in various countries. For example, Kazakhstan implemented televised lessons to reach students across the country, particularly those in remote areas with limited Internet access (Bokayev, Torebekova, Davletbayeva, & Zhakypova, 2020). This approach provided widespread access to education and mitigated the disparities caused by unequal Internet availability. These strategies employed by educators exemplify their adaptability and creativity in leveraging technology and alternative instructional methods to ensure effective learning during challenging times.

Perceptions of Instructional Strategies and Delivery from the Virtual Site Visits

Transition to Digital Delivery: The onset of the pandemic brought about a significant shift in the educational landscape, requiring educators to quickly adapt their instructional strategies to the online environment. Teachers faced a steep learning curve, grappling with new technologies and determining the most effective tools for their teaching needs. **The importance of training and support became evident as educators sought ways to navigate the digital environment successfully,** moving their traditional face-to-face instruction to an online delivery model. An IB Educator reflected on the initial challenges, acknowledging,

We were all handicapped. We didn't know that much... and we had to learn in a very quick way. And it was sort of like fast-forward learning. But that made us more aware of how much we still have to learn. ~ IB Educator, Private National, Mexico, PYP

Despite these obstacles, educators leaned on each other for guidance and inspiration as they sought to find ways to use the digital technologies available to them to deliver instruction to students.

Minimal Loss of Instructional Time: Among the proudest accomplishments of educators during the pandemic was their ability to swiftly transition to online learning without losing instructional time. The

sheer dedication and hard work invested by teachers ensured all aspects of education continued seamlessly. From virtual classes to services and even virtual trips, educators worked diligently to maintain a sense of normalcy. One IB Educator proudly stated,

We didn't miss a single aspect whether it was class, whether it was service, whether it was virtual trips. Everything went as it would have gone in a physical school. ~ IB Educator, Private International, India, Multiple Programmes

This remarkable achievement was made possible through collaboration with school leaders and staff, as well as open communication between schools and families, which played a vital role in facilitating a successful transition and enabling students to continue their education effectively. As one educator stated,

Something that facilitated this whole experience was, I think, the management that the school gave it in terms of trying to maintain clear communication and real expectations of what we could start to explore in our classroom environments, the support of the technology team... because they not only had to educate the teachers, but the students as well. ~ IB Educator, Private National, Colombia, Multiple Programmes

Exploration of Instructional Strategies: The pandemic became a catalyst for the development of innovative online instructional strategies and practices. **Schools embarked on a journey of exploration, seeking different approaches to ensure effective teaching and learning in the digital space.** One of the site visit schools, a Private International school in Germany, recognized the need for a clear policy on digital learning, focusing on a balanced mix of synchronous and asynchronous activities to engage students effectively. Educators were quick to adapt their teaching methods, considering factors such as attention spans and screen time concerns to keep students engaged. Adjustments to class duration and homework assignments were made based on valuable feedback from parents and ongoing research. The Private International school in China went even further, empowering students to create their own learning schedules, providing them with autonomy and flexibility. These innovative instructional strategies and delivery methods enabled educators to deliver high-quality education remotely. Seeking feedback from students played a vital role in enhancing the online learning experience.

Innovative Strategies: In this new era of digital learning, educators embraced innovative strategies that allowed them to adapt to the remote environment. **Leveraging the resources available in students' homes, creativity flourished in learning activities.** Basic materials like onions were used to explore the layers of the Earth, and science experiments were conducted using teachers' home setups. Physical Education teachers guided students to exercise at home using limited resources, documenting their progress through screenshots and dance recordings. One educator stated,

Something that I found much more successful, was designing units to be... basically, here is your at-home task and here is your in-class task and taking advantage of that contact time when you have them in the classroom to prepare them to be able to do things more independently on their own at home for me, at least, was a much more successful hybrid environment. ~ IB Educator, Public (U.S.), USA, PYP

Distance learning provided educators with a unique opportunity to reflect on their instructional strategies and delivery methods. Many educators recognized the benefits of incorporating digital tools and more active learning approaches into their teaching. One educator noted the importance of embedding a variety of instructional materials to keep students engaged, saying,

A combination of things to present instruction with multimedia, that seems to be the best combination to help kids. ~ IB Educator, Private International, China, Multiple Programmes

They acknowledged the expectations of the digital generation of students, who thrive in a technology-rich environment. Leveraging technology not only increased student engagement but also allowed for differentiated instruction. An IB educator highlighted this shift, stating,

It is moving us towards a more active learning environment... with differentiation among students, for example. ~ IB Educator, Private National, Brazil, Multiple Programmes

Content-Specific Strategies: The experience of the pandemic paved the way for a more student-centered approach to education, with technology serving as a powerful tool to empower learners. Across schools, there were many examples of innovative digital tools used to deliver or support instruction. For example, science educators used online simulations and science experiment videos to bring laboratory experiences to their students at home. Mathematics educators described using a variety of online tools, emphasizing that the most difficult part of teaching math(s) online was being able to write out problems and give students feedback on written work. One educator found online graphing tools particularly useful:

We have been able to use the technology in a very effective way, one of them being especially in math[s]... we were using a lot of paper graph for drawing the graphs [in person]... but then during COVID, we were able to use the software or applications such as GeoGebra, Desmos, where they were really able to visualize and also to explore. ~ IB Educator, Private International, India, Multiple Programmes

As educators continue their journey in the digital learning landscape, the lessons learned during the pandemic will shape their future practices. The embrace of innovative strategies, collaboration, and the integration of technology will undoubtedly contribute to a more dynamic and engaging educational experience, fostering the growth and development of students in an ever-evolving world. As one educator reported,

All those tools, I think that has been the biggest innovation that I have done in my class, to use those digital tools for reflections. Super simple, super easy, the evidence remains, the kids love it, they don't get bored, so it's been wonderful. I think it has been what I innovated the most in my class, during and after the pandemic. ~ IB Educator, Private National, Colombia, Multiple Programmes

Perceptions of Instructional Strategies and Delivery from the Survey

Respondents were provided 12 *innovations* related to instructional strategies and delivery. Figure 8 displays the top three innovations respondents selected as having been implemented and will

continue to be implemented. Perhaps unsurprisingly, the highest percentage of respondents (60%) reported providing curated sets of online materials to supplement student learning *during* the pandemic. A little more surprising is that more than a third (37%) of respondents reported they plan to *continue* using this strategy post-pandemic.

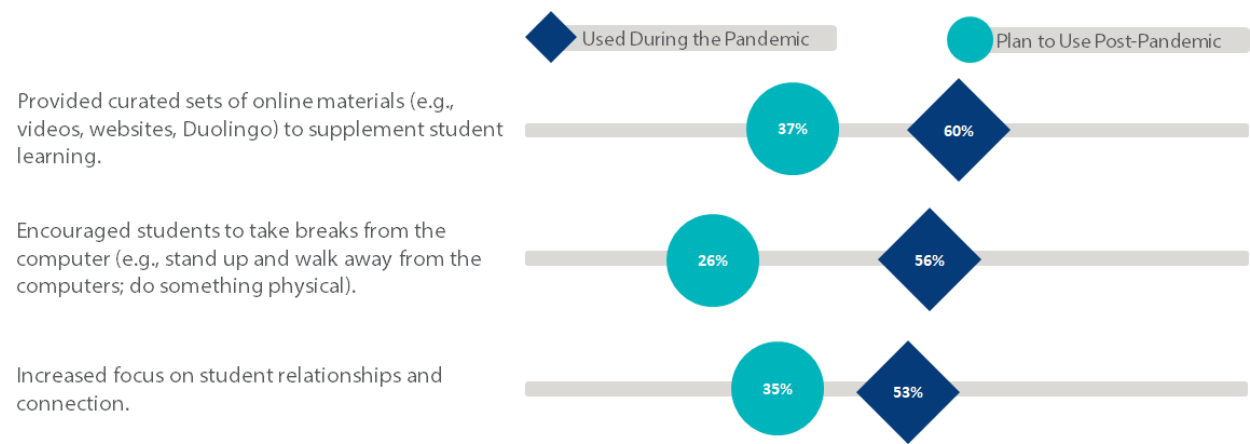


Figure 8. Most common innovative strategies related to instructional strategies and delivery.

Note. Percents are from total respondents to each innovation listed in the survey. See Appendix H for tables.

Nine respondents provided comments; however, most of the innovations shared were designed to increase student engagement (see student engagement section below). As shown in Table 8, two new innovations emerged from respondent comments related to instructional strategies and delivery.

Table 8. Emerging Instructional Strategies and Delivery Innovations

| Instructional Strategies and Delivery Innovations |
|---|
| Used short anonymous surveys at the end of lessons to gauge student understanding, enjoyment, progress, and feedback to inform changes to instruction and delivery. |
| Assembled and couriered lab kits to students to ensure access to all necessary lab equipment and supplies. |

When asked about their **most innovative experience during the pandemic**, 13% of respondents named a new instructional practice. Science teachers spoke of applications to replace in-person laboratory experiments; many teachers mentioned more engaging ways of having students collaborate via online whiteboards. Of the 70 survey respondents who described an instructional strategy and delivery-related innovation as one they considered the best example or were most proud of implementing at their school during the pandemic, 54.3% stated the innovation was completely or partially implemented and still in use at the time of survey completion.

Instructional Strategies and Delivery Key Takeaways

Applications and Social Media: Educators worldwide adapted their instructional strategies by using various communication apps and social media platforms to improve connectivity with students. Apps like WhatsApp, Facebook, Twitter, YouTube, TikTok, and Instagram were utilized for sending assignments, sharing resources, facilitating discussions, and promoting collaboration. These platforms allowed for asynchronous learning, personalized instruction, and enhanced student engagement.

Varied Activities: Educators explored approaches such as a balanced mix of synchronous and asynchronous activities, multimedia instructional materials, student-created learning schedules, and virtual classrooms. These strategies aimed to enhance student engagement, address attention spans and screen time concerns, and empower students with autonomy and flexibility.

Use of Digital Tools: Educators recognized the benefits of incorporating digital tools and active learning approaches into their teaching. Technology facilitated differentiated instruction, increased student engagement, and provided opportunities for active exploration and experimentation. Online simulations, science experiment videos, online graphing tools, and multimedia presentations were used to deliver high-quality education remotely.

Theme 5: Assessment Practices

The shift to remote learning prompted educators to rethink and innovate their assessment practices.

They embraced formative assessment, project-based assessments, and multiple modes of assessment to ensure meaningful and reliable measures of student learning in the virtual environment. The integration of technology further facilitated these assessment practices and enhanced their effectiveness. By adapting their assessment strategies to the remote context, educators aimed to provide students with valuable feedback, foster engagement and reflection, and ensure a comprehensive evaluation of their learning outcomes.

Perceptions of Assessment Practices from the Literature Review

Shifting the Approach to Assessment: During the transition to remote learning, educators faced the challenge of reevaluating their assessment practices to ensure they could effectively measure and evaluate student learning in the virtual environment. Traditional assessment methods, such as in-person exams and quizzes, were no longer feasible or practical. Educators recognized the need for more flexible and diverse approaches to assessment that could accommodate the unique circumstances of remote learning.

Prioritizing Formative Assessment: Formative assessment emerged as a key focus for educators during remote instruction. With formative assessment, the emphasis shifted from simply measuring student performance to providing ongoing feedback and guiding instruction throughout the learning process. Educators used online quizzes, self-assessments, and peer assessments as tools to gauge

student understanding and tailor instruction accordingly (An, Kaplan-Rakowski, Yang, Conan, Kinard, & Daugherty, 2021). These methods allowed for timely feedback, identified areas of improvement, and encouraged student reflection and metacognition. By continuously monitoring student progress and adjusting instruction based on formative assessment results, educators could effectively support student learning in the remote context (Yuan et al., 2022).

Using Project-Based Assessment: Project-based assessments also gained prominence as a valuable assessment approach during remote learning. These assessments provided students with opportunities to engage in long-term projects that required research, critical thinking, and creativity. Students were able to showcase their knowledge and skills in authentic and meaningful ways through these projects. Educators recognized the importance of assessing students' abilities to apply their knowledge and skills in practical contexts, and project-based assessments provided a way to achieve this goal (Yuan et al., 2022).

Evidencing Learning in Different Ways: In addition to diversifying assessment methods, educators emphasized the use of multiple modes of assessment to capture different forms of student expression and understanding. These included incorporating multimedia presentations, videos, and e-portfolios as assessment tools (Vincent-Lancrin, Cobo Romani, & Reimers, 2022). By allowing students to express their learning in various formats, educators aimed to accommodate different learning styles and provide a more comprehensive evaluation of student learning (Zhang et al., 2022).

Leveraging Digital Tools for Online Assessment: Technology played a crucial role in facilitating and enhancing assessment practices during remote learning. Educators leveraged various technological tools and platforms to administer assessments and provide feedback (Lemay et al., 2021). Online testing platforms and learning management systems allowed for secure online exams and quizzes. Screen-sharing and remote proctoring tools helped maintain academic integrity during remote assessments. Video conferencing tools enabled oral examinations and interviews, allowing for more interactive and personalized assessment experiences. Additionally, a variety of digital tools designed for formative assessment gained popularity, providing educators with the means to create interactive quizzes, polls, and surveys that provided instant feedback to students and allowed for real-time monitoring of student progress (Francom, Lee, & Pinckney, 2021).

Perceptions of Assessment Practices from the Virtual Site Visits

Formative Assessment: The pandemic prompted a reimagining of assessment methods, prompting educators to leverage digital resources to enhance the evaluation process. They recognized the importance of providing ongoing feedback in this new learning environment, and so swiftly adapted their assessment practices to new technologies and practices. An IB educator commented,

*For me, it was more easy for me, for example, check the work in real time, because they worked on the Google Doc, give some example, and I can see the work in that moment. ~
IB Educator, Private National, Mexico, PYP*

In addition, many educators actively sought students' input on effective strategies used in other classes.

Student Choice and Individualized Assessment: In the remote learning environment, re-imagining assessment required innovative solutions. Educators used built-in tools in their learning management platforms and online tools like exam.net, Quizzes, and Kahoot, among others. They conducted one-on-one video conferencing to administer standard assessments. However, educators also acknowledged the value of offering diverse options for students to demonstrate their learning and understanding.

Providing choices for assessments increased student engagement and allowed for personalized learning experiences. In describing a literature assignment that included a novel the students were reading, an educator noted the way in which the assignment was personalized:

They were... asked to pick one episode or one small section of the novel, focused on one of the characters they chose and then they had to analyze it from a certain point of view. They were maybe given five ways of doing it and the format also... That way, it was possible to assess them and it was totally individualized and differentiated. ~ IB Educator, Private International, Germany, Multiple Programmes

Teachers encouraged students to evidence their learning through collaborative boards, podcasts, videos, photos, and other creative media. An educator noted,

So what I did learn too, in addition to the use of platforms and others, was to expand the range of products that the children could give me as class work, from videos to the little ones making a piece of music that recreated a story, but they did only with a violin piece, even works done in ceramics of a tremendous introspection exercise, murals, collage, well, what didn't we do! ~ IB Educator, Private National, Colombia, Multiple Programmes

The focus shifted from traditional testing to individualized assessments, fostering meaningful connections with students and nurturing their unique talents and strengths.

Engaging Parents: The transition to remote learning also presented challenges in ensuring transparency and understanding for parents as to how learning was being evidenced and how to use the new assessment modalities. To address this, some schools implemented tools like weekly Excel spreadsheets and brief statements explaining students' weekly tasks. These practices helped parents understand their children's learning progress and provided a foundation for meaningful conversations at home. An educator reported,

I think they [parents] played an important role in assessment because sometimes we would ask them to please print out whatever quiz only to be able to know... Not because of grades honestly, but because we wanted to know whether they were ready to move forward or not. ~ IB Educator, Private National, Mexico, PYP

Reflection on Traditional Assessment Practices: The shift to digital teaching and learning also prompted educators to critically reflect on their assessment practices. **They emphasized the importance of clear learning outcomes and the availability of instructional materials for**

students and families. Educators acknowledged the need to allow students a variety of assignment choices and multiple modes of presentation, as well as, for some, re-thinking how and why work was assigned and assessed. An educator noted,

I do know that [school teams] were responsive to concerns that parents had about all the screen time because initially, we were doing full classes and then I think we cut it down to 40 minutes, maybe... but then it gave kids a longer break between. I think at some point also, they said no homework. I do think that they were pretty good at being responsive. As research came out and as things happened with digital learning, I think they tried to incorporate it as best as they could. ~ IB Educator, Private International, Germany, Multiple Programmes

In the digital learning landscape, assessment practices evolved to embrace innovation, flexibility, and personalization. **Teachers' adaptability and willingness to explore alternative methods ensured that students' learning progress was effectively measured, celebrated, and supported.** The use of digital tools and diverse assessment options allowed for a more comprehensive understanding of student achievements, empowering students to thrive in a remote learning environment. Many educators also noted they would continue to use some of the new assessment technologies with which they became familiar while engaging in digital remote teaching.

Perceptions of Assessment Practices from the Survey

Respondents were presented with three innovations related to assessment practice. More than half of respondents (52% to 57%) reported using these innovations during the pandemic and about a third of respondents (30% to 34%) reported they plan to use the two most relevant innovations post-pandemic. These results suggest that the pandemic had a positive impact on student flexibility and choice related to assessment and the products that students create to evidence learning. Figure 9 displays the ranked assessment-related innovations.

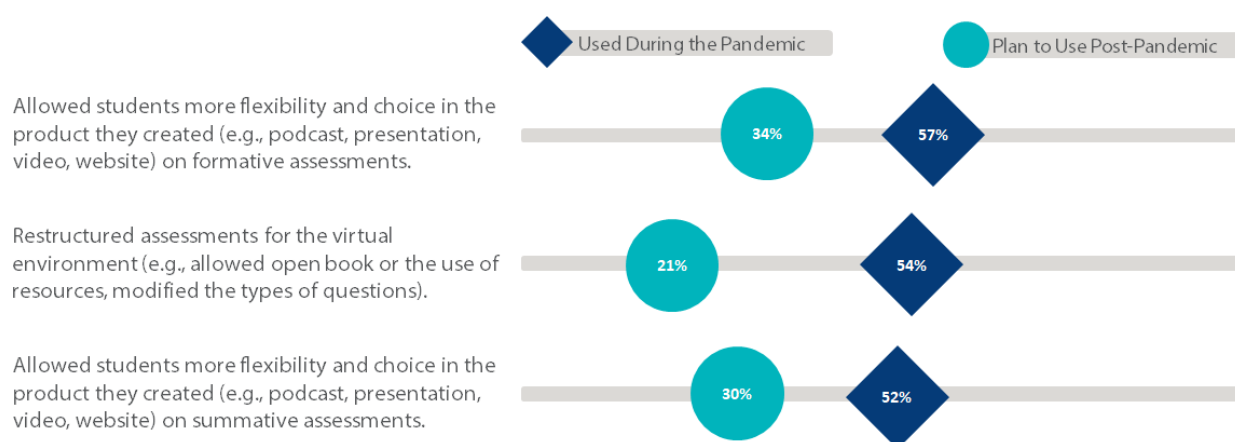


Figure 9. Most common innovative strategies related to assessment practice.

Note. Percents are from total respondents to each innovation listed in the survey. See Appendix H for tables.

Respondents were also given an opportunity to share other assessment-related innovations they used during the pandemic. Overall, *20 respondents* provided comments to this open-ended question. As shown in Table 9, a total of *15 innovations emerged* centering on addressing two main challenges: assessment implementation (5) and academic misconduct (10).

Table 9. Emerging Assessment-Related Innovations

| Assessment-Related Innovations |
|---|
| Assessment Implementation |
| Eliminated summative assessment to focus on keeping the subject area enthusiastic and engaging. |
| Provided flexibility by allowing more time to complete assessments during class and/or by adjusting due dates for submitted work. |
| Conducted online assessments using digital technologies (exam.net, AssessPrep) rather than paper-based exams. |
| Implemented common assessment tools across classrooms to alleviate some of the assessment burden. |
| Implemented assessments for primary students that did not require typing (e.g., multiple choice, audio answers, videos, handwriting and scanning work). |
| Academic Misconduct |
| Created multiple sets of questions (assessment forms) and shuffled the order of the items. |
| Implemented timed assessments to ensure students did not have time to look up answers. |
| Implemented oral exams during class time to prevent cheating and plagiarism. |
| Implemented online exam procedures where students received sealed exam packs and students were monitored online while completing the exam. |
| Used multiple devices/cameras: one to show the student's face and body and the other to show their screen and/or desk area. |
| Increased monitoring by ensuring at least two teachers monitored every assessment. |
| Used software (e.g., Zoom, Teams, AssessPrep) to monitor/invigilate assessments and instructed students to have their camera and microphones on during testing, |
| Used an online testing platform that allowed browser lockdowns and/or used blocking systems to prevent students opening other tabs during the assessment. |
| Used academic honesty software (e.g., Turnitin.com, Page, GoGuardian) to prevent cheating and plagiarism. |
| Conducted training with the school teaching staff to increase ability to detect academic dishonesty. |

Six percent of teachers provided an example of an assessment practice as the best example of an innovation that demonstrated how their school adapted successfully to the pandemic. Many of these practices were related to ensuring academic integrity. Of the 34 survey respondents who described an assessment practice-related innovation as one that they considered the best example or were most proud of implementing at their school during the pandemic, 52.9% stated the innovation was completely or partially implemented and still in use at the time of survey completion.

Assessment Practices Key Takeaways

Emphasis on Formative Assessment: Educators recognized the value of formative assessment during remote learning, shifting their focus from measuring student performance to providing ongoing feedback and guidance. Online quizzes, self-assessments, and peer assessments were utilized to gauge student understanding, identify areas of improvement, and promote student reflection and metacognition.

Rise of Project-Based Assessments: Project-based assessments gained prominence as a valuable approach during remote learning. These assessments allowed students to engage in long-term projects that required research, critical thinking, and creativity. By assessing students' abilities to apply their knowledge in practical contexts, educators aimed to provide meaningful evaluation opportunities.

Multiple Modes of Assessment: To capture different forms of student expression and understanding, educators incorporated multimedia presentations, videos, e-portfolios, and other creative media as assessment tools. By accommodating different learning styles and providing comprehensive evaluations, educators aimed to enhance the assessment process.

Technology-Enabled Assessment: Technology played a crucial role in facilitating assessment practices during remote learning. Educators leveraged online testing platforms, learning management systems, screen-sharing tools, remote proctoring/invigilating, and video conferencing to administer secure exams, oral assessments, and personalized evaluation experiences. Digital tools for formative assessment, such as interactive quizzes and real-time monitoring, were also popular.

Personalization and Flexibility: The transition to remote learning prompted educators to offer diverse options for students to demonstrate their learning and understanding. Providing choices for assessments increased student engagement and allowed for personalized learning experiences. Educators explored alternative methods, adjusted workload and screen time, and fostered student autonomy, empowering students to take ownership of their education.

Theme 6: Teacher Collaboration

In the digital learning landscape, teacher collaboration proved to be an essential source of strength and innovation. By sharing ideas, experiences, and resources, educators collectively navigated the challenges of remote teaching, enriching their professional growth and providing an enhanced learning experience for students.

Perceptions of Teacher Collaboration from the Literature Review

Developing Teacher Collaboration Environments: The shift to remote learning during the pandemic emphasized the importance of increased collaboration among teachers. Educators recognized the need to share resources, ideas, and best practices for successful online instruction. Collaborative platforms and tools such as Google Drive, Microsoft Teams, and learning management systems (LMSs) facilitated real-time collaboration and document sharing, enabling teachers to work together effectively (Bowers, Young, & Glade, 2021). Virtual communities of practice were formed, providing a space for teachers to exchange insights, troubleshoot challenges, and develop innovative teaching strategies (Li et al., 2021). These communities fostered professional growth and mutual support, enhancing collective efficacy in remote teaching.

Sharing Resources and Support: Collaborative lesson planning became a common practice among teachers. They collaborated on designing interdisciplinary projects, creating shared units, and aligning learning objectives across grade levels and subject areas (Li et al., 2021). By leveraging the strengths of their colleagues, educators provided a more comprehensive and engaging learning experience for students. Collaboration extended beyond the school level, as teachers participated in virtual professional development workshops, webinars, and conferences, connecting with educators from different regions and sharing insights on remote teaching practices (Erten, 2022; Songkram & Osuwan, 2022). Teachers shared online resources, lesson plans, and teaching materials through school-based platforms and platforms such as Pinterest, Teachers Pay Teachers, and educational blogs. Social media groups and hashtags dedicated to teaching emerged, providing access to curated resources, and facilitating idea exchanges. Additionally, teachers with more online teaching experiences often acted as mentors and guides for teachers challenged by the new technology requirements of remote instruction (Berry, 2021). Online communities, such as virtual professional learning communities (PLCs), allowed educators to collaborate, share resources, and support one another across schools, districts, and even countries (Hahn, 2020).

Continued Collaboration and Professional Development: The literature review indicated K-12 teachers leveraged virtual collaboration platforms, shared resources online, formed virtual learning communities, engaged in collaborative lesson planning, provided peer observation and feedback, participated in professional learning networks, developed hybrid teaching models, and engaged in collaborative problem-solving to enhance their teaching practices during the pandemic. These strategies and innovations enabled educators to support one another, adapt to new teaching environments, and continue providing quality education to their students. The success of these

strategies suggest that teachers should continue to build their skills and knowledge around effective online pedagogy.

Perceptions of Teacher Collaboration from the Virtual School Visits

Importance of Teacher Collaboration: Teacher collaboration, from the early days of the pandemic, became a cornerstone of success transitioning to and working within the digital learning environment. **Educators, working to find viable solutions to remotely delivering instruction and communications to their students, eagerly shared resources, experiences, and expertise to support one another.** An IB Educator vividly described the collaborative environment, stating,

It was a steep learning curve that was both stimulating and stressful at times... But we all grew about 10 years in the first five minutes. ~ IB Educator, Private International, China, Multiple Programmes

Many schools went through a process of trial and error with using shared technologies at the beginning of the pandemic. **All participating schools eventually found tools that were used to strengthen internal and external communication among users, and to serve as central collaboration tools for distributing/collecting assignments, schedules, sharing resources, and offering student and parent support.** Teachers created "how-to" documents, recorded instructional videos, shared digital tools, and conducted internal training sessions to facilitate the seamless adaptation to online teaching.

Supporting Teacher Confidence: This collective effort bolstered teachers' confidence in using technology effectively. An IB Educator expressed pride in their school community, stating,

I am proud of the way that we communicated what was going on. I'm proud of sticking close to the mission and core values of the school that didn't yield in the way. ~ IB Educator, Private International, China, Multiple Programmes

This collaborative spirit ensured a cohesive and supportive environment, benefiting both educators and students. Teachers for Teachers and the Global Online Academy provided networks where educators could connect, share, and create tools. A music teacher mentioned,

I had a network of music teachers who began to share, create, and share tools. That helped me a lot to have such access [to] virtual instruments, for example, that children who did not have a way to reproduce sounds at home could do so. ~ IB Educator, Private National, Mexico, PYP

Collaborative Learning Spaces: One school, a Private International school in Germany, **emphasized the importance of collaboration and research, understanding that effective strategies required collective effort and learning from one another's experiences.** The exchange of knowledge and best practices enabled schools to develop structured processes for online teaching and learning. Educators met both online and in person, creating spaces to exchange successful practices and navigate technological challenges. One educator noted,

We made it a point that... as educators we meet after school on computer after 4:00 and then exchange ideas. What went well, what was successful, how we can modify our teaching, and if teachers were struggling, then we were having these sessions to help teachers to navigate those technological tools. ~ IB Educator, Private International, India, Multiple Programmes

Collaborative rotation meetings focused on educational technology were established, ensuring personalized support for each team's needs. As one educator explained,

The edtech team would go and meet with all of the teams... to help onboard those new tools. ~ IB Educator, Private International, China, Multiple Programmes

This collaboration fostered a sense of teamwork and enabled educators to rise to the occasion.

Importance of Ongoing Teacher Collaboration: As educators found value in working together, seeking solutions and support from their colleagues, they also expressed a desire to continue connecting and networking with other educators, both within and across schools. This collaboration provided opportunities for sharing experiences and learning from each other's insights. An IB educator highlighted the potential of the IB program to pioneer a shift in education, stating,

I think the IB is well positioned to make that quantum leap of faith and pioneer something that will definitely influence for the benefit of all: education. ~ IB Educator, Private National, Colombia, Multiple Programmes

Perceptions of Teacher Collaboration from the Survey

Respondents were provided *five* teacher collaboration innovations; Figure 10 displays the top three innovations selected by respondents. Perhaps unsurprisingly, the highest percentage of respondents (59%) reported using online platforms to collaborate and share materials during the pandemic. More than a third of respondents (37%) reported they plan to continue using this strategy post-pandemic.

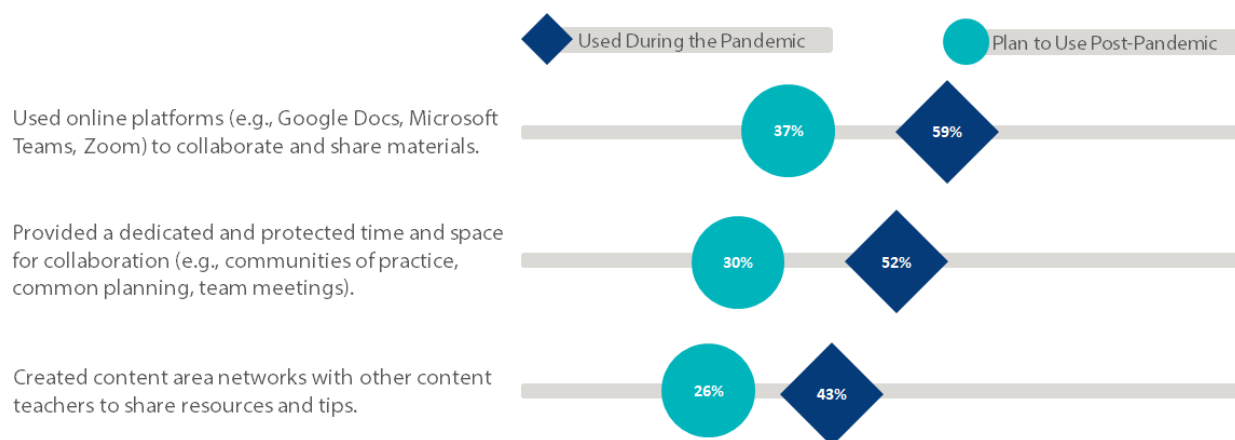


Figure 10. Most common innovative strategies related to teacher collaboration.

Note. Percents are from total respondents to each innovation listed in the survey. See Appendix H for tables.

Further, respondents were given an opportunity to share other teacher collaboration innovations they used during the pandemic. *Six respondents* provided comments for a total of *three* emergent innovations. See Table 10 for a list of emerging teacher collaboration innovations.

Table 10. Emerging Teacher Collaboration Innovations

| Teacher Collaboration Innovations |
|---|
| Provided time and space for teachers to build personal connections and interact with colleagues (e.g., digital lunch breaks, coffee or tea breaks, morning mindfulness breaks). |
| Provided time and space for teachers to share best practices and lessons learned from their digital experiences. |
| Invited external professionals to meet with teachers to share their expertise. |

Two percent of responding teachers cited a feature of teacher collaboration as the most innovative experience they encountered during pandemic teaching. Teachers set up various means to collaborate with each other, both within their schools and with other teachers across the globe. Of the 12 survey respondents who described a teacher collaboration-related innovation as one they considered the best example or of which they were most proud implementing at their school during the pandemic, 41.7% stated the innovation was completely or partially implemented and still in use at the time of survey completion.

Teacher Collaboration Key Takeaways

Increased Collaboration: The shift to remote learning highlighted the importance of collaboration among teachers. Collaborative platforms and tools facilitated real-time collaboration and document sharing, enabling teachers to share resources, ideas, and best practices for successful online instruction. Teachers collaborated on designing interdisciplinary projects, aligning learning objectives, and creating shared units, resulting in a more comprehensive and engaging learning experience for students.

Professional Learning and Teacher Groups: Teachers participated in virtual professional development workshops, webinars, conferences, and networks, connecting with educators from different regions. They also formed virtual groups where they exchanged insights, troubleshoot challenges, and developed innovative teaching strategies. These communities fostered professional growth and mutual support, enhancing collective efficacy in remote teaching. Teachers with more online teaching experience acted as mentors and guides for their colleagues. The groups allowed educators to collaborate, share resources, and support one another across schools, districts, and even countries.

Resource Sharing: Teachers created and shared "how-to" documents, recorded instructional videos, shared digital tools, and conducted internal training sessions to facilitate the seamless

adaptation to online teaching. They shared online resources, lesson plans, and teaching materials through school-based platforms and platforms including Pinterest, Teachers Pay Teachers, and educational blogs. Social media groups and hashtags dedicated to teaching emerged, providing access to curated resources and facilitating idea exchanges. The collaborative environment ensured a cohesive and supportive atmosphere, benefiting both educators and students.

Continued Collaboration and Networking: Educators found value in working together and expressed a desire to continue connecting and networking with other educators, both within and across schools, even after the pandemic. Collaboration provided opportunities for sharing experiences, learning from insights, and supporting each other in navigating the challenges of remote teaching. Teachers recognized the potential for collaboration to drive innovation and positively influence education.

Theme 7: Parent Engagement

During the period of distance and hybrid learning, educators witnessed a significant increase in parent engagement and involvement in their child's education. With parents playing a more active role in supporting their child's learning from home, educators recognized the importance of building strong partnerships with families. They actively sought ways to collaborate with parents, providing regular communication, resources, and guidance to facilitate their involvement.

Perceptions of Parent Engagement from the Literature Review

Increased Communication with Parents/Families: The shift to remote learning demanded a deepening of the partnership between educators and parents, as parents became even more integral to their children's education. Educators recognized effective collaboration with parents was vital in ensuring the success of remote learning and supporting students' academic and emotional well-being. Communication emerged as a cornerstone of parent engagement during this period (Huck & Zhang, 2021). Teachers understood the importance of regular and transparent communication with parents, providing updates on learning objectives, assignments, and expectations. They shared resources, tips, and strategies to help parents navigate the remote learning environment effectively. This proactive communication helped parents understand their role in supporting their children's learning at home and enabled them to provide the necessary guidance and structure (Gibson, 2021).

New Methods of Parent/Family Communication: Technology played a crucial role in enhancing parent involvement. Schools and teachers leveraged digital platforms and tools (e.g., emails, social media, shared schedules, school websites, etc.) to facilitate communication and provide parents with access to learning materials and resources. Parent portals within learning management systems allowed parents to monitor their child's assignments, progress, and attendance. They also provided opportunities for parents to communicate with teachers, ask questions, and seek clarification (Morse, Banfield, Batterham, Gulliver, McCallum, Cherbuin, Farrer, & Calexar, 2022).

Parents/Families as Instructional Collaborators: Educators also recognized the importance of supporting parents in developing the necessary skills and knowledge to effectively support their children's learning. Schools provided resources and training sessions to empower parents to navigate the digital tools and platforms. This support helped parents feel more confident and equipped to assist their children with technology-related challenges and provide academic support (Maggio, Stagnitti, Calatozzo, Cannavò, Bruschetta, Foti Cuzzola, Manuli, Pioggia, & Calabrò, 2021). To facilitate meaningful engagement, educators organized virtual parent-teacher conferences, information sessions, and workshops. These sessions provided platforms for open dialogue, enabling teachers to address parents' questions and concerns and share insights into their child's progress. Collaborative problem-solving took place, with teachers and parents working together to identify strategies for overcoming challenges and maximizing student learning outcomes (Kolak, Markic, Horvat, Klemencic, & Stojanac, 2021).

Supporting Family Well-Being: By fostering strong partnerships with parents, educators aimed to create a cohesive and collaborative learning ecosystem. The active involvement of parents in their children's education during remote learning helped bridge the gap between home and school, ensuring continuity and reinforcing a sense of shared responsibility for student success (Morse et al., 2022). These efforts not only supported academic progress but also contributed to the overall well-being and emotional development of students.

Perceptions of Parent Engagement from the Virtual School Visits

Increased Parent Engagement: The period of distance and hybrid teaching and learning during the pandemic prompted educators to prioritize and strengthen parent engagement. By establishing regular communication, encouraging collaboration, and providing resources and support, educators supported parents to play an active role in their child's education. This increased parent engagement proved invaluable in promoting student success and well-being during challenging times. As an IB Educator aptly described,

The collaboration [with families] is vital and helps us overcome the challenges. ~ IB Educator, Private National, Colombia, Multiple Programmes

Collaborative Approach to Teaching: Collaboration with parents became an integral part of the instructional delivery process. Educators at the Private National school in Mexico encouraged parents to share activities, books, or objects from their homes, fostering a sense of connection and involvement. **Educators recognized the importance of involving parents in the learning process to strengthen the home-school connection and further promote student engagement.** By encouraging students to explore their own homes and use readily available resources for hands-on activities, educators empowered students to take ownership of their learning. One educator highlighted the impact of this collaborative approach, stating,

Involving parents and having them create things at home like homemade Play-Doh or using vegetables for art projects has allowed students to exercise agency in their learning. ~ IB Educator, Private National, Brazil, Multiple Programmes

The Private International school in Germany emphasized the importance of involving parents in presenting the curriculum, using videos to facilitate their participation. As teachers collaborated with parents as an extension of themselves, working together to create a supportive learning environment, it became clear to both educators and parents that they needed to be active members of the educational team. This shift in perspective brought educators and parents closer, working together towards a common goal. One educator highlighted the dedication of school staff in supporting parents during the transition to remote learning by saying,

The families had lots of trouble. Our coordinators worked even more than us because they were talking to parents on the phone and teaching them how to do stuff. ~ IB Educator, Private National, Brazil, Multiple Programmes

Effective Parent Feedback: Teachers and schools encouraged open lines of communication, inviting parents to share their perspectives, concerns, and ideas. This collaborative approach fostered a sense of shared responsibility, with parents and educators working together to support student learning and well-being. **Educators valued parent feedback and incorporated it into their instructional practices, ensuring a more tailored and effective learning experience for each student.** An IB Educator mentioned the positive feedback received from parents:

The feedback that we got from our parents. They would constantly tell us that teachers are doing an amazing job. ~ IB Educator, Private International, India, Multiple Programmes

This acknowledgment from parents highlighted the impact of effective communication and collaboration between educators and families.

Using Virtual Connections: Parent-teacher conferences and virtual meetings were conducted regularly to discuss students' progress, address any concerns, and establish strategies for continued growth. Educators provided guidance and resources to help parents create a conducive learning environment at home, offering tips for managing schedules, promoting self-discipline, and using available technology effectively. **By harnessing the power of technology, educators also provided wider access to school-based events and virtual tours, ensuring that students and parents could participate regardless of their physical location.** These practices proved so effective that educators at multiple schools (the Private National school in Mexico, the Private International school in Germany, and the Private International school in China) expressed their commitment to continuing them with the return to in-person instruction.

Supporting Community Well-Being: Parent engagement also extended beyond academics, with educators recognizing the importance of supporting parents in nurturing their child's social and emotional well-being. They provided resources and strategies for promoting a healthy balance between screen time, physical activity, and family time. By actively involving parents in discussions about their child's holistic development, educators were able to create a more comprehensive and supportive learning environment. An IB Educator acknowledged the importance of emotional support and expressed gratitude for the school's efforts, saying,

I think [School Name] is a supremely special school in managing the emotionality of all of us who are part of the community. It seems to me that this is supremely redeemable because I know that there was a genuine concern and some very nice intentions to help us all in the situation. ~ IB Educator, Private National, Colombia, Multiple Programmes

Perceptions of Parent Engagement from the Survey

Respondents were presented with three parent engagement innovations. More than half of respondents (50% to 56%) reported using two of these innovations *during* the pandemic and almost a third of respondents (27% to 30%) reported they *plan to use* those same two innovations post-pandemic. Figure 11 displays the ranked parent engagement innovations.

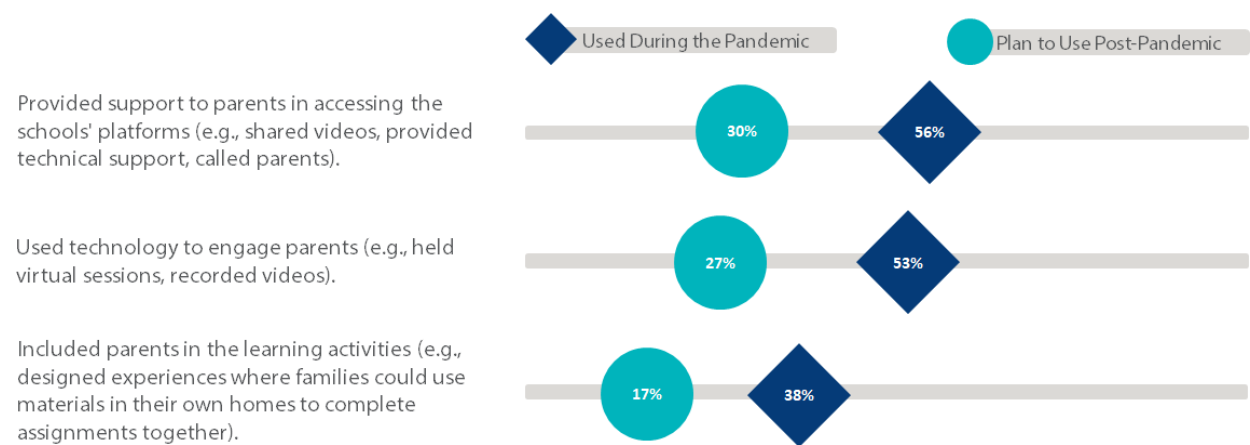


Figure 11. Most common innovative strategies related to parent engagement.

Note. Percents are from total respondents to each innovation listed in the survey. See Appendix H for tables.

Respondents were given an opportunity to share other parent engagement innovations they used during the pandemic. Overall, *eight respondents* provided comments to this open-ended question. Many of the comments focused on the challenges associated with parent engagement, including parents providing too much support (e.g., doing the work for their child) and parents providing too little support (e.g., not assisting younger students, not ensuring students attended class and completed assignments). *Two innovations emerged* focused on parent engagement (see Table 11).

Table 11. Emerging Parent Engagement Innovations

| Parent Engagement Innovations |
|---|
| Provided information to parents on how to set up the best learning environment for their child(ren). |
| Actively discouraged activities that required parental involvement (due to other parent stressors and the impacts on family relationships) and/or designed activities to limit reliance on parents. |

Two percent of teacher respondents to the survey indicated that a practice related to parent engagement was the one that illustrated best the innovation occurring at their school. Teachers

were aware that parents were as isolated as students and that engaging parents was more critical during remote teaching and learning than during non-pandemic in-person instruction. Of the 11 survey respondents who described a parent engagement-related innovation as one they considered the best example or of which they were most proud implementing at their school during the pandemic, 54.6% stated the innovation was completely or partially implemented and still in use at the time of survey completion.

Parent Engagement Key Takeaways

Communication and Collaboration: Educators recognized the importance of regular and transparent communication with parents, leveraging technology and various digital platforms to enhance parent involvement. They provided updates, resources, and guidance to support parents in their role and encouraged open dialogue and collaboration between parents and educators.

Methods of Communication: Technology played a crucial role in enhancing parent involvement. Schools and teachers utilized digital platforms and tools such as emails, social media, shared schedules, and parent portals within learning management systems to facilitate communication and provide access to learning materials and resources.

Parents and Families as Instructional Collaborators: Educators recognized the importance of supporting parents in developing the necessary skills and knowledge to effectively support their children's learning. Schools provided resources and training sessions to empower parents in navigating digital tools and platforms used in remote learning. Virtual parent-teacher conferences, information sessions, and workshops were organized to facilitate collaborative problem-solving and open dialogue between teachers and parents.

Supporting Student Well-being: By fostering strong partnerships with parents, educators aimed to create a cohesive and supportive learning environment. The active involvement of parents in their children's education bridged the gap between home and school, ensuring continuity and reinforcing shared responsibility for student success. Support extended beyond academics to encompass emotional well-being and promoting a healthy balance.

Theme 8: Student Agency

Engaging in online learning during the pandemic facilitated the development of student agency for many students, empowering learners to take ownership of their education. Teachers helped to foster and facilitate self-directed learning, as students had to independently access and engage with educational resources, set goals, and make decisions regarding their learning pathways. They were able to exercise agency by actively participating in virtual discussions, collaborating with peers, and seeking support when needed. Through online learning, many students gained valuable skills in self-regulation, problem-solving, and digital literacy, empowering them to become more autonomous and

proactive learners. As the world continues to evolve, the profound impact of student agency on motivation, engagement, and a lifelong love for learning cannot be overstated.

Perceptions of Student Agency from the Literature Review

Individualizing Student Outcomes: Remote learning presented a unique opportunity for students to develop self-directed learning skills and take greater ownership of their educational journey. With the absence of traditional classroom structures and direct teacher supervision, educators recognized the importance of cultivating student agency to ensure meaningful and effective learning experiences. One of the key aspects of promoting student agency during remote learning was the encouragement of personalized learning plans and goal setting (Ruiz, 2022). Teachers empowered students to reflect on their learning needs, interests, and aspirations, and actively participate in setting their own learning goals. By involving students in the goal-setting process, educators aimed to increase their motivation and sense of ownership over their education. This approach allowed students to align their learning objectives with their individual interests and aspirations, making the learning experience more meaningful and relevant to their lives (Maestrales et al., 2022).

Increasing Student Voice and Choice: In addition to personalized goal setting, students were given autonomy in choosing learning activities and resources that catered to their unique needs and learning styles. Educators provided a variety of options and platforms for students to access educational materials, including digital libraries, online databases, and interactive multimedia resources (Sarioğlu, Rabia, & Altaş, 2021). By allowing students to make choices and explore topics that piqued their curiosity, educators fostered a sense of agency and intrinsic motivation (Heyworth et al., 2021). These approaches recognized the diverse needs and interests of students, allowing them to engage in meaningful and authentic learning experiences aligned with their individual strengths and passions (Avery, Jones, Marr, & Wenmoth, 2021).

Connecting Student Collaboration and Agency: Furthermore, the promotion of student agency in remote learning environments emphasized the importance of providing opportunities for collaboration and peer interaction. Educators encouraged innovative collaborative activities such as online group projects, virtual discussions, and peer feedback sessions (e.g., Mohammad-Roe, & Tørnby, 2023). By engaging in collaborative work, students had the opportunity to learn from and with their peers, share their ideas, and develop their social and communication skills. These collaborative experiences fostered a sense of community and shared responsibility for learning, further enhancing student agency (Arnett, 2021).

Continuing the Emphasis on Student Agency: It is important to note that the promotion of student agency and self-directed learning is not limited to remote learning contexts but has broader implications for educational practices. These strategies can be adapted and implemented in hybrid and face-to-face learning environments to empower students and create more student-centered and inclusive classrooms (Cole & Coulson, 2022).

Perceptions of Student Agency from the Virtual Site Visit

Empowering Student Autonomy: In the digital learning environment, many students were given the opportunity to exercise autonomy and make decisions about their learning journey, as remote learning often included asynchronous instruction and as teachers modified the assessment practices to include more diversity in assignment and evaluation choice. **Students embraced the challenges of digital learning and took charge of their own education, demonstrating a remarkable ability to manage themselves.** The Private International school in China empowered their students by providing them with the freedom to create their own schedules and take ownership of their assignments and time management. The educator further explained the impact of this approach, stating,

That was very much an innovation letting students get on with... having a front-loaded [system] and then giving them their own time and autonomy to decide when and how they do it and how they chunk their time between the initiation [of the assignment] and the product delivery. ~ IB Educator, Private International, China, Multiple Programmes

Another IB educator highlighted this, stating,

Kids really had a deeper understanding and could grasp their own learning... They step out and take charge of their own independent learning. ~ IB Educator, Public (U.S.), USA, PYP

This emphasis on student agency not only fostered independence but also contributed to the overall growth and development of the learners.

Encouraging Self-Directed Learning: The remote learning landscape provided a unique platform for promoting student agency. Students had the freedom to access resources, follow instructions, and navigate their classwork independently through virtual platforms and digital tools. **By providing students with a living agenda containing real-time information, instructions, and resources, educators facilitated a learning experience that encouraged self-direction.** This availability of resources and the ease of navigation were key factors that empowered students to engage actively in their own education.

Importance of Educator Guidance: The shift towards student agency not only empowered students but also highlighted the significance of ongoing guidance and support from educators. Teachers played a crucial role in providing feedback and opportunities for self-reflection to support students in their independent learning journey. This approach fostered a sense of responsibility and self-motivation among learners. As one educator observed,

[Students] took ownership of their own learning... That again, helped them to be responsible learners. ~ IB Educator, Private International, India, Multiple Programmes

By embracing student agency, educators created a culture of independent and self-directed learning that will continue to shape students' educational experiences beyond the remote digital learning era.

Perceptions of Student Agency from the Survey

Similarly, respondents were presented with three innovations related to student agency. More than half of respondents (52%) reported allowing students flexibility in timelines so that students could work at their own pace during the pandemic, while only a quarter of respondents (25%) indicated they allowed students to control their own schedules during the pandemic. Further, respondents plan to continue using these strategies at lower rates than other strategies (10% to 21%). Figure 12 displays the ranked student agency innovations.

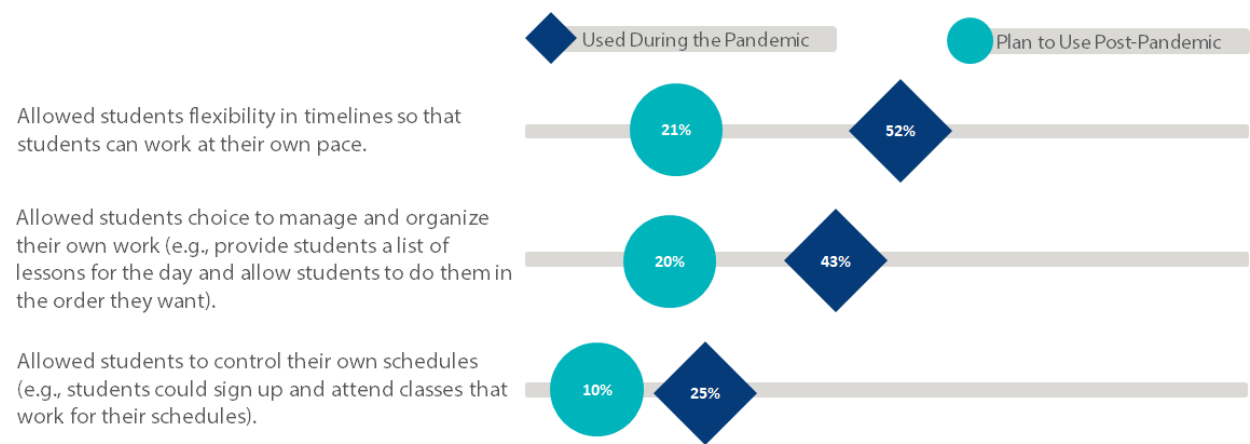


Figure 12. Most common innovative strategies related to student agency.

Note. Percents are from total respondents to each innovation listed in the survey. See Appendix H for tables.

Additionally, respondents were given an opportunity to share other innovations they used during the pandemic to facilitate student agency. *Five respondents* provided comments to this open-ended question. As shown in Table 12, *three innovations emerged* designed to increase student agency.

Table 12. Emerging Student Agency Innovations

| Student Agency Innovations |
|--|
| Provide presentations to students on topics related to self-agency (e.g., motivation, self-regulation, and autonomous learning). |
| Provided time and space for students to receive individual feedback from teachers. |
| Eliminated deadlines or provided flexible deadlines/extended time to give students more ownership of their work. |

Although 2% of teachers mentioned a practice related to student agency as the one that served as the best example of innovation, their comments centered on striving to help students develop the sense of agency with which many struggled during pandemic learning. Of the 10 survey respondents who described a student agency-related innovation as one they considered the best example or of which they were most proud implementing at their school during the pandemic, 70.0%

stated the innovation was completely or partially implemented and still in use at the time of survey completion.

Student Agency Key Takeaways

Development of Student Agency: Online learning during the pandemic provided an opportunity for students to take ownership of their education and develop self-directed learning skills. Students actively engaged with educational resources, set goals, and made decisions about their learning pathways, which empowered them to become more autonomous and proactive learners.

Personalized Learning and Goal Setting: Educators recognized the importance of promoting student agency during remote learning by encouraging personalized learning plans and involving students in the goal-setting process. By aligning learning objectives with students' individual interests and aspirations, educators aimed to increase motivation and a sense of ownership over their education.

Autonomy and Choice: Students were given autonomy to choose learning activities and resources that catered to their unique needs and learning styles. This approach recognized the diverse needs and interests of students, fostering a sense of agency and intrinsic motivation.

Role of Educators: While student agency was emphasized, the significance of ongoing guidance and support from educators was highlighted. Teachers played a crucial role in providing feedback and opportunities for self-reflection to support students in their independent learning journey. This approach fostered a sense of responsibility and self-motivation among learners, creating a culture of independent and self-directed learning.

Conclusions

This study sought to capture (a) the journey of schools and teachers in adopting digital teaching and learning during the course of the pandemic; (b) the digital learning engagements and teaching strategies that could be further investigated to be scalable, transferable, and effective for teachers, students, and schools; and (c) the future-focused strategies and promising practices teachers may consider bringing into their schools and classrooms post-pandemic.

Major Takeaways

The COVID-19 pandemic had a significant impact on education worldwide, leading to several big-picture takeaways. Here are some of the key insights gained from this study on digital innovations in teaching and learning during the pandemic.

The pandemic **accelerated the adoption of technology in education**. Schools and educational institutions rapidly transitioned to online learning, using various digital tools and platforms. This shift

highlighted the importance of technology in education and the need for improved digital infrastructure and access for all students. The affordances and challenges associated with the rapid adoption of new technologies are interwoven into every aspect of this study. Across focus groups and confirmed in the survey data, all educators noted the reliance on and increased use of technologies in all forms. Both the top facilitator (Access to technology tools and resources; 22%) and top barrier (Issues with using or accessing technology; 29%) to innovation during the pandemic related to the use of technology for teaching and learning. Teachers in this study were both proud and frustrated by technology issues, but the fact remains that technology played a critical role in pandemic teaching. The pandemic also exposed and exacerbated existing educational inequities. Not all students had equal access to devices, reliable Internet connectivity, or supportive learning environments at home. This highlighted the urgent need to address the digital divide and ensure all students have equal opportunities for learning. Teachers and school staff also did not always have access to the tools needed to provide teaching and learning from a remote standpoint, suggesting schools should consider evaluating their own digital infrastructure and access. Schools in this study, as with so many others across the globe, not only deployed and implemented a multitude of technology innovations simultaneously, many are planning to continue using a number of innovative technology solutions to enhance teaching, learning, and communications with families.

With the rapid adoption of new technologies to support remote learning, both teachers and students had to **quickly develop the skills necessary to navigate and use multiple online platforms and applications**. The steep learning curve was a source of frustration and pride for teachers. Both students and teachers gained valuable digital skills from this experience, often to the teachers' own surprise. Students became more proficient in navigating digital platforms, collaborating online, and managing their digital resources. Teachers developed new competencies in delivering online instruction, creating digital content, and using educational technology effectively. Survey results indicated 13% of responding teachers named a new instructional practice as the most innovative instructional strategy and delivery experience during the pandemic. These digital skills will continue to be valuable in the evolving educational landscape.

The challenges posed by the pandemic **encouraged teachers to think creatively and develop innovative teaching approaches**. Educators explored new instructional and classroom management strategies, incorporated multimedia resources, and leveraged online platforms to engage students. More than half of educators surveyed reported using new strategies to structure their online classroom environment, including breaking up the delivery with multiple activities and reducing both assignments and screen time to alleviate the burden on students. These innovative practices can enrich teaching and learning even in traditional classroom settings. Further, the pandemic highlighted the potential for collaboration and knowledge-sharing among educators globally. Teachers and schools connected across borders to exchange experiences, resources, and best practices. Maintaining and encouraging this level of educator interconnectedness can continue to foster innovation and enhance education in the post-pandemic era.

In parallel with the opportunities afforded to increase collaboration and use of varied technological tools, this period of remote learning also provided **opportunities for personalized learning**

experiences. Students could access a variety of online resources, choose their learning pace, and explore topics of interest. This individualization allowed students to take ownership of their learning and pursue their passions, fostering a deeper level of engagement. An emphasis on personalized learning recognizes that students thrive when they have agency over their own education. Further, remote learning provided opportunities for students to have more choice in their assignments and projects. Educators designed flexible assignments that allowed students to explore topics of interest or pursue inquiry-based projects aligned with their passions. Virtual school visit interviews confirmed that educators were impressed with students' ability to embrace their independent learning opportunities and survey results indicate many of these opportunities will continue to be offered to students. Student choice promotes engagement and deeper learning by tapping into individual interests and motivations.

The pandemic reinforced for the education community the social-emotional value of in-person learning. However, educators also realized that online learning allowed students to access education from anywhere, overcoming geographical barriers. Students who previously faced challenges attending school due to distance, health issues, or other circumstances could continue their education remotely. Many educators in this study noted that having the materials from their classes available online at any time would be a boon to their students, regardless of the mode of delivery. This **increased access to education** has the potential to bridge gaps and provide opportunities for learners who were previously underserved, and to provide new and innovative experiences for all learners.

The pandemic emphasized the importance of **prioritizing students' social and emotional well-being.** School closures, remote learning, and disrupted routines took a toll on students' and teachers' mental health. Educators recognized the need to support students' emotional needs and develop resilience-building strategies, both for themselves and their students. Based on the results of the survey, the majority of respondents used a variety of innovative strategies to increase student well-being, including individual check-ins, mentoring and counseling, and generally creating spaces where the focus was on connection rather than solely on teaching and learning. Educators prioritized students' mental health, providing resources, guidance, and counseling services. In schools that successfully navigated the pandemic, modes of communication between school and home expanded, with teachers reaching out far more frequently to ensure their students' emotional health and continued engagement. This increased awareness and support for mental health issues in education serves as a reminder of the importance of relationships and can contribute to more holistic approaches to student well-being.

Remote learning during a time of the physical and emotional vulnerabilities caused by the pandemic highlighted the **importance of collaboration and communication between schools and families.** More than half of educator survey respondents reported increasing direct family supports and communication methods during the pandemic, and both virtual school visit interview and survey data suggest schools plan to use similar family engagement innovations post-pandemic. Parents became more involved in their children's education, supporting remote learning and actively engaging with teachers and providing valuable feedback. As stated previously, teachers and others at the school

reached out more proactively to learn students' stories and environments to ensure students were known and valued, and their efforts to continue learning were actively encouraged and celebrated. The strengthened partnerships and recognition of the importance of parent and community engagement between schools and families can have long-lasting positive effects on student success.

This study emphasized the remarkable transformation schools underwent during the pandemic, driven by necessity and resulting in several years of innovation. However, it also highlights a **potential boomerang effect** given the weariness among educators and their desire to return to a sense of normalcy. Although survey respondents reported that several individual innovations developed during the pandemic would remain in use post-pandemic, the overall trend indicated many of the new strategies for digital teaching and learning used during the pandemic would not be continued post-pandemic. This suggests schools may be inclined to revert to a "business as usual" approach without fully considering what they have learned and gained from the pandemic. The data patterns indicate that schools and teachers may overlook valuable lessons and opportunities to retain and capitalize on the beneficial changes that emerged during this challenging period.

By embracing the lessons learned from this unprecedented and challenging global event, and through an exploration of successful experiences and innovative practices, this study sought to highlight for school administrators, teachers, and other stakeholders the factors that optimized the advantages realized from digital education, ensuring quality learning experiences for all students. Ultimately, the data revealed valuable insights and practical strategies to maximize the potential of digital innovations in education. Further, this research endeavored to provide information for the IB community, highlighting promising practices that have emerged from the pandemic that can be used to develop and encourage discussion and reflection. By celebrating the triumphs achieved during these testing times, the hope is to inspire a collective commitment towards harnessing the positive pandemic-induced transformations that can be found in teaching and learning online, potentially revolutionizing education and fostering a brighter future for students around the globe.

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Appendices

Appendix A: Research Questions

1. What was the school's journey with digital teaching and learning over the course of the pandemic?
 - a. How do schools define innovative digital teaching and learning that is reflective of their context?
 - b. How did the COVID-19 pandemic affect the development of schools' digital learning landscape?
 - c. What specific needs drove this experience? (i.e., increased student collaboration, personalization to student special educational needs, facilitating parents' preparation for homeschooling)
 - d. How prepared were schools and teachers to make the shift to digital teaching and learning?
 - e. What are teachers' perceptions of the digital competence, non-teaching staff and leadership influences that contribute to successful experiences?
 - f. What are teachers' perceptions of parents and student views of digital teaching and learning?
 - g. What are teachers' perceptions of the tools and platforms they have or had to develop?
2. What developments in teachers' digital teaching and learning strategies and practices worked well?
 - a. What made digital teaching and learning experiences work well?
 - b. What positive changes were noticed in teachers, students and schools?
 - c. What is the set of factors that were most important to making the experience of digital teaching and learning so positive?
 - d. What were some lessons teachers learned based on digital teaching and learning experiences that didn't work well?
3. What will teachers and schools do in the future with their experiences of digital teaching and learning to continually improve and strengthen learning for their students?
 - a. What digital teaching and learning strategies and practices are worth continuing in the future?
 - b. In which aspects of their context would teachers see requiring digital teaching and learning solutions?
 - c. What types of student learning outcomes could benefit from digital teaching and learning in the future (knowledge, skills, attitudes, values)?
 - d. What would teachers' like to see their schools do to support them in digital teaching and learning?

4. What are students and parents' perspectives of the digital teaching and learning that occurred during the pandemic?
 - a. How do parents and students think about innovations in digital teaching and learning (as identified by the teachers and schools)?
 - b. What helped parents and students to make the shift to digital teaching and learning?

Appendix B: Technical Methodology

To address the research questions, Inflexion researchers are employing an exploratory sequential multi-method design rooted in appreciative inquiry and narrative and story-based methodologies (Reed, 2006, Ye & Oxendine, 2019). This study consists of two phases. In Phase 1, the research team explored teacher and school experiences with digital teaching and learning during the pandemic. In Phase 2, we broadly captured the innovative and promising practices of digital learning and the contextual factors influencing their adoption in IB schools. Collectively, the results will contribute to comprehensive recommendations and considerations.

Phase 1: Exploring: Teacher & School Experience Stories of Digital Teaching & Learning

Phase 1 of this study sought to understand the state of schools’ digital landscapes and how these changed during the pandemic, and to capture descriptive details about what worked well and why. It consisted of three primary components: a targeted literature review, informal conversations with IB staff, and virtual visits to selected IB schools. Each component is described in detail below.

Targeted Literature Review

Inflexion researchers conducted a mixed methods targeted literature review (Grant & Booth, 2009) to capture the range of innovative digital teaching and learning practices in academic and grey literatures. Borrowing from our systematic literature review process, we developed working definitions for key terms (see Table B1). These working definitions were written to consider the perspectives being centered and allow for variability in innovations (e.g., what is innovative in Asia may not be in Europe).

Table B1. Working Definitions of Key Terms

| Working Definitions of Key Terms |
|--|
| <p>Innovation:</p> <p>In simple terms, innovation means <u>solving a real problem</u> in a <u>new way</u>. Specific to education, an innovation is the <u>creation, development, and/or implementation of a new or adapted/modified process or practice</u> with the aim of <u>improving efficiency, effectiveness, and/or achieving greater learning outcomes</u>.</p> <p>In the world of education, innovation comes in many forms. There are innovations in the way education systems are organized and managed; innovations in the way teachers are recruited, prepared, and compensated; and innovations in instructional techniques or delivery systems that relate to school and community engagement as well as classroom/course instruction.</p> |

Working Definitions of Key Terms

Digital/Technology/Distance/Virtual/Remote/etc.:

Digital or virtual learning is any type of learning that is accompanied by technology or by instructional practice that makes effective use of technology.

Hybrid/Blended/Multimodal Learning:

Hybrid or blended learning is an approach to education that combines the use of technology or online educational materials and opportunities with transitional in-person classroom methods. This could be a situation where all students attend class in-person part of the time and virtually the other part of the time. Alternatively, this could be a situation where some students attend class in-person while other students join the class virtually, and educators teach remote and in-person students at the same time.

Strategy (General):

A strategy is a simple tool used to accomplish a task. Strategies are processes that when matched to task requirements, improve performance. Essentially, strategies allow a person to do things better, easier, and/or quicker.

Instructional/Teaching Strategies (Teacher Focused):

Instructional/teaching strategies are methods that teachers use to deliver course material in ways that keep students engaged and allows students to practice different skill sets. An instructor may select different teaching strategies according to unit topic, grade level, class size, and classroom resources. Many kinds of instructional strategies are employed to achieve teaching and learning goals and support different kinds of students. Instructional/teaching strategies in a digital environment can be categorized into one of three categories (Dabbagh, Marra & Howland, 2019):

- *Supportive strategies:* Strategies typically enacted by the expert, coach, mentor, instructor, or embedded performance support system, with the goal of modeling the desired performance, skill, or process, and observing and supporting learners during their implementation of a learning task.
- *Dialogic strategies:* Strategies that promote dialogic or discursive type activities such as engaging students in articulation, collaboration and social negotiation, and reflection.
- *Exploratory strategies:* Strategies that promote exploratory-type activities such as engaging students in problem solving, exploration and creation, hypotheses testing, and role-playing.

Learning Strategies (Student Focused):

Learning strategies are operations and actions students use to optimize the processes of obtaining and storing information and course concepts. Students may choose and employ various techniques to accomplish tasks or meet specific learning goals. The ultimate goal of these strategies is that students are able to extract this information from memory in order to apply it. Successfully selecting strategic approaches to tasks separate poor learners from more effective learners.

Employing those definitions, we identified search terms related to digital innovations in teaching and learning during the COVID-19 pandemic and developed search parameters. To ensure the most comprehensive set of search terms, we also worked with IB to determine what terms resonate across cultures and what additional terms might be needed to capture the most globally representative pool of literature. This process resulted in 44 search terms to be explored, as shown in Table B2.

Table B2. Full List of Literature Review Search Terms

| Search Terms |
|--|
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") |
| ab(innovat*) AND ab("COVID*" OR "corona*" OR "pandem*") |
| ab(teach*) AND ab("COVID*" OR "corona*" OR "pandem*") |
| ab(instruct*) AND ab("COVID*" OR "corona*" OR "pandem*") |
| ab(lesson*) AND ab("COVID*" OR "corona*" OR "pandem*") |
| ab("silver lin*") AND ab("COVID*" OR "corona*" OR "pandem*") |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(learn*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(strateg*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(practice*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(class*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(school*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(collaborat*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(positive*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(success*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(change*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(trend*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(synchron* OR asynchron*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(access) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(equity) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(Internet OR tech*) |
| ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(competen*) |
| ab(synchron* OR asynchron*) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") |
| ab(synchron* OR asynchron*) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(innovat*) |

| Search Terms |
|--|
| ab(synchron* OR asynchron*) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(teach*) |
| ab(synchron* OR asynchron*) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(learn*) |
| ab(synchron* OR asynchron*) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(instruct*) |
| ab(synchron* OR asynchron*) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(strateg*) |
| ab(synchron* OR asynchron*) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(practice*) |
| ab(synchron* OR asynchron*) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(class*) |
| ab(synchron* OR asynchron*) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(school*) |
| ab(synchron* OR asynchron*) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(collaborat*) |
| ab(synchron* OR asynchron*) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(competen*) |
| ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) AND ab(educat*) |
| ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(innovat*) |
| ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(teach*) |
| ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(learn*) |
| ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(instruct*) |
| ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(strateg*) |
| ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(practice*) |

Search Terms

ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(class*)

ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(school*)

ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(collaborat*)

ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone) AND ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(competen*)

Note. Truncation () was used to capture variations of key search terms. References to the search term in the article title or abstract resulted in the inclusion of the article in the initial pool.*

The Inflexion research team conducted broad-based database searches in four academic databases: PsychNet, Education Resources Information Center (ERIC), ProQuest's Education Collection, and the Coronavirus Research Database. To focus on the most recent and relevant literature, we limited the search to article titles and abstracts from January 1, 2020, to March 31, 2022. The original 44 search terms resulted in 26,631 potential articles. To maintain a manageable number of articles, we instituted a two-step search process. First, we started the search with six broadly defined primary search terms. Second, we followed up with a secondary set of 15 search terms that focused on specific aspects of teaching and learning in a digital environment (see Table B3). A precursory review of articles from the remaining search terms indicated that these documents were redundant and/or unrelated to digital innovations in teaching and learning during the pandemic. Thus, explicit searches were not performed using these search terms.

Table B3. Search Terms Included in the Targeted Literature Review Search

Primary Search Terms

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*")

ab(innovat*) AND ab("COVID*" OR "corona*" OR "pandem*")

ab(teach*) AND ab("COVID*" OR "corona*" OR "pandem*")

ab(instruct*) AND ab("COVID*" OR "corona*" OR "pandem*")

ab(lesson*) AND ab("COVID*" OR "corona*" OR "pandem*")

ab("silver lin*") AND ab("COVID*" OR "corona*" OR "pandem*")

Secondary Search Terms

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(learn*)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(strateg*)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(practice*)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(class*)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(school*)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(collaborat*)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(positive*)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(success*)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(change*)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(trend*)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(synchron* OR asynchron*)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(digital* OR distanc* OR virtual* OR remote OR electron* OR online OR multi-modal* OR hybrid OR mixed media OR blended OR mobile OR cell* OR phone)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(access)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(equity)

ab(educat*) AND ab("COVID*" OR "corona*" OR "pandem*") AND ab(Internet OR tech*)

Note. Truncation () was used to capture variations of key search terms. References to the search term in the article title or abstract resulted in the inclusion of the article in the initial pool.*

Together, the primary and secondary search terms produced 16,435 unique articles. Researchers reviewed the abstract for each article to determine the extent to which it related to digital innovations in teaching and learning during the pandemic. This search established a general sense of the type of information each article could provide. From that initial pool, we excluded articles that were not explicitly related to digital innovations or the COVID-19 pandemic. The resulting pool included 202 articles for inclusion in the literature review.

To ensure the literature review was comprehensive and included the most relevant information available on digital teaching and learning strategies and practices, Inflexion researchers conducted a

targeted search of grey literature posted on the websites of specific organizations. These searches emphasized well-known research and governmental organizations representative of different worldwide geographic regions that began investigating the impact of the COVID-19 pandemic on the education ecosphere, as well as practitioner-oriented outlets that provide practical resources and guidance to teachers. We used a preliminary list generated during the proposal process and recommendations from IB staff to select organizations for the targeted organizational search. Using the same review process employed for the academic database search, we searched the websites of 59 organizations resulting in an additional 41 documents (or webpages) for inclusion in the targeted literature review. The main types of documents or webpages from the organizational search included lessons learned and recommendations from the experiences of educators, schools, and governmental organizations in education during the COVID-19 pandemic. Table B4 displays a complete list of organizations and geographic regions.

Table B4. Full List of Organizations and Geographic Regions for Targeted Search

| Organizations | |
|---|---|
| AACTE | NCEE |
| Asia Society | NCME |
| Aurora Institute | New Meridian |
| Cambridge | NWEA |
| Carnegie Foundation | OECD |
| Centre for Teaching and Learning (University of Newcastle) | Online Learning Consortium |
| College Board | Ontario's Inclusive Policy (Canada) |
| Common Sense | Organisation for Economic Co-operation and Development |
| Curriculum Associates | Pearson |
| EASPD (Europe) | Plan Ceibal Strategic Plan |
| eAssessment Association | Pratham India |
| Economic Commission for Latin America and the Caribbean | Rand |
| Economic Policy Institute | REL |
| Education Policy Institute London | SAGAR (India) |
| Educause Review | Seesaw |
| Edutopia | Spencer Foundation |
| ETS | The World Bank |

| Organizations | |
|---|--|
| Eunec | Toddle App |
| European Education Area | Transforming Education for Sustainable Futures |
| Global Partnership for Education | UN Institute of Labor |
| Google | UNESCO |
| Human Rights Watch | UNICEF |
| IILP | University of Bristol |
| International Research Exchange Board | University of Oxford |
| ISTE | US Institute of Education Science |
| Jacobs Foundation | VIDYA (India) |
| KIPP | WestEd |
| KnowledgeWorks | World Economic Forum |
| McCrindle Research Pty Ltd | XQ Institute |
| National Standards for Quality Online Courses | |

Informal Conversations with IB Staff

To solicit IB staff perceptions around innovative digital teaching and learning definitions and practices, we conducted 12 individual and group informal interviews with 21 key IB staff. Interviewees covered a range of roles and responsibilities including heads of curriculum design and development, subject managers, curriculum managers, IB World Schools managers, an assessment quality manager, the formative assessment manager, the equity and inclusion policy manager, and a regional development consultant.

These virtual 45- to 60-minute informal interviews were conducted in March and April 2022. The semistructured protocol had ten items and included probing follow-up questions as needed. Interviewees were asked to provide feedback on their perceptions of (a) characteristics of innovations in teaching and learning, (b) examples of innovative practices in IB schools and/or education organizations, (c) descriptions of school and teacher learning journeys over the course of the pandemic and (d) lessons learned from transitioning to the digital environment. The IB staff informal conversation protocol is included in Appendix C.

IB School Virtual Visits

The Inflexion research team conducted virtual site visits of seven schools recommended by IB staff as exemplars of digital innovations in teaching and learning during the pandemic. The following section describes the school selection process and interview/focus group data collection.

IB School Selection

Inflexion employed a two-pronged convenience sampling plan to select schools for participation in Phase 1. First, we asked IB staff to identify possible exemplar schools during the informal conversations. Additionally, IB World School managers participating in these conversations were asked to provide a list of 10 recommended schools from their portfolio. IB staff identified the potential schools primarily based on their knowledge of the digital innovations the schools implemented during the pandemic. Second, we collaborated with IB staff to identify and select key school characteristics and unique educational contexts that may affect digital innovations. School characteristics included IB region, IB strand, school type, language of instruction, programmes offered, and years since authorization. While not included as specific selection criteria, we also examined variables related to country dimensions, gross domestic product, electricity quality and supply, digital quality, Internet affordability, and Internet quality.

Inflexion provided a recommended list of IB schools (Tier 1) and an alternative for each school in case they declined participation (Tier 2). Schools were reflective of IB contexts, as well as contexts considered important to innovative digital teaching and learning (from the literature review and informal IB conversations). The research team worked in partnership with IB to contact schools and secure permission to conduct a multi-day virtual site visit. Seven schools agreed to participate in Phase 1 of the study and were visited in May and June 2022. Table B5 presents information about the schools visited in Phase 1 data collection. There are some notable gaps in representation across the participating schools. We do not have representation from the following: a school with French as its language of instruction, a Public-Rest of the World school, a school offering the Career-Related Programme (CP), and a school located in Africa or the Middle East. We sought to address these representation issues in Phase 3.

Table B5. List of Study Schools

| Location | IB Region | IB Strand | Language | Programmes |
|------------------------|-----------|-----------------------|----------|------------------|
| Washington DC, USA | IBA | Public (U.S.) | English | PYP |
| Bogotá, Colombia | IBA | Private National | Spanish | PYP MYP DP |
| Mumbai, India | IBAP | Private International | English | PYP MYP DP |
| Rio de Janeiro, Brazil | IBA | Private National | English | PYP MYP DP |
| Mexico City, Mexico | IBA | Private National | English | PYP |

| Location | IB Region | IB Strand | Language | Programmes |
|--------------------|-----------|-----------------------|----------|------------------|
| Starnberg, Germany | IBAEM | Private International | English | MYP |
| Beijing, China | IBAP | Private International | English | PYP MYP DP |

Interviews and Focus Groups with School Staff

Once schools were selected and agreed to participate, Inflexion staff worked with our contact at the school (usually the head of school or one of the programme coordinators) to schedule interviews for heads of schools, programme coordinators, and a subset of IB teachers. The research team provided guidance on how many teachers, and from which programmes and content areas; our contact secured teacher volunteers to participate in the focus groups. In communications with schools, researchers acknowledged that not all research activities may be possible, and researchers worked with schools to schedule the activities that would work best for them. All data were collected in the school's language of instruction. Table B6 presents a list of data collection activities by school. Additionally, prior to any data collection activities, this study and all instruments were reviewed and approved by Inflexion's external Institutional Review Board (IRB) to ensure the protection of human subjects.

Table B6. Data Collection Activities by School

| School | Number Interviewed | | |
|------------------------|--------------------|------------------------|------------------------------|
| | Heads of School | Programme Coordinators | IB Teachers |
| Washington DC, USA | 1 | 1 | 3 (PYP) |
| Bogotá, Colombia | 1 | 2 | 6 (PYP) 6 (MYP) 4 (DP) |
| Mumbai, India | 2 | 3 | 5 (PYP) 4 (MYP) 4 (DP) |
| Rio de Janeiro, Brazil | 1 | 3 | 4 (PYP) 3 (MYP) 4 (DP) |
| Mexico City, Mexico | 1 | 1 | 6 (PYP) |
| Starnberg, Germany | 1 | 1 | 6 (MYP) |

| School | Number Interviewed | | |
|----------------|--------------------|------------------------|------------------------------|
| | Heads of School | Programme Coordinators | IB Teachers |
| Beijing, China | 5** | 4 | 7 (PYP) 7 (MYP) 7 (DP) |

**In addition to the roles specified in the table, focus group participants at the school in Beijing, China included the Director of Marketing, Communication and Admission and the Head of EdTech and IT.*

***This number includes school principals and vice principals.*

As part of the virtual school site visit, Inflexion researchers conducted 45- to 60-minute interviews individually or in small groups of two to four educators via Zoom or Microsoft Teams (depending on the preference of the school). The semistructured protocol had 12 items and included probing follow-up questions as needed. IB administrators and teachers were asked to provide feedback on their perceptions of (a) characteristics of innovations in teaching and learning, (b) their journey to digital learning, (c) successful digital teaching and learning strategies and practices, and (c) how teachers and schools will leverage their experiences with digital teaching and learning moving forward. The IB Educator focus group protocol is included in Appendix E.

The Inflexion research team began data analyses by collaboratively developing a qualitative coding scheme (Guest, MacQueen, & Namey, 2012). The qualitative coding scheme included overarching *parent* codes that described broad topics and associated *child* codes for specific themes within each broad topic. The fully developed qualitative coding scheme was used to code transcripts from each of the seven virtual site visits. Each researcher coded the transcripts from the interviews that the researcher conducted. Following coding, each researcher analyzed and summarized a subset of the research questions.

Phase 2 Expanding: Generalize Teacher and School Successful Strategies and Classroom Practices of Digital Teaching and Learning

In Phase 2, we broadly captured the innovative and promising practices of digital learning and the contextual factors influencing their adoption in IB schools.

Phase 2 Survey Description

Expanding on Phase 1, Inflexion researchers triangulated data obtained through the literature review, informal IB staff conversations, and IB virtual school visits to construct a comprehensive survey of innovative digital teaching and learning practices. The survey included 39 items related to school and teacher journeys with the use of digital teaching and learning over the course of the pandemic; teachers' innovative approaches with digital teaching and learning strategies and practices; and the future-focused strategies and promising practices teachers might consider bringing into their schools and classrooms post-pandemic. Particular attention was given to ensuring the research questions

were adequately represented on the survey. Inflexion researchers solicited and incorporated feedback from the IB prior to finalizing the survey. The Phase 2 Survey is included in Appendix G.

School Sampling

Inflexion researchers worked with IB staff to determine the most appropriate sampling plan for survey administration and to ensure the most suitable representatives were selected. At the request of the research team, a random sampling technique was employed by IB staff. Using an initial list of authorized IB schools offering at least one IB programme (PYP, MYP, DP, or CP) during the pandemic, IB staff randomly selected 1,300 schools for inclusion in the study. After selection, IB staff implemented a quality control process to ensure the sampling of schools was representative of IB World School strand, region, programme, and language of correspondence, with intentional oversampling of schools that offered the CP, had French as their language of correspondence, or were located in Africa or the Middle East.¹ Table B7 presents information on the initial survey sample.

Table B7. Initial Survey Sample

| | Population | | Sample | |
|-----------------------|------------|-----|--------|-----|
| | N | % | N | % |
| Unique Metrics | | | | |
| Unique Schools | 5,629 | – | 1,274 | – |
| Unique Programmes | 7,947 | – | 1,849 | – |
| Unique Coordinators | 7,529 | – | 1,736 | – |
| Region | | | | |
| IBA | 3,796 | 48% | 846 | 46% |
| IBAEM | 2,358 | 30% | 662 | 36% |
| IBAP | 1,793 | 23% | 341 | 18% |
| Strand | | | | |
| Private International | 1,479 | 19% | 339 | 18% |
| Private National | 3,169 | 40% | 728 | 39% |
| Public (ROW) | 1,110 | 14% | 284 | 15% |
| Public (U.S.) | 2,187 | 28% | 498 | 27% |

¹ Oversampling was accomplished by doubling the schools' odds of being selected if they met one of the criteria for oversampling. These criteria were set to balance the lack of representation of these groups in Phase 1 data collection.

| | Population | | Sample | |
|-----------------------------------|------------|-----|--------|-----|
| | N | % | N | % |
| Programme | | | | |
| PYP | 2,201 | 28% | 486 | 26% |
| MYP | 1,804 | 23% | 416 | 22% |
| DP | 3,611 | 45% | 826 | 45% |
| CP | 331 | 4% | 121 | 7% |
| Language of Correspondence | | | | |
| English | 6,838 | 86% | 1,597 | 86% |
| Spanish | 865 | 11% | 167 | 9% |
| French | 244 | 3% | 85 | 5% |

Survey Administration Procedure and Response Rates

In December 2022, IB sent a message to the selected heads of schools and programme coordinators announcing the survey. The following week, the participant pool received an email invitation to complete the survey. All programme coordinators at the identified schools were invited to complete the survey and were asked to share the link survey with their IB teachers. Respondents completed the survey online at their convenience at a location of their choice. Respondents were told that the purpose of the survey was to provide information that would help IB explore how teachers' and schools' experiences with digital teaching and learning can be leveraged to inform innovative practices in IB classrooms and schools in the future. The survey was available online in English, Spanish, French, Arabic, and Mandarin and took approximately 20 minutes to complete. Overall, 782 respondents from 223 schools completed the survey for a school-level response rate of 17.6% (IBA = 12.6%, IBAP = 18.8%, IBAEM = 24.6%). Table B8 describes the characteristics of the respondents.

Table B8. Survey Respondent Characteristics

| | N | % |
|------------------------|-----|-------|
| Survey Language | | |
| English | 626 | 80.1% |
| Spanish | 76 | 9.7% |
| French | 59 | 7.5% |
| Arabic | 18 | 2.3% |
| Mandarin | 3 | 0.4% |

| | N | % |
|-----------------------------------|-----|-------|
| Region | | |
| IBA | 245 | 31.3% |
| IBAEM | 181 | 23.1% |
| IBAP | 356 | 45.5% |
| Strand | | |
| Private International | 123 | 15.7% |
| Private National | 488 | 62.4% |
| Public (ROW) | 78 | 10.0% |
| Public (U.S.) | 93 | 11.9% |
| Programme | | |
| PYP | 278 | 35.5% |
| MYP | 133 | 17.0% |
| DP | 370 | 47.3% |
| CP | 52 | 6.6% |
| Language of Correspondence | | |
| English | 645 | 82.5% |
| Spanish | 85 | 10.9% |
| French | 52 | 6.6% |

Survey Data Analysis

Survey data were analyzed descriptively to note frequencies and distributions of responses and detect patterns across region, strand, and programme. Open-ended items were coded thematically using the constructs identified during Phase 1; in vivo qualitative codes were added, as needed. Respondents who completed at least one question were included in response rate calculations and subsequent analyses.

Study Limitations

- Small sample size:** The survey had a limited sample size, which could limit the generalizability of the findings to a larger population. The findings may have limited generalizability to different settings, regions, or populations, which should be considered when interpreting the results.

- **Non-representative sample:** There might be a possibility of selection bias if the participants in the study were not randomly selected, which could affect the representativeness of the results.
- **Self-reporting and response bias:** The study's reliance on self-reporting or survey responses could introduce response bias, as participants may not accurately recall or report their experiences, leading to potential inaccuracies in the data.
- **No parent/student feedback:** The study may have limitations in capturing the perspectives of all relevant stakeholders involved in the education system, such as students, parents, teachers, administrators, and policymakers. This could result in an incomplete understanding of the complex dynamics and varied experiences within the educational context. Incorporating diverse stakeholder perspectives can provide a more comprehensive and nuanced understanding of the issues at hand.
- **Schools still in lockdown/recovery, haven't spent necessary time on reflection:** The study was conducted during a period when schools were still in lockdown and/or undergoing recovery from the pandemic. As such, there might have been limited time for schools to reflect on their experiences and fully assess the impact of digital transformation and other changes in education. This limitation could affect the depth of insights and understanding obtained from the study, as schools may still be in the process of adapting and addressing immediate challenges, leaving less opportunity for in-depth reflection and analysis.
- **Time constraints:** The study was conducted within a limited timeframe, which could restrict the depth and breadth of data collection, potentially missing important nuances or long-term effects.

Appendix C: Informal Conversations with IB Staff Protocol

Thank you for your willingness to participate in this conversation. As you may know, I am a researcher with Inflexion. Inflexion is partnering with the IB to investigate innovative digital teaching and learning during the COVID-19 pandemic. Based on your experiences with and general knowledge of IB and its specific programmes, we would like to ask you a series of questions to help us frame our study and to make the results more meaningful to the diverse contexts in which IB operates.

There are no right or wrong answers to these questions. Please share your honest point of view. Keep in mind that we are interested in constructive comments, whether positive or critical in nature. We will combine information from this conversation with others at IB without identifying you by name or role. Ultimately, we will share a summary of the results with IB and the results will be used to guide data collection with IB schools.

Given these are informal conversations, I will **not** be recording the discussion; however, I will take notes while we talk. Do you have any questions before we begin? *[Answer questions]*

Background and Experience

1. Tell me a little bit about your role and experience working within IB. [Probe about specific duties and responsibilities]
 - a. Do you work directly with schools? Who at the schools do you interact with?
 - b. Do you work directly with assessments?

Defining Innovations

2. When you think about innovation in teaching and learning, in your opinion, what makes something innovative? [MAY PROBE ABOUT SPECIFIC ASPECTS OF LIT REVIEW]
 - a. What role do you think context plays in determining whether something is innovative? Can you elaborate on how context impacts what makes something innovative?
 - b. To what extent do you think content areas impact whether something is viewed as innovative? Can you elaborate on how subject area may impact whether something is innovative?

School Journey

3. In thinking about the schools you work with (or have experience with), what can you tell us about school and teacher learning journeys with the use of digital teaching and learning over the course of the pandemic?
 - a. How prepared were schools and teachers to make the shift to digital teaching and learning?
 - b. How prepared were students and parents to make the shift to digital teaching and learning?

4. What impact did the transition to digital learning have on IB schools and students?
 - a. How did the transition to digital learning impact formative and summative assessment?
 - b. How did the transition to digital impact equity/access and inclusion?
 - c. Do you have any disciplinary perspectives on the impact digital learning has on IB schools and students?

School and Organization Exemplars

5. Are there any examples of innovative digital teaching and learning practices that you have seen or heard from IB schools during the COVID pandemic?
 - a. Which schools?
 - b. What can you tell us about those innovations (describe them for us)?
 - c. What has worked well for schools, teachers, and/or students? What made those experiences work well?
 - d. Are there any contextual factors that you think would be particularly important for facilitating digital innovations in teaching and learning?
 - e. Are there any characteristics of the school that you think would be particularly important for facilitating digital innovations in teaching and learning?
 - f. Are there any characteristics of the teachers or students that you think would be particularly important for facilitating digital innovations in teaching and learning?
6. Are there any organizations that you would say have examples of innovation in teaching and learning during COVID?
 - a. What organizations?
 - b. What can you tell us about those innovations (describe them for us)?

Guidance from IB

7. Over the last two years of the pandemic, what guidance has the IB provided to schools about teaching and learning around the IB curriculum in a digital environment?
 - a. What recommendations did IB make about which technologies to use?
 - b. What recommendations did IB make about pedagogical strategies to use in online environments?
 - c. What recommendations did IB make related to equity/access and inclusion?
 - d. What recommendations did IB make about the assessment of students in a digital environment?
 - e. What recommendations/guidance did IB provide to parents regarding digital learning and/or assessments?
 - f. In your opinion, how supported by IB did schools feel when making the shift to digital teaching and learning?

8. What has IB and/or their schools learned from this experience that could be used in the future?
9. Is there anything you can think of that started in response to the pandemic that IB and/or schools should continue to do moving forward?
 - a. Are there certain types of student learning outcomes that could benefit from digital teaching and learning in the future (knowledge, skills, attitudes, values)?
 - b. Are there certain content areas that could benefit from digital teaching and learning in the future?

Wrap-Up

10. Is there anything else you would like to share to help us better understand digital innovations in teaching and learning throughout the pandemic?
 - a. Are there any questions you wanted to answer that we didn't get to?

That's all of my questions. Do you have any questions or comments for me?

Thank you again for taking the time to talk with me today.

Appendix D: Informal Conversations with IB Staff Summary

This section presents the results from informal conversations with IB staff and includes quotes to illustrate examples of the most common themes.

Defining Innovation

To assist in our understanding of innovation, IB staff were asked to describe the characteristics of what makes something innovative. Generally, IB staff agreed innovation happens in two ways: (a) creating something new or (b) modifying or combining existing things in new and unconventional ways. Two IB staff members stressed the importance of *uniqueness*. As one stated, “In education, we are always combining things in different ways, and this can feel innovative even though we aren’t doing anything real.” Another IB staff member added, “There has to be an element of uniqueness... lots of things that are branded as innovative but it’s just the same thing repackaged.” Another key characteristic of innovations is that they should remove barriers, fill a gap, or solve a problem. Innovation should have a purpose rather than just be a change for the sake of change. Lastly, some IB staff opined that true innovations need to be something that will last, not just a phase or fad. IB staff were quick to clarify that innovation does not always have to be extensive and schools may not even recognize what they are doing as innovative.

Although the role of technology in innovation is a complex one, IB staff generally agreed technology provides certain affordances; however, as with a chalkboard, technology is a *tool* that can be used to facilitate innovation. Technology can be applied in innovative ways. For example, as one IB staff member stated, “Phones were not designed for teaching and learning, but we’re using them for teaching and learning.” However, technology is only as good as how it is used. There are numerous examples of technology reinforcing, rather than innovating on, what exists. As one IB staff member noted, “When technology started having more of a presence in the classroom, there was no shift in the position of the teacher; technology just reinforced it.” Another IB staff member added, “We shouldn’t use technology just to use it or to say we are innovative if it’s not serving the purpose.” Similarly, another IB staff member added, “Innovation is about pedagogy rather than technology. It should change the learning experience, how students engage and share feedback.” One IB staff member characterized it best by saying, “If online content made you smart, we have enough.” She continued, “That doesn’t make it innovative, the innovative part is the relation between the learner and the teacher and the learner and the content.”

IB serves a range of schools across many different countries, and IB staff agreed context was extremely important in determining whether something is considered innovative. Something that is innovative for one country, region, or school may not be innovative for another country, region, or school. While there are a plethora of examples, the most obvious (especially coming out of digital learning during the pandemic) is technology. IB staff noted not everyone has equal access and skill with technology and the pandemic highlighted these differences. As one IB staff member explained, “Putting digital audio into classrooms may not be considered innovative in Europe, but it would be in classrooms with no electricity in Africa.” Another IB staff member added, “In Africa, they were using cell phones

because that's all they had. But, in the US, they were giving out laptops and hotspots." One IB staff member characterized the role of context by saying, "As with instruction, innovations have to be anchored in the local context to make it meaningful."

Finally, IB staff were asked whether subject or content area played a role in whether something was viewed as innovative. IB staff generally agreed all content areas could be innovative. One IB staff member characterized it by saying, "Innovation can happen in every subject. We just have to jump over the hurdle of traditionalism... this idea that we've always done it this way so we must continue to do it this way."

Importantly, IB staff noted it was less about innovating the curriculum and more about innovating pedagogy and assessment. As one IB staff member noted, "Physics is physics. The content is the same, but it's how it's taught. It used to be textbook, but now it's more animations and videos." Another added,

In classical literature, the innovation isn't in the content itself, but maybe the approach or new type of analysis... incorporation of new media... looking at innovative ways for students to express themselves. Something other than an essay. Maybe a business plan or different modality. Just being innovative around our approach to evidencing skills.

IB staff also stated there were more resources in some disciplines to help teachers be innovative. As one IB staff member noted, "For STEM disciplines, there is such a glut. It can feel like drinking from a fire hose. There are so many options you end up looking at the solution and trying to find the problem rather than looking at the problem and finding a solution." However, using the resources will not guarantee innovation. Several IB staff members pointed this out with regard to mathematics: "In math[s], there is a lot of use of technology and the ability to adapt to the learner's level, but the majority of it involves rote memorization."

School Journeys

IB staff members who worked directly with schools provided their insights on school and teacher learning journeys with the use of digital teaching and learning throughout the pandemic. The transition to remote learning happened over the course of a week or less for most schools, which, understandably, felt chaotic. Initially, everyone struggled. Teachers did not have time to prepare, and their courses were not designed to be taught online. Teachers were forced to learn new technologies that were considered a staple for many professions (e.g., Zoom, Flipchart, Microsoft Teams). Many teachers did not have time for professional development on a new tool because they were trying to convert their content to a digital environment. When teachers did engage in professional development, it was focused on how to use the new technologies rather than learning pedagogy and assessment practices for the digital environment. IB staff agreed if a slower conversion to digital teaching had been possible, teachers could have designed the curriculum differently with less content and more time to explore. Teachers were just trying to survive and had to do something. As one IB staff member noted, "Teachers just started to do something and many of them continued doing it because it wasn't terrible. They didn't question whether they could do it better." Another IB staff

member added, “During the pandemic, teachers did not have the time to create something new. They didn’t have time to be creative thinkers about the problem.”

Some schools tried to emulate the face-to-face experience in the digital environment, while others acknowledged that digital teaching and learning required a different approach. These schools acknowledged that something was happening and adapted and adjusted as needed rather than just trying to move forward. As one IB staff member stated, “Schools that were successful were the ones who recognized that teachers can’t just mirror what they were doing in the face-to-face environment.”

Further, successful teaching and learning in a digital environment required a shift for which the education system was not prepared. One IB staff member noted, “We were more prepared than we would have been 20 years ago. The majority of people know how to access the Internet and are familiar with technology, even if they have to leave their homes to get it.” However, another IB staff member added, “Teaching in a digital environment requires a paradigm shift and that doesn’t happen overnight. Teachers tried to occupy the same space in the online classroom that they did in person. It was difficult to think of their role in a different way.” Similarly, another IB staff member added, “We’ve had these tools that we’ve used for years to enhance learning but having to use them as the main teaching tool is a real shift.” IB staff also commented that as schools are transitioning back to face-to-face instruction, many teachers are going back to what they did before.

Characteristics of Successful Schools

IB staff also identified characteristics of the school, leadership team, teachers, students, and parents that contributed to a successful transition to digital learning.

External Regulations

Local regulations played a role in how a school transitioned to the digital environment. In some cases, there were regulations around the number of hours students could be online and whether schools could require students to have their cameras on.

School-Level Resources

Historically well-resourced schools (rather than schools that received an influx of resources due to the pandemic) experienced a quicker and smoother transition to digital learning. The more resources schools had, the more easily they were able to shift to the digital environment. Further, teacher and student populations in well-resourced schools were more likely to have access to technology and the Internet. Moreover, these schools were more likely to have Information Technology (IT) departments that could assist with the transition.

School Culture

School culture played a key role in the success of a school’s transition to digital learning. When teacher and student agency, as well as growth mindset and trust, were built into the school culture, teachers

were able to embrace innovation, be creative, experiment in the digital environment, and step outside of their comfort zones. As one IB staff member shared, “Those schools that were embedded in an inquiry philosophy and valued it before the pandemic adapted more easily than those who were more of a conveyor belt of students.”

Professional Development

Schools that had a history of valuing professional development before the pandemic, offered professional development at the beginning of the pandemic, and paid for online professional development during the pandemic were most successful in their transition to digital learning.

Existing Technology Use

Schools in which teachers already used at least some digital tools experienced a less burdensome transition than did teachers in schools with less technology. Additionally, schools with technology platforms in place had an easier journey and time to innovate with their students. If neither condition applied to a school, those schools’ teachers were starting from scratch, making innovation more difficult because teachers (and often students) were starting digital learning for the first time, which was a large hurdle to cross.

School Leadership

IB staff also noted the importance of strong leadership support (e.g., heads of schools, programme coordinators). Successful leaders gave teachers permission and encouragement to explore. As one IB staff member noted, “When leadership encouraged different ways of thinking, staff felt like they could explore new ways of doing things.” Another IB staff member added, “It came down to leadership. Successful schools had confident leaders who didn’t have the answers but viewed teachers as partners and allowed them to examine different paths and took what worked and everyone moved forward.”

Teachers Characteristics

IB staff noted key characteristics about the teachers that contributed to successful teaching and learning in a digital environment. These characteristics included comfort with the content area and familiarity and confidence with technology, willingness to experiment and try new ways of doing things, being responsive to the emerging needs of students (e.g., students needed time for socializing with their peers and the teacher so teachers instituted time for connection and well-being), and the ability to extract data from the digital tools and use those data to inform pedagogical choices instead of just adhering to one approach.

Student and Parent Characteristics

IB staff shared key characteristics about students that contributed to successful digital education: self-management, student agency, and familiarity and confidence with technology. IB staff added that

students were more prepared than parents, noting that parents were not prepared to work from home while their children were schooling from at home; they were not prepared to be co-teachers.

The Impact of Digital Learning

IB staff were asked to comment on the impact of the transition to digital learning on IB schools and students. Although the transition was challenging and the initial impact was not positive for most schools, many schools were able to find a positive impact from the overall experience. As one IB staff member noted, “One advantage of COVID, it made us do what we dreamt of doing in 10 years in one year.” Another IB staff member shared, “The biggest learning impact was on teachers. Some didn’t use technology at all. But they had to learn how to use [Microsoft] Teams and breakouts and check-ins. Many students were already familiar with the tools.” IB staff also noted the impact on assessment and differences in how student learning is being evidenced. IB created spaces for a digital exhibition and personal projects and schools uploaded student work online. As one IB staff member noted, “Many schools—PYP and MYP—transitioned many portfolios to digital formats, and some teachers used videos as a summative assessment.” Overall, there was an overarching increase in (principals’, teachers’, students’) senses of agency and individual student choice.

Many schools were able to increase their communication and collaboration practices. Schools were able to provide time and space for collaboration. Some teachers took this as an opportunity to take a more systemic view and break down grade silos. One IB staff member stated, “Teachers took a holistic view of the group. Students were interacting more with students across the grade levels. People became more agile and responded to the needs and interests of students.” Further, schools were able to collaborate across networks rather than just within a school. As one IB staff member shared, “We have MYP and DP partnership schools and they typically have a hard time meeting, but it was easier during the pandemic because they could just jump on Zoom. That strengthened their relationship.” The increased use of digital platforms also increased the ability for teachers to have guest speakers join virtually, which many teachers did not consider before the pandemic.

The pandemic also resulted in increased attention to and emphasis on health and well-being. Schools had to come up with new ways (e.g., virtual sports days, competitions, and assemblies) to engage students and make them feel connected to the school. Schools and teachers were more responsive to emerging student needs: “The kids wanted to chat with their friends. They didn’t want direct instruction. So, teachers instituted time for connection and well-being and just letting students be together and chat.”

IB staff also commented on the positive effects on parents. As a result of the pandemic and transition to digital learning, parents were more involved in their children’s education. Parents were closer to the curriculum than ever before; they became facilitators. They learned what supports their students needed, and what their students did well. There was a positive change in the parent-teacher relationship; schools and teachers became closer to parents because of the constant dialog. Some parents rethought how to make their home environment more friendly for education.

Of course, there were plenty of negative effects of the pandemic and the rapid transition to digital learning. In some areas, people left the country to spend the pandemic in their home country. So, in some cases, students were not in the same time zone as their schools. Schools and students struggled with access to technology. Some students did not have access to the Internet and would have to sit outside establishments with free Wi-Fi to do their homework or join their classes. Some students had to engage through a mobile device because they did not have access to a computer or tablet. This also affected the products that students were able to create. Additionally, there were limitations in the tools and resources available to schools. Access to resources is often limited by language. While there are a lot of resources in English, there are not as many in Spanish and even fewer in French.

The biggest negative impact for teachers involved turning over authority for learning to students. Teachers were not used to working in front of a screen. They could not move around the room and interact in the ways to which they were accustomed. In the digital environment, teachers were not able to walk around and see what students were working on and how they were progressing. Teachers were not able to walk around the room and give informal feedback and direct students. Students had to self-manage, self-organize, and be prepared. As one IB staff member noted, “Teachers worried for their students. They want to watch behind their shoulders, but in a digital environment, they can’t see how their students are progressing. Teachers weren’t prepared to give that up.”

The negative effects on students has been profound and it will be an ongoing challenge for potentially several years to help students gain the academic and social skills that weren’t taught or practiced during the isolation of the pandemic. One IB staff member characterized the experience for students by saying,

“For students it was unbearable regardless of what we tried, the social impact of being at home and not being at school, the social stuff, we tried to do things to give a sense of community, but you could tell that the experience of what we thought we did and what students thought we did was way off.”

Lessons Learned

IB staff identified several important lessons learned from the transition to the digital environment. More generally, IB staff noted they had learned patience, compassion, resiliency, and flexibility. However, they also noted specific lessons learned that will continue to inform their work.

The pandemic highlighted issues with equity and inclusion within schools and these topics have become an important part of conversations moving forward. One IB staff member shared, “Well-resourced schools were adapting, but in other schools, students were dropping out because they didn’t have access. Now we are talking about inequalities among our schools.”

IB noted a shift in the power dynamic between IB and schools and the importance of listening to schools. As one IB staff member commented, “IB is used to holding the knowledge, but the schools were on the frontlines, and we were asking schools what was happening so we could get a better handle on it.” Another IB staff member added, “This gave IB the opportunity to be seen as an

organization that listens and pays attention to feedback. Not a director of schools, but a true partner of schools.” Similarly, IB staff also stressed the renewed emphasis and importance of the role of the student: “When I started it was organization and students, then it became customer and stakeholder and student was gone, and pandemic brought the focus back to student and that was good.” And “We’ve put the individual at the center in ways that we’ve never done before. Individual voices and preferences can’t be ignored any longer. That’s the beauty of it and I see it in schools.”

IB staff also commented on the lessons learned around their own operations. IB staff generally noted they learned to respond more quickly to meet schools’ needs. As one IB staff member shared, “In IB we have to get everything figured out, but it’s trial and error and trying and refining, very small things we can do to see that it works instead of having to figure everything out at once.” Another staff member added, “We can do things quicker. We can respond to an emergency more than policy and procedure have allowed.”

Similarly, another IB staff member shared, “Prior to the pandemic, it was all about quality and it had to be perfect, now 70% is good enough and get it out to schools and give them guidance.” Further, one IB staff noted a “breakdown in silos” because anyone in the organization can access anyone else virtually, saying, “Barriers have been broken down. We are more accessible. And there seems to be more acceptance that we can do that.” Because events like COVID-19 and the war in Ukraine are not one-time things, IB staff agreed they need to plan for the impact of these types of events in their programmes, resulting in the development of a crisis response plan.

IB staff also acknowledge it was possible to do more in the digital environment than originally thought. Throughout the pandemic IB held meetings, self-studies, evaluations, assessments, and professional learning opportunities virtually. As one IB staff member stated, “Learned how to engage people virtually in a way we haven’t done before.” This was particularly true for professional learning sessions:

We learned that we need to provide opportunities for virtual training. They don’t all need to be in one weekend. They can be self-paced and integrated over time and embedded into the work of the school.

Schools don’t need to come to the IB for three days. Virtual opportunities allowed us to provide broader representation and engage people who couldn’t come in person.

Online workshops allowed collaboration across schools everywhere. Schools and teachers collaborated more, created Facebook and WhatsApp groups and they just shared.

IB staff also commented on their lessons learned about student assessment. As one IB staff member shared, “In assessment, we had to change. We had to look at policies and processes, moderation and standardization, and we will use all of that in the future.” Other IB staff focused on the impact the last two years will have on the future of assessment. IB staff shared that they learned that fewer assessments could be acceptable, alternative assessments or opportunities for evidencing student learning could be acceptable, and learning outcomes may be different in a digital environment. Many

IB staff agreed the IB should leverage the current situation to move to digital assessments before teachers “go back to the old way of doing things.”

Finally, IB staff reflected on what is next. One IB staff member questioned, “Now that we are going back, does that mean that schools are just going to go back to what they were doing? What lasting effects will this have?” Another IB staff member added, “It could be like a rubber band and snap back to what it was before.” An IB staff member responded, “I don’t think it’s possible to go back to the way things were.” Another staff member shared,

I hope that schools go through a period of reflection on what works and how they can harness the forced innovation to think about what they would like to do moving forward and not just revert back to what was safe and what they are used to doing.

Appendix E: IB School Staff Interview/Focus Group Protocol(s)

Digital Innovations in Teaching and Learning During COVID

Phase 1 IB School Staff Interview/Focus Group Protocol

Thank you for your willingness to participate in this interview and to share your insights about digital innovations in teaching and learning during the COVID-19 pandemic at [NAME OF SCHOOL]. As you may know, I am a researcher with Inflexion. Inflexion is partnering with the IB to investigate innovative digital teaching and learning during the pandemic. Based on your experiences at your school during the pandemic, we would like to ask you a series of questions to help us better understand the innovations in teaching and learning in a digital environment that were deployed during the pandemic.

There are no right or wrong answers to these questions. Please share your honest point of view. Keep in mind that we are interested in constructive comments, whether positive or critical in nature. Inflexion will combine information from this interview with others at your school and other IB schools across the world without identifying you by name. Ultimately, we will share a summary of the results with IB and the results will be used to develop reports and recommendations to share with other IB schools and the education community in general.

I will be audio recording this discussion to ensure that I accurately capture the information you share with me today. Do you have any questions before we begin? *[Answer respondent's questions]*

Do I have your permission to record our conversation?

Thank you. I will begin recording now. *[Start recorder]*

This is [RESEARCHER'S NAME] speaking with [SCHOOL REPRESENTATIVE'S NAME] on [DAY, MONTH, DATE] at [NAME OF SCHOOL]. Thank you again for speaking with me today.

Thematic Interview Framework

Background and Experience

1. INDIVIDUAL: Tell me a little bit about your involvement with the IB program at [NAME OF SCHOOL].
GROUP: First, let's just go around and everyone tell a little bit about your involvement with the IB program at your school.
FOR NON-TEACHERS: Tell me a little bit about your IB-related duties and responsibilities.
 - a. How long have you been at your current school?
 - b. **FOR IB TEACHERS:** How long have you taught IB classes?
 - c. **FOR IB TEACHERS:** Which IB subjects do you teach?

Defining Innovations

2. When you think about innovation in teaching and learning, in your opinion, what makes something innovative? [MAY PROBE ABOUT SPECIFIC ASPECTS OF LIT REVIEW]
 - a. What role do you think **context** plays in determining whether something is innovative? Can you elaborate on how context impacts what makes something innovative? [Researcher clarification, if needed: context may be your particular country, community, or school; your classroom or particular cohort of students]
 - b. To what extent do you think **content areas** influence whether something is viewed as innovative? Can you elaborate on how the subject area may influence whether something is innovative?
 - c. Are there certain types of student learning outcomes that could benefit from digital teaching and learning in the future (knowledge, skills, attitudes, values)?

Journey to Digital Learning

3. In early 2020, the global COVID-19 pandemic changed education as many schools closed their doors and educators shifted face-to-face instruction to a virtual setting. In thinking about your school, what can you tell us about school and teacher learning journeys with the use of digital teaching and learning over the course of the pandemic?
 - a. Describe your journey of transitioning your IB course(s) to a virtual or hybrid environment.
 - b. **FOR ADMIN:** How were you involved in transitioning the IB program to a virtual or hybrid environment?
 - c. **FOR ALL:** What are you most proud of that your school accomplished during the pandemic?
 - d. **FOR ALL:** What kinds of actions did your school and teachers take that you feel helped your school transition to a virtual or hybrid environment?
 - e. How long did you work in a digital environment with your students?
 - f. To what extent did you experience issues with electricity or Internet stability?
 - g. Did you and your students have regular access to computers at school? At home?
 - h. **FOR TEACHERS:** To what extent were you already using technology in the classroom? What ways? How did that change during the pandemic?

- i. *FOR TEACHERS:* What types of technology or platforms did you use in the remote teaching environment?
- 4. The transition for most schools to the virtual environment was sudden. To what extent were you (or your teachers) able to easily transition the IB programme to a virtual or hybrid environment?
 - a. How prepared was your school and teachers to make the shift to digital teaching and learning? How prepared were you specifically?
 - b. How prepared were students and parents to make the shift to digital teaching and learning?
 - c. What does IB look like in a virtual or hybrid environment and how does that compare to how IB was being implemented in your traditional classroom setting?
 - d. What aspects of the IB programme have been most helpful for teaching in a virtual environment (Learner Profile, Approaches to Teaching and Learning, etc.)?
 - e. Was there a moment when your mindset towards teaching and learning in the digital environment shifted? Can you describe that for me?
- 5. What impact did the transition to digital learning have on your school and students?
 - a. What positive changes were noticed in teachers, students and schools?
 - b. How did the COVID-19 pandemic affect the development of the school's digital learning landscape?
 - c. What specific needs drove this experience? (i.e., increased student collaboration, personalization to student special educational needs, parents facilitating schooling?)
 - d. How did the transition to digital learning impact equity, access, and inclusion at your school?
 - e. How did the transition to digital learning impact social-emotional learning and/or sense of student belonging at your school?
 - f. How did the transition to digital learning impact families and the community connection with your school?
 - g. How did the transition to digital learning impact formative and summative assessment at your school?

Successful Digital Teaching and Learning Strategies and Practices

- 6. We are interested in learning about new or innovative digital teaching and learning practices that you may have used during the COVID pandemic. What can you tell us about any innovations you used (describe them for us)?
 - a. To what extent are you making different choices about your instructional practices in a virtual or hybrid environment than you made in your traditional classroom?
 - i. What prompted these changes? What teaching practices are you using in a digital environment that you didn't use before?
 - b. What has worked well for your school, teachers, and/or students? What made those experiences work well?
 - i. What helps to cognitively engage your students in virtual class sessions?

- c. Were there digital teaching strategies you wanted to try but could not, given your particular situation?
 - d. What can you tell me about innovative school-level strategies during the pandemic (e.g., teacher/staff collaboration, strategies for engaging parents and/or the community)?
 - e. What digital teaching and learning strategies and practices are you likely to continue post-pandemic (e.g., instructional strategies/ways to engage students in a virtual environment)?
- 7. We are also interested in the resources you/your school used to support digital teaching and learning practices during COVID.
 - a. What resources did you find the most useful? What made these resources useful/valuable?
 - b. What resources did you find least useful? What made these resources unhelpful/not valuable?
 - c. How did they support your work [probe for clarity - provided direct teaching resources, ideas, coaching, tech support, etc]?
 - d. To what extent do you think the tools and platforms you had available or developed influenced the successful experiences with digital innovations in your classroom or school?
 - e. What digital learning supports are you likely to continue using after COVID, when students return to the classroom? Are there materials that you don't plan to continue using?
- 8. As one part of the study, we are interested in the contextual factors that are particularly important for facilitating digital innovations in teaching and learning (Probe about school, leadership, teacher, student, and community characteristics).
 - a. Are there any aspects of the **school or school leadership team** that you think would be particularly important for facilitating digital innovations in teaching and learning (e.g., schoolwide identity, approaches to learning, shared vision, school characteristics, structures, processes, leadership behaviors)? How do these aspects facilitate digital innovations?
 - b. Are there any characteristics of the **teachers** that you feel are important for positively facilitating digital innovations in teaching and learning (e.g., digital competence, views of digital teaching and learning, willingness to try new things)?
 - c. Are there any characteristics of the **students and/or parents** that you feel are important for positively facilitating digital innovations in teaching and learning (e.g., digital competence, views of digital teaching and learning, willingness to try new things)?

Leveraging Experiences with Digital Teaching and Learning Moving Forward

9. What lessons have you learned from your experiences with digital teaching and learning during the pandemic?
 - a. What have you or your school learned from this experience that could be used in the future?
 - b. What were some lessons you learned based on digital teaching and learning experiences that didn't work well?
 - c. How do you plan to use your experiences with digital teaching and learning to continually improve and strengthen learning for your students?
 - d. What would you like to see your school do to support you in digital teaching and learning moving forward?
 - e. If you had it to do over, what would you change about how your school transitioned to a virtual or hybrid environment?
10. What innovative teaching/learning practices may you/your school continue to use even after the return to regular learning? Please describe these innovations.
 - a. Is there anything you can think of that started in response to the pandemic that you or school should continue to do moving forward?
 - b. How sustainable do you believe those changes or innovations will be?
 - c. What kinds of support do you need from your school or the IB organization to ensure the practices are sustainable?
 - d. What barriers might you foresee in continuing the use of these innovations?

Wrap-Up

11. Looking back now, after this conversation in your opinion what is the most innovative experience that you went through?
12. Is there anything else you would like to share to help us better understand digital innovations in teaching and learning throughout the pandemic?

That's all of my questions. Do you have any questions or comments for me?

Great. This concludes our interview. Thank you again, [SCHOOL REPRESENTATIVE'S NAME], for taking the time to talk with me today.

[Stop recorder]

Appendix F: Phase 1 Interviews/Focus Groups with IB School Staff Summary

This section presents the results on schools' perceptions of digital innovations in teaching and learning during the pandemic and includes quotes to illustrate examples of the most common themes.

Journey to Digital Learning

Administrators and educators from all schools were asked about their transition to teaching and learning in the digital environment. Depending on the school, the transition took between two days and two weeks, and schools and teachers generally characterized this as a difficult time. This was further complicated when schools had to coordinate across time zones. The transition was sudden and unexpected, which limited the amount of planning that schools were able to do. It was also unclear how long lockdowns and quarantines would last. Schools were required to change protocols frequently to meet new guidelines and emerging needs and demands, and transitioned among virtual, hybrid, and in-person formats with little notice and time for planning.

When COVID started in China, no one in the world knew what it was. So it was really coupled with a lot of disbelief and fear... So there was that feeling that it was a temporary online shift while everything got under control. Then once it got to Italy, then you realized, "Hold on. This is going to be a big challenge." ~ IB Educator, Private International, China, Multiple Programmes

It was quite a journey. Quite a rollercoaster. When it first, online learning, it was really scary... Everything changed very quickly. ~ Administrator, Private National, Brazil, Multiple Programmes

We were all handicapped. We didn't know that much... and we had to learn in a very quick way. And it was sort of like a fast-forward learning. But that made us more aware of how much we still have to learn. ~ Administrator, Private National, Mexico, PYP

One of the things that was really important was to actually make a decision, right? You have to. There's uncertainty, and if you wait, it's going to change again. So, you have to make a decision, and then you have to maybe adjust after you've made it because things have changed. ~ IB Educator, Private International, India, Multiple Programmes

We say, okay, after spring break everything will become normal, we'll go back to school. But it didn't happen. And then we said, okay, fine, two, three months down the line it'll start a new academic year [that] will start again on campus. So, that also didn't happen. Then we thought, okay, now comes the holidays for the month of October now more then comes Christmas, I think then some COVID order would go on, but it didn't happen. ~ IB Educator, Private International, India, Multiple Programmes

Generally, these schools noted that technology and access to the Internet were not substantial issues. Additionally, the majority of these schools seemed to implement a common platform either before the pandemic or shortly after schools transitioned to the digital environment. Administrators commented on their role in ensuring teachers had access to technology and rallying staff around a common platform.

For us to be successful, we need to have... teacher support with us. So, we need to have investment in making sure that, you know, the right amount of Wi-Fi connections, the speed, those were available to us because that was very, very important. So, that way, I'm very thankful for the [school] board because they were quite generous in their budgeting. So, whatever we needed as teachers whether it was electronic devices or updated versions of laptops or extension to Zoom, so, whatever technology could buy, you know. I think that way the board was very, very supportive in making sure that the teaching and learning did not stop for the students and teachers. ~ IB Educator, Private International, India, Multiple Programmes

Most of the schools we visited acknowledged that they were highly resourced.

We've been a one-to-one school for a long time and we're quite a privileged school in that we have a big technology budget and kids have wi-fi at home. We're not talking about a disadvantaged school in terms of access to digital learning. ~ Administrator, Private International, Germany, MYP

Interestingly, one school noted more technology challenges for their teachers than their students. As the administrator from the PYP programme at the Private National school in Mexico shared, "It was the day before we have to go fully online, and I would say about 40% of the teachers don't own a computer." He continued, "Some teachers had two devices. We borrowed stuff. We pitched in. I mean, fortunately there is that there's not many of us." However, this school shared that students have access to technology and in some cases, parents purchased additional devices at the start of the pandemic to eliminate the need for family members to share devices.

There were also some issues with access to software, computer programs, or applications. An educator from a Private National school in Brazil commented, "It was really, really tough and we were teaching on Zoom. We didn't have a [paid] account. So, classes were dropping after 40 minutes."

Teachers struggled with learning new technologies and deciding which technologies they wanted to use from the abundance of options. Teachers were learning as they went: As one PYP educator (Public [U.S.], USA) noted, "Everything was learning as you go and trying to fill a need as you saw what was happening online. I was building a plane as I was flying it." An administrator at the Private National School in Brazil (Multiple Programmes) shared, "It was also a lot of trial and error. I personally tried many formats that, I would say that of the 100% of the strategies I used, 80% ended up discarded because they did not generate the expected result." Another educator from the Private International School in India offering Multiple Programmes shared,

We didn't have time. We went back on a weekend and from next week Monday onwards, we just had to start Zoom teaching and Zoom learning. Everything went online within two days. It was like being thrown into the deep side of the pool even when you haven't learned how to swim. It was always trial and error.

Many teachers needed training and support to transition to the digital environment. An IB PYP educator from the Private National school in Mexico shared, "I think the quality of the sessions, in the beginning, was not as good. And then they, with the progression of the year, got better." A teacher from the Private National school in Mexico (Multiple Programmes) added, "I think my classes were terrible, horrible for some time, while I was looking for the right tool... We did very well with the tools, but at the initial stage, it was very complicated." However, teachers learned from each other and leveraged their diverse experience and expertise by sharing tools, creating "how to" documents and videos, and facilitating internal training sessions. An IB educator from the Private International school in China (Multiple Programmes) characterized it best by saying, "It was a steep learning curve that was both stimulating and stressful at times... But we all grew about 10 years in the first five minutes."

Teachers commented that the pandemic forced them to learn and use new technologies and resources with which they were previously unfamiliar. Additionally, teachers shared that their confidence in using technology has increased.

Some teachers were already using technology in their classes... For those teachers, the gap was a bit shorter. It was easier for them to adjust. For some teachers, we knew that they had a very hard time working. Creating a PowerPoint presentation wasn't easy for them. With those teachers, we saw enormous growth. ~ Administrator, Private National, Brazil, Multiple Programmes

The transition to the digital environment also affected the structure of the typical class session. At the beginning of the pandemic, teachers sought technology solutions that helped them emulate the traditional classroom. However, this was often unsuccessful. As one educator at the Private International school in India (Multiple Programmes) shared, "In school, you've got lessons and you can take the whole day to do it, but you can't expect children to sit through those many hours in front of the monitor." An administrator from the Private National school in Brazil (Multiple Programmes) stated, "It's not just moving your regular teaching to an online environment, but you need to adapt the lesson as a whole to this new environment." Further, a PYP educator from the Public (U.S.), USA school commented on the impact on classroom management: "I found that the lack of having to be a manager, the classroom management was so different. It allowed me a lot of time to really not have things get in the way of relationships. So, it was a very different teaching perspective."

Only one interviewee described the transition as easy:

I think we were able to transition to online, in my perspective, somewhat easily. I know that there was a lot of people, they were super busy. But on our end, as teachers, it was just the connecting to Google Classroom, learning a little bit how to control and manage the account... So in that regard, it was easy." ~ IB Educator, Private National, Mexico, PYP

Schools briefly commented on the transition for students. An educator at the Private International school in China (Multiple Programmes) shared, “I think some students really thrived, and some students maybe didn’t. And so, there was a real need to personalize, and a real need to connect with learners, and really support their social and emotional learning.” Generally, school staff reported younger students adapted more quickly than older students. As one of the administrators at the Private National school in Brazil (Multiple Programmes) shared, “Kids are more used to like okay, is this a touchscreen? Can I try this? Oh, no, you need to click there. Kids, they know how to use this much better.” Another IB educator from the Public (U.S.), USA (PYP) school added, “Having the worldwide web, the Internet, Google searches, I mean, just different platforms, it has opened up a plethora of things for the kids to experience.” Another educator from the Private National school in Colombia (Multiple Programmes) added, “Students were very, very important because of the level of exposure they had to certain tools and platforms. And that made, in some way, that transition a little easier.”

Schools also commented on the transition for parents. One educator from the Private National school in Brazil (Multiple Programmes) characterized the transition for parents, saying “It was a big adaptation that took some time... The families had lots of trouble. Our coordinators worked even more than us because they were talking to parents on the phone and teaching them how to do stuff.” Another added,

I think our teachers did a tremendous job... The feedback that we got from our parents. They would constantly tell us that teachers are doing an amazing job. We would get a lot of feedback, positive feedback from our parents about how hard it is and how difficult it is to get students focused for such long hours. ~ IB Educator, Private International, India, Multiple Programmes

Proudest Accomplishments During the Pandemic

IB schools were asked to highlight their proudest accomplishment during the pandemic. For some educators, these were personal accomplishments, while others were proud of each other, their schools, their students, and community. Recurring themes within proudest accomplishments for participating educators include pride in their schools' response and support with the transition, advancing their abilities with technology, and ability to address the social emotional needs of not only students but also each other.

Educators across the globe had varied experiences with technology and its application to the classroom prior to the pandemic. An educator from the Private National school in Brazil (Multiple Programmes) exclaimed, “My personal pride and joy during the pandemic was really coming from zero to hero technology-wise.” Some schools had better technology support than others, and others filled in the gaps by helping each other. In the end, many educators described how well they were able to come together and figure things out in order to continue learning for their students.

We were reliable and consistent with our classes. We had enough help, as in our aids and our ICT person, like giving us feedback and telling us what to do, what not to do, how to better our Internet and our image and so on and so forth. So I think that I would be most

proud of... We were still able to represent what we are, which is a school... Kids were restless. They were eager to be back. They were happy. They were also scared. And I think we truly handled it in a very caring and loving way. Our approach was to make them feel safe, to make them feel welcome. So I think that is only possible whenever you are in a community, and whenever you feel like you're a part of something else, part of something bigger. ~ IB Educator, Mexico, Private National, PYP

Many educators highlighted their most proud point around their ability to transition quickly without losing any time for learning.

We didn't miss a single aspect whether it was class, whether it was service, whether it was or the virtual trips. Everything went as it would have gone in a physical school and this aspect of this side of the thing also was enjoyed by students. I think we really jumped back very well. We were trained properly and supported resourcefully by school. Everything as if it went in a normal school would have gone from sports day to everything. That was one good part which we are proud of. ~ IB Educator, Private International, India, Multiple Programmes

Many educators were especially proud of their students. They describe how their ability to adapt, sense of autonomy, and level of professionalism during distance learning was astonishing. With the transition also came change in regular school standards, so one educator from the Private International school in China (Multiple Programmes) attributes this to the “sense of pressure has dropped and the kids being able to just do and enjoy.” Open communication between schools and families made room for this to happen.

I'm most proud of was generally people at the school just tried to respond to the students' learning needs and there was a genuine concern and empathy that this whole lockdown and learning from home... You know, just being flexible and showing understanding. ~IB Educator, Private International, Germany, MYP

This same sense of belonging and being aware of each other's well-being was apparent in many of the virtual visits conducted by the Inflexion team.

To have made our whole team, the whole community—parents, students, and teachers—feel supported and challenged to do what we are going to do and we can do it. At a great emotional and financial cost, there were also complications for everyone. But this feeling that we can do this and we are together, I think that was the most important achievement. ~ IB Educator, Private National, Colombia, Multiple Programmes

Similarly, student autonomy was another emerging theme, as teachers were very proud of their abilities to manage themselves and take on more responsibility during the pandemic.

And so, I was very proud of the way the kids also pivoted, the way that they jumped in and would try new things. And they stayed engaged. And they demonstrated how much learning they could do in this kind of environment independently for a second grader was

really challenging. But they made it look very easy. And I was really impressed because some of them had pods. ~ IB Educator, Public (U.S.), USA, PYP

Many MYP educators at the Private International school in Germany noted they were proud of an Excel sheet that they created to communicate student work with parents. While on the surface this may not seem very innovative, communicating with parents of older students was innovative for this school. Similarly, the Private International school in China (Multiple Programmes) also created an Excel file to facilitate the transition to digital learning. Again, the true innovation is that the Excel file allowed students to take ownership of their schedule and made for more smooth transitions between classes.

The Private International school in China (Multiple Programmes), which had educators participating in distance learning at the time the research team conducted virtual site visits, are still leveraging many of the techniques developed during the pandemic as they continue with remote instruction. One educator explains how the school “managed to really ride that wave and stay connected with our students... I'm really looking forward to seeing them on Monday morning. And there's nothing better than that. But I still feel completely connected, even though we're only virtually connected.” Many educators on campus put a large emphasis on connection with their school community. As one stated, “I am proud of the way that we communicated what was going on. I'm proud of sticking close to the mission and core values of the school that didn't yield in the way” (IB Educator, Private International, China, Multiple Programmes).

Another common area for proudest accomplishment was around the connection educators had with their students and their families. Leveraging technologies in their classrooms opened a window for opportunity to connect with their community in a way many had not before.

I think [this school] is a supremely special school in managing the emotionality of all of us who are part of the community. It seems to me that this is supremely redeemable because I know that there was a genuine concern and some very nice intentions to help us all in the situation. Both students and workers. I think it's one of the most salvageable things. Like somehow they were aware. We had groups. Like support groups... The students also had the opportunity to express how they felt. There were some who felt more comfortable than others but it was something in which the school always supported us and was very attentive. ~ IB Educator, Private National, Colombia, Multiple Programmes

One PYP educator from the Public (U.S.) school shared, “No matter what was thrown at us, we made it work.”

Defining Innovations

To help facilitate our understanding of innovations, IB schools were also asked to describe what makes something innovative. IB schools identified three key characteristics of innovations. First, innovations involve doing something new or improving on something that exists in a new way. Second, innovations should also address a problem, lead to a better outcome, meet a need, or provide a benefit. Third, innovations should be sustainable over time, rather than being a fad.

It is a moving target. Once it becomes normed, then doing that thing is no longer considered innovative. I think innovation is noticed and aimable when it is actively helping you solve key problems and moving people forward. Once they're forward, then it no longer feels like an innovation. It might seem innovative to somebody from the outside. ~ IB Educator, Private International, China, Multiple Programmes

IB schools noted innovations do not need to be something drastically new or different. IB school also agreed that innovations do not have to be big changes; it can be the smaller things that schools and teachers do every day. As one educator from the Private International school in China (Multiple Programmes) shared, “We talk about the idea of big I and little I innovations and the big projects versus the things that teachers are doing all the time.”

Additionally, IB schools commented on the role of technology in innovations. Like IB staff, IB schools agreed technology can support technology, but the benefit was in the affordances that technology allow:

Digital technologies can be the ultimate leveler, equalizer in the classroom for inclusion and personalization... At its most basic level, just the affordance of being able to put all of the instructions, the resources, the outcomes, in one place, where students can access them at their own pace and at their own level and be able to show their evidence of learning in so many different ways, it's just become very normal here for us now and then as is for a lot of schools. ~ IB Educator, Private National, Colombia, Multiple Programmes

IB schools generally agreed context was vital in determining whether something is innovative. Governments have different requirements and regulations; each country and school had a different response to the pandemic. The resources to which each individual had access were different and each person's experiences with technology (e.g., some teachers had used teams before while others had not, some students were used to using computers and others were not) was different. All these differences influence whether a practice would be considered innovative. However, one interviewee insisted that context should not play a role. Instead, she believed context was often used as an excuse as a reason not to innovate. Further, IB schools commented on the role of content or subject area in evaluating whether something was innovative. IB educators recognized that some content areas were used to using computers, while others were not (e.g., physical education, performing arts). However, like IB staff, IB educators agreed all subject areas could be innovative. They may not be innovating the content or the curriculum; however, they can innovate on pedagogy.

Successful Digital Teaching and Learning Strategies and Practices

At the seven schools visited virtually by the research team, educators were asked in the focus groups to describe innovative online teaching and learning strategies and practices they experienced in their schools during the COVID-19 pandemic, as well as any facilitators and barriers to the implementation of these strategies and practices. These strategies and practices are described below, categorized by the level at which the described innovations were implemented.

School-Level Innovations

Across participating schools, an overarching and holistic theme heard from participants was around the innovation involved in the whole process of moving so quickly to a fully digital teaching and learning space. All schools experienced a very abrupt shift to the online learning environment and had to pivot from face-to-face learning to developing and using tools, strategies, and practices for a wide range of students and content areas, as well as for communicating the plans with parents/guardians. As one IB PYP educator at the Private National school in Mexico noted, “The true transformation came with the pandemic in which literally in 24 hours, we were teaching all the subjects online.” While some schools did find the transition slightly less difficult because they already had some experience with remote/online instruction, the situation was more challenging for schools/teachers where there was much less experience with using digital strategies for teaching and learning. IB educators agreed that being able to make the transition work, even with the initial difficulties and challenges, was an innovation in and of itself.

I remember a conversation with this team, where we said we're in a strange time and this is an opportunity to try something really different because we have to do it differently anyway. So let's look at—we call them targets here, but—kind of strategic goals of the school in terms of innovation. And this is an opportunity to try things that we... might not ever have this opportunity again, so let's look at those together and figure out what can we achieve in this moment when we have to do it in a different way anyway. And I look back at that moment quite fondly... I remember feeling like, 'This is really exciting. It doesn't have to be a negative experience. This is the moment when we can really learn some things about teaching and learning and logistics and institutions.' ~ IB Educator, Private International, China, Multiple Programmes

Another common theme about school-level innovations was the adoption and use of centralized and common communication and collaboration platforms. Many schools went through a process of trial and error with using shared technologies at the beginning of the pandemic. All participating schools eventually found tools that were used across their schools to strengthen internal and external communication among users, and to serve as central collaboration tools for distributing/collecting assignments, schedules, sharing resources, and offering student and parent support.

“Our school started 2020 without a really clear understanding of how to use the existing [learning management system] (LMS) for a remote learning context, and then transitioned to using Microsoft Teams and has consolidated that. If I was to point to one... I don't know if it's an innovation. It's more an adoption of a system. But through that, there has been a really sustained and improved efficiency I can see, and clarity and most of the key signposts you might look for a great online environment can be achieved through that platform, I think. I think that part, for our school, that was the most profound adoption.” ~ IB Educator, Private International, China, Multiple Programmes

A final common school-level innovation described by IB leaders and educators centered on the new ways in which schools over time developed successful routines and schedules for students to not only

attend their classes but also to access resources and meet with teachers for both academic and social-emotional support:

Something that facilitated this whole experience was, I think, the management that the school gave it in terms of trying to maintain clear communication and real expectations of what we could start to explore in our classroom environments, the support of the technology team... because they not only had to educate the teachers, but the students as well. ~ IB Educator, Private National, Colombia, Multiple Programmes

IB educators across schools described how the initial transition to online learning was sudden and chaotic, as it happened in such a short timeframe and schools across the globe were not prepared for how long the pandemic would last. Many schools in the spring of 2020 were more focused on the immediate needs of ensuring students and teachers had access to technology and Internet access for the remainder of that school year. However, once the full scale of the pandemic set in, IB leadership teams, staff, and IT professionals began looking at research about effective strategies for online teaching and learning and sharing ideas with colleagues at other schools to install more structured processes for the new school year. As noted by an educator at the Private International school in Germany (Multiple Programmes), “What we realized early on was that we firstly needed a school site policy on how to teach digital learning.” In addition, although implementation and structure varied by school, all IB school leaders recognized a traditional school-day model would not work for students in the online environment; instead there needed to be a mix of synchronous and asynchronous work time, and activities to engage the full range of student learners while in synchronous class times: “You had to be innovative every single day to get your message across to engage your children and even to make sure that a small amount of learning is happening at the very initial stages because everything had to be revamped... from timetable to how long children could sit, what they could actually understand through a monitor and the teachers being on the other side of the monitor.” Many educators from IB schools participating in this study reported greatly reducing or eliminating the amount of homework. A MYP educator from the Private International school in Germany noted, “I do know that [school teams] were responsive to concerns that parents had about all the screen time because initially, we were doing full classes and then I think we cut it down to 40 minutes, maybe... but then it gave kids a longer break between. I think at some point also, they said no homework. I do think that they were pretty good at being responsive. As research came out and as things happened with digital learning, I think they tried to incorporate it as best as they could.” The Private International school in China (Multiple Programmes) further innovated its scheduling and student support system during the COVID-19 pandemic by developing a process that allowed secondary students to see what synchronous classes were being offered by teachers on different days and to sign up to attend classes that fit their schedule/time zone²/support needs, thus essentially empowering students to create their own learning schedules: “That was very much an innovation letting students get on with... having a front-loaded [system] and then giving them their own time and autonomy to decide when and how

² When the Private International school in China (Multiple Programmes) made the move to digital teaching, they were on holiday and many educators and students and their families were out of the country and in different time zones around the world.

they do it and how they chunk their time between the initiation [of the assignment] and the product delivery.”

Teacher-Level Innovations

When asked to describe innovative digital teaching and learning strategies they personally experienced for themselves during the pandemic, the responses from IB educators fell into two main categories. The first type of innovations centered on the ways in which educators were able to build new digital teaching skills and use the skills and resources in their instruction and interactions with students. Across schools, IB educators noted the importance of collaboration times where teachers met to share ideas and resources, as well as having teachers with more experience in digital strategies support those with less experience. As one IB educator at the Private National school in Brazil (Multiple Programmes) noted, “My personal pride and joy during the pandemic was really coming from zero to hero technology-wise.” These collaborations, which occurred both online and in person (as allowed by the pandemic conditions) and across schools, increased educators’ comfort levels using digital technologies and applications. One educator at the Public (U.S.), USA (PYP) school discussed the importance of the teachers having good training to help them better support their students: “I think COVID forced us to all sharpen... our skills. I think in the long run, it has benefited us. When we think about what it means to be an IB School in 21st century learning, I think it’s important as educators, before we can share with our students how to have those tools, we need to embody them as educators.” Educators at some IB schools created their own videos and used other communication strategies to support and train teachers, while others sought out and shared videos and training resources they found online, such as Teachers for Teachers and the Global Online Academy.

I can say that the implementation of my virtual classrooms was something that was very successful for me because... I also began to have a network of music teachers who began to share, to create, to share tools, and that helped me a lot to have such access, that there were virtual instruments, for example, that children who did not have a way to reproduce sounds at home could do so, apart from the voice and the body, with other tools too, and I still use them. In other words, they are things that I am still implementing, and many times I take things that I myself created from that base, and it is already a whole database that for me it has been successful to have, and not only there but from that, that same network of teachers continues to function, and we continue to communicate. So it is something very nice to be able to count on that connection of people who were going through the same thing as me, and from their practice as musicians they were also able to take advantage of what I did, and I was able to take advantage of theirs. ~ IB Educator, Private National, Colombia, Multiple Programmes

We also built in [to our faculty meetings] what we called CRMs this year, which were built into the timetable, they’re collaborative rotation meetings. And I guess, basically, what it is, is if there’s four weeks in a month, one week was devoted to edtech. And so, the edtech team would go and meet with all of the teams in one week. So, every month they’d get a built-in meeting into their timetable. And what this did was allow in a slightly smaller group, a personalized approach to what does this team need just implying learning in

terms of what the tools can do and what are we struggling with or what do we need a fix for. And that helped [educators] to kind of help onboard those new tools. ~ IB Educator, Private International, China, Multiple Programmes

We made it a point that... as educators we meet after school on computer after 4:00 and then exchange ideas. What went well, what was successful, how we can modify our teaching, and if teachers were struggling, then we were having these sessions to help teachers to navigate those technological tools. So, I feel it was a big boon for the teachers because it helped us to, in a challenge... strengthen our knowledge about, you know, technological tools. ~ IB Educator, Private International, India, Multiple Programmes

The second type of teacher-level innovation described by IB educators consisted of those that centered on ways in which the educators structured their new online classrooms, the instruction and resources they used during digital teaching and learning, and their perspectives on what made a “successful” online class. After the initial and sudden transition to digital learning, when schools started making substantive changes to student instruction schedules based on research and best practices in digital teaching and learning to better support students, educators began the process of developing innovative online classes to include the new technologies to which they now had access. One educator at the Private National school in Colombia (Multiple Programmes) stated, in response to the question about what was innovative about their digital teaching and learning experience, “I don’t know if this is really innovative, but, of course, the whole format of the virtual classroom, of having a virtual classroom, which concentrates the evaluation schedule, the links to meet in class, the planners, resources to work in class, virtual resources, whether [it is] text, images, videos.” Educators noted the importance of embedding a variety of instructional materials to keep students engaged, “... a combination of things to present instruction with multimedia, that seems to be the best combination to help kids” (IB Educator, Private International, China, Multiple Programmes). This sentiment was echoed by an educator at the Private International school in India (Multiple Programmes), “But because of COVID I had to make sure that my 80-minute session with my students had to be different. Like, every 20 minutes I had to bring something different to keep their attention. I guess what that basically means [is] a change in the routine.” One educator at the Private International school in Germany (MYP) noted that getting feedback from students about their online experience was also helpful: “Getting feedback from the students was quite good. I would ask my class, ‘What are you doing in other classes that works?’” A couple of the participating schools were able to transition to hybrid classrooms throughout the course of the pandemic, where some students were present in the face-to-face classroom while some either continued in or moved back and forth to remote learning, based on a variety of factors (e.g., parent/guardian choice, family illness, quarantine, governmental directives, etc.). This transition also required educators to innovate the ways in which they set up their physical and online classrooms to support all student learning, including the use of cameras and instructional tools.

I started to use virtual platforms more systematically. It was something I already did, but now I do it more often. So, for example, for reflection processes I use Flipper a lot, or I use Jamboard, all that kind of stuff. For quizzes, well, I have Quizzes, Kaput, like all those tools

that I learned to use in virtuality, I now use them in a much more systematic way. And I also make the students use them and get them used to using them permanently. And it has really made the processes much easier. For me they have been vital for the processes of reflection. All those tools, I think that has been the biggest innovation that I have done in my class, to use those digital tools for reflections. Super simple, super easy, the evidence remains, the kids love it, they don't get bored, so it's been wonderful. I think it has been what I innovated the most in my class, during and after the pandemic. ~ IB Educator, Private National, Colombia, Multiple Programmes

That was something that I found much more successful, was designing units to be... basically, here is your at-home task and here is your in-class task and taking advantage of that contact time when you have them in the classroom to prepare them to be able to do things more independently on their own at home for me, at least, was a much more successful hybrid environment. ~IB Educator, Public (U.S.), USA, PYP

One of our history teachers, he just restructured the hour that he had with the kids differently to if he'd been teaching face-to-face... But he'd always send them, for example, a bit of pre-reading or something that they had to watch and then when they logged into the lesson, he would have up some questions. They would go into their channels and discuss those questions and then there'd be some kind of activity for them to do. I think it was quite a bit of innovation around how you structure the activities in a classroom hour. ~IB Educator, Private International, Germany, MYP

For many educators, an innovation that resulted from the transition to digital teaching and learning was in now having complete sets of classroom materials, including recordings and instructions for how to complete assignments and use the communication/collaboration tools, for use when students are absent or there was a return to a remote-instruction situation. In addition, many educators noted that having the materials available online will be useful for students who want or need to review classroom materials, and for parents who want to become more familiar with what is happening in their children's learning.

I think before, [the teaching] mindset was you teach your lesson and that's it. I don't think anyone thought about the fact that you could record it or have a student view it at another time or have multiple students listening to different lessons all from the same teacher, but since they were recorded, it provides more flexibility, right? So, they're still getting to interact with the teacher and still getting to learn from the teacher. ~IB Educator, Public (U.S.), USA, PYP

The virtual classrooms also allowed us to structure and formalize student access to all the resources of our classes, so it is like a constant, living agenda that one feeds, and they have the ease of navigating it according to the need they have in their class. So having in real time the information, instructions, procedures, the teacher's explanations or the resources that have been made available to facilitate the experience, because they are an advantage, that many times we don't even have it even in person, it all depends on wear

and tear from the teacher, but they do not find in a permanent place what they need for their class. ~IB Educator, Private National, Colombia, Multiple Programmes

Finally, several IB educators reported the innovation they experienced because the digital transition was a change or reinvigoration in mindset about the importance of relationships, among both school staff and students. One educator at the Private International school in India (Multiple Programmes) noted, “I think the teamwork which came out was very strong and the fact that all teachers are learners and everybody challenged themselves to rise up to the occasion.” While educators stated that prior to the pandemic, relationships were clearly an important part of the educational experience, the remote experience highlighted for many educators not only the critical nature of having and maintaining good connections to their students, but also that school staff need those connections. Many discovered, although they preferred face-to-face connection, there were ways in which they could effectively and consistently develop and maintain connections through digital means. Not only did they maintain connections with staff, students, and families at their own school, but many also developed new connections and networks with other schools.

For me personally... the most innovative experience was not a tool or not a way in which I delivered instruction with. The way colleagues and leadership developed relationships through being digital. The way that we connected remotely, the way that we continued to support each other remotely. I think that was the most innovative thing... It showed me how important those relationships are for everything. ~ IB Educator, Private International, China, Multiple Programmes

I learned to think outside the box even more. I always considered myself to think outside the box and then COVID hit and it's like no, this is what it means to be outside the box. It really stretches you. It requires you to become more creative. It requires you to think about things from different angles... Everyone talks about the importance of teamwork and collaboration, but it's made all the difference and actually seeing it in collaboration in action at that level just shows how much a school can accomplish if they have that spirit of teamwork. ~ IB Educator, Private National, Brazil, Multiple Programmes

Student-Level Innovations

Many of the innovative digital teaching and learning strategies noted by IB educators were those that related to ways in which students received instruction and support. Educators were enthusiastic about the new collaboration and communication platforms and tools that were widely adopted across schools. Besides the use of centralized platforms and learning management systems like Microsoft Teams, many educators noted the use of collaboration tools allowed them to create shared folders where instructional materials and student schedule materials could be easily located and accessed, like the one used at the Private International school in India (Multiple Programmes), “We had these online weekly diaries that would go every week to the students. It was sent right up in the morning. Even if the student is sitting at home, they knew that this is the class, this is when the teacher will be logging in. There was a structure to it. It was not completely haywire.” Educators also appreciated the use of shared documents where students could work individually or in groups, and educators could

provide rapid feedback. A IB PYP educator at the Private National school in Mexico commented, “For me, it was more easy to me, for example, check the work in real time, because they worked on the Google Doc, give some example, and I can see the work in that moment.” Another shared,

For example, we have the class notebook. It used to be a notebook where teachers would just tell when you have a test, when you have research... Everything would go in that notebook. Now we have this [digital] collaborative notebook for each class. ~IB Educator, Private National, Brazil, Multiple Programmes

Across schools, IB educators provided specific examples of innovative digital tools used to deliver or support instruction. For example, many science educators used online simulations and science experiment videos to bring laboratory experiences to their students at home. Mathematics educators described using a variety of online tools, emphasizing that the most difficult part of teaching math(s) online was being able to write out problems and give students feedback on written work. One educator at the Private International school in India (Multiple Programmes) found online graphing tools particularly useful: “We have been able to use the technology in a very effective way, one of them being especially in math[s]... we were using a lot of paper graph for drawing the graphs [in person]... but then during COVID, we were able to use the software or applications such as GeoGebra, Desmos, where they were really able to visualize and also to explore.” Another educator at the Private National school in Mexico (PYP) shared how their school staff is proud of the way they teach their young students how to write, so to continue their high level of instruction while online, they were able to make and share videos of one of their teachers with a specialty in grip and tracing: “She posted the letters. And she could see how the children with their fingers sort of traced them. And she had a one-on-one approach. And she also made some videos for each grade... So, those videos, we send them to the parents... So, having those videos that were like a tutorial, were very helpful for the parents and for her class to be successful.”

In the very beginning [of the pandemic], all Chinese teachers were very frustrated. Students handwrite [Chinese characters] and then they have to take a photo, or they scan to use a PDF. They do some other file text format. When they send their work online, you're able to mark them or not really depends on text format of how you choose. Then which platform they turned it in. It's really frustrating. Then we decided to use our department budget to buy some iPads. We bought every single teacher an iPad and then we had a couple of rounds of training in our department regarding how to use iPad to mark and how to train students to turn in their handwriting in a certain text format with a certain platform. How we use, for example, Notability on iPad to work out a way for cross note and then we can handwrite, share, and then share as a PDF to students instantly... I think after two or three years of online learning, every Chinese teacher now is super good at iPad. ~IB Educator, Private International, China, Multiple Programmes

In addition to using digital resources to deliver and supplement content area instruction, many educators were also proud of teaching and learning innovations they developed using things that educators and students could find in their own homes. Some educators used their own homes as demonstration sites, like one PYP educator at the Public (U.S.), USA school: “I created my home lab

with my doc webcam. And I had my science experiments on my table at home.” An educator at the Private International school in India (Multiple Programmes) noted, “I would say we started using the innovation strategy with very basic things. In school, we are equipped with a lot of resources and manipulatives. But now, when we had to do the layers of the earth, we had to use an onion because the resources which we had at home and the students at home, we used to explore those things and bring our best from our lessons and teaching learning activities.” Another educator working with very young kids at the Private National school in Brazil (Multiple Programmes) had parents join in the learning at home: “When I got the families engaged... I had them saying, ‘Oh, my gosh, your class was so fun. I was working right beside my kid and I wanted to do Play-Doh along with you.’ I asked the parents to bring the material and we did a live class making homemade Play-Doh.” Other examples include the following:

For example, the dance unit in PE. The teachers, they transferred into an online teaching mode that’s quite difficult, it’s all physical. But they did get kids to work out in the house using the limited resources they have, or they get them out to run and send the screenshots of their steps and the workout plans. And it also involved them putting the kids into breakout rooms and they danced on the screen and then recorded as their dance product that they present to the teacher as a unit product. They worked together collaboratively to submit their work. ~ IB Educator, Private International, China, Multiple Programmes

So, their lab or their art room was the kitchen. And they took vegetables and created little structures or sculptures, or they use hotcakes and... the painting was on a hotcake. And I mean, things like that that were really, I would say, accessible, cheap, in their houses. And then, we created presentations that were beautiful. Or if they had a painting at home, whatever painting, they reproduced the painting with pieces of cloth or flowers. . . And we each sort of gave ideas to our colleagues like, ‘Do this in science. Do this in art.’ So, I would say that we’re proud of having been able to deliver the curriculum in a very creative way online. ~IB Educator, Private National, Mexico, PYP

Educators at several schools shared innovative ways they used the ability to connect virtually with people and places to bring experiences to students that they may not have been able to in an in-person environment. Classroom instruction in some schools was enhanced by virtual visitors. One educator at the Public (U.S.), USA (PYP) school reported how their school invited black business owners for Black History Month, scientists from the Grand Canyon, and writers from the Pulitzer Organization to visit them virtually, using their Microsoft Teams platform. Fifth grade students at the same school also participated in a classroom exchange and peer-partnered with a school in Florida for writing "workshops". Another educator at the Private International school in India (Multiple Programmes) noted, “We could get global speakers this time and really, it went off well. We could call a scientist. Students were very engaged the whole day. The pandemic really challenged us, but we could overcome all that by doing this kind of thing.” Virtual field trips were also new features of many schools’ instruction during the pandemic, for example visiting museums and galleries, and many educators plan to continue these innovations going forward. In addition, many educators discussed

how they used the tools of the digital environment to continue to conduct established school-based activities online, such as science and art fairs, student project exhibitions, and awards ceremonies.

We started experimenting with virtual field trips... I was just trying to find a way whether it was covering a class virtually or providing an outlet for kids, connection to what they were learning in class, I created virtual field trips and dabbled in that. That was really neat. I did one for each grade level. The kids really seem to enjoy it. I made connections to their existing IB units. So, the field trip was connected to what they were learning in class. It was kind of an extension of that. It was really well-received by the teachers and the students, and I still have all of those virtual field trips. That's something we can use for years to come.
~ IB Educator, Public (U.S.), USA, PYP

During the pandemic, we had the opportunity to start working with a foundation called Pazosfera. They work with the population deprived of liberty. In normal circumstances, it would be impossible for our CAS students to assist in person to jail because they only allow adults to enter. But thanks to this new dynamic of the pandemic, a space was opened in the Buen Pastor Jail, a women's jail. We could communicate with some of them and for me, that was really valuable because, in other circumstances, if the pandemic wouldn't exist, that space wouldn't have been opened. Pazosfera already opened a program where our students can share with this population, and it has been very nice and wonderful. ~IB Educator, Private National, Colombia, Multiple Programmes

Curating the exhibition offline suddenly, which we never experienced, was a very first-time and first thing we had to tackle. We chose to go it and set up work at home. Students displayed their work using Airmeet as a medium to showcase their work. That was something really new and innovative for us and then kids could also display their work very, you can say confidently in front of them. Because I have few kids who are not very open to talk to people so easily. So, they feel very comfortable in fact going online and just read to themselves and show their work and talk to people about what is that they are trying to show through it. That worked well. ~ IB Educator, Private International, India, Multiple Programmes

Another way in which IB educators reported using innovative strategies and practices to support their students during the COVID pandemic was by offering a wide variety of ways students could evidence their learning. Although standard assessments presented some challenges in the digital environment, educators were able to surmount some assessment barriers by using platforms like exam.net and one-on-one video conferencing. However, educators also found that offering a variety of options for demonstrating learning and understanding often increased student engagement and empowerment.

In grade 10, they studied a novel. The assignment and summative was set up in a way that students picked, not the novel, that was given they because they sort of did that together and they discussed it. But then they were... asked to pick one episode or one small section of the novel, focused on one of the characters they chose and then they had to analyze it from a certain point of view. They were maybe given five ways of doing it and the format

also... That way, it was possible to assess them, and it was totally individualized and differentiated. ~ IB Educator, Private International, Germany, MYP

I would say on a day-to-day basis, assessment was more individually focused. There were times when after school, we did something called Q&A at the end of the school day. So, children... would stay for the Q&A session. So, I would say the teacher's eye... There are things the screen couldn't hide, right? So, it was more on a one on one. And we didn't use the test. And if they did the test, we needed a lot of support from the parents. So, parent involvement became very evident because it was there or because it wasn't. And I think they played an important role in assessment because sometimes we would ask them to please print out whatever quiz only to be able to know... Not because of grades honestly, but because we wanted to know whether they were ready to move forward or not. ~IB Educator, Private National, Mexico, PYP

I used collaborative boards where all the kids could put their things, they used platforms to create stories with cartoons, with music, I asked them for podcasts, videos, photos, I even had them make some... well, I also received work done in ceramics, so during the pandemic I greatly expanded the spectrum of products that the children could give me, also thinking about how to motivate them more. How to get the student to generate a link with the class experiences. So what I did learn too, in addition to the use of platforms and others, was to expand the range of products that the children could give me as class work, from videos to the little ones making a piece of music that recreated a story, but they did only with a violin piece, even works done in ceramics of a tremendous introspection exercise, murals, collage, well, what didn't we do. We got to know each other's house. You know? It wasn't just platforms. It was also, man, we're home, let's also get to know each other a little better, then show me your... show me your bedroom. And what is special in your room? Show me the most special thing you have here. I don't know. I mean, it was really trying to make a connection with them, and not so much focusing on literary studies and text analysis because they were going to totally disconnect from me. So, we're talking about a range of platforms but also personal connection experiences with the class. ~IB Educator, Private National, Colombia, Multiple Programmes

We thought design would be easy. Teachers know about computers, know about the software. They should be easy to get the kids going on a digital design product. The first year, we learned a hard lesson that the kids all struggled with using the software. All the kids struggled. Or I would say most kids struggled. They just could not get to finish that project even though the software is on the computer, they know the skills. And design teachers adapted. After seeing the initial challenge, they transferred the unit into a design carousel where the kids could choose different projects that they can actually manage and work on at home on their own computer with the teacher's guidance. So, that's why I was saying that it's the mindset of the people involved in the teaching and learning that is defining innovation rather than the content itself. ~IB Educator, Private International, China Multiple Programmes

The importance of providing student support and connection with their teachers and other students led to new ways through which IB educators maintained relationships during the pandemic. Educators recognized the impact of students being isolated from school and each other and tried to incorporate strategies and routines to help alleviate the isolation.

We used breakout rooms as well when we were all at home. That gave kids a feeling of belonging still. In my room, we would do classroom job[s]. Each beginning of the day for example, I'd have somebody present the news, somebody else present the weather or somebody else give a joke. We would often do that one feature on Microsoft Teams where it looks like we're all in like a theater together for example. They really enjoyed that and they wanted to always see what new background we could be in. ~ IB Educator, Private International, Germany, MYP

I just want to share something about the student support system. I think during online learning or transition to digital learning, this gives a chance for us to even develop the students' support system even better. For example, during the online learning period, teachers have come out with a lot of even more specific guidelines. For example, what to do if a student's assessment or assignment is missing. They have those clear guidelines. The first step, if you don't have a reply from the students within 48 hours, what do you do? If you don't have a reply from the student within one week, what do you do? Who to copy to and who to send emails to? Those very specific guidelines. Also, during everyday check in, a mentor will take care of the check in every day. However, we also have at least one online video virtual mentoring talk with each student. If we notice any issues, we usually leave comments on my time to inform the subject teacher, the counselor, and learning support teacher, and some other grade level leaders. I think our student support system is being developed even better during digital learning. ~ IB Educator, Private International, China, Multiple Programmes

Parent/Guardian-Level Innovations

IB educators discussed the importance of including the parents/guardians of students in the communication platforms that were implemented during the pandemic. Although many educators noted that parent communications had been part of their school practices prior to the pandemic, the new platforms were seen as ways to deepen the relationships between educators and parents and engage them more fully in their children's educational experience. An educator at the Private National school in Brazil (Multiple Programmes) noted, "We changed the whole communication of the school. Now we communicate better with each other, and with the parents, and with children." To this end, many administrators and educators created new tutorials to support parent/guardian understanding and use of technology for themselves and their students. In addition to the general communications, educators at some schools also reported they were able to open up new channels of feedback directly from parents/guardians. As one educator at the Private International school in India (Multiple Programmes) stated, "I also think we had a lot of great feedback from parents in terms of how we cared for their children and how they felt that high-quality learning was happening with what they were doing because it was a time when our teaching had never been so visible."

Something we realized very early on related to students just not being engaged, and we had a lot of parents contacting us saying, "Well, my ninth grader is in bed all day in their pajamas and they're looking at a screen, but I don't know what they're doing." In response to that, we created an Excel spreadsheet that just... had tabs at the bottom every week and then the subject and the teacher name. The teachers just had to write a brief couple of sentences or statements explaining what the students would be working on that week so that the parents had a bit of an idea of what their kids should have been doing and then they could have conversations with them. That was really very popular. We got a lot of positive feedback from both students and parents about that because it just helped them support the kids. ~IB Educator, Private International, Germany, MYP

I think for me, I have to say that I actually used parents, whenever they were available. Since we are talking about early years, okay, so we're talking about very restless and creative and noisy and hyper [young children]. I actually, whenever I see that they were maybe open to working with us...or maybe listening or wanting to share something, I would ask them to maybe, I don't know, have an activity ready for us to follow or read a book or, I don't know, if they had something that they would have in their house that they wanted to show us, like for show and tell, I would actually encourage that to happen to make them feel like we were part of their environment, even though we weren't in the same place. It kind of felt that way. So I think I did use the help of the parents a lot, like an extension of me. ~IB Educator, Private National, Mexico, PYP

I also think it is a very nice opportunity for the parents to value the work of the teachers. I think that talking to parents is one of the main challenges that one has in these management positions. But I feel that I learned during the pandemic, just as they learned to value the role of teachers, and the work that they do in the classroom, the value of a teacher is really invaluable... with their children. So, I also realized that if [parents] are not on the same shore as us and we do not feel that they are members of the team, we are not going to make it to the other shore. So, instead of seeing them on the other shore, what I did was to put them on the same shore as me. So, come with us too, and we are all rowing towards the same side of the same boat, and we are not in opposite teams if you are with us. ~IB Educator, Private National, Colombia, Multiple Programmes

Beyond communicating with families about student academic issues, some schools began using the digital tools they acquired during the pandemic for student instruction as a way to allow wider access to school-based events, which they plan to continue with the return to in-person instruction. One PYP educator from the Private National school in Mexico noted they will also be able to provide virtual tours of their school for applicant families that live abroad, which they did not offer before the pandemic.

Instead of having parents coming here and we're going to present the new program they had, they made videos and then I met with the parents and then they went to see videos. That was one effect, one positive effect in terms of innovation. We will also use that in the future. When we have parents' meetings in the future about presenting curriculum, we will

also allow parents who, many of our parents, they live maybe one parent live[s] here, another one is traveling... and they also want to be part of it. So, that will be so we will have, both face-to-face and digitally in the future. ~IB Educator, Private International, Germany, MYP

I would say one thing that we are doing consistently as a school is our all-school meetings. Those are all a live stream. We have a whole production team. I'm one of the producers. Teachers will project the live stream onto their smart board, right. So, everyone's in their classroom watching the old school meeting. They're at home watching. Yes, and the production team is in my office. We're running this virtual event and kids are in their individual classrooms around the school watching from their smart board. The custodian might join in on his computer. Front desk might join in and then parents and community members are watching from whatever space that they are. All school [meeting] is like a big part of our school community. It's basically a time once a month where we all come together. ~ IB Educator, Public (U.S.), USA, PYP

We recently had an award ceremony, and we know many times, the parents could not attend due to different kinds of work obligations or the personal life obligations. We streamed it simultaneously for the parents and also to ensure the COVID protocols and everything is maintained. That was a hybrid event that happened. I'm sure the school is going to continue with that in future as well. ~IB Educator, Private International, India, Multiple Programmes

Across schools, the most common innovation that arose due to the digital environment of the pandemic was the move to offer parent-teacher conferences online, which educators agreed would continue to happen in the future.

It works well for working parents because all could attend. So, attendance of parents was very, very high compared to the physical one because to meet teacher for half an hour, parents had to take a leave and then actually travel too far and come. That's something parents also want [the] school to continue with. They were also very happy. ~IB Educator, Private International, India, Multiple Programmes

Contextual Factors/Characteristics

Across the schools that were visited virtually by the researchers, there were many shared contextual factors that contributed to the ways in which educators were able to successfully implement innovative digital teaching and learning strategies that are important to consider in relation to how the online environment worked for other schools. Similarly, there were contextual factors that were limited to individual/small groups of schools as well. A summary of these factors are noted below.

- Across schools, most students had swift access to computers to use at home, either issued by the school or one that was already in their home.
- Internet stability and connection was not a limiting factor in most global areas.

- All schools shared the common feature that the pandemic transition happened very quickly, and schools had very little time to prepare.
- Most students had at least some familiarity with the use of technology, although at varying levels depending on age and the type of tools used (e.g., even though older students were adept at some applications and cell phone use, the communication tools and collaboration tools needed instruction for them to use effectively).
- In general, parents/guardians were very supportive of the schools, teachers, and their students, although there was some variation in how involved parents could be by home context.
- Some schools experienced restrictions or challenges based on local rules (e.g., no online education program at all in the school in Brazil prior to the pandemic, restrictions around being online with young kids in Germany and Mexico, firewalls and limitations on Internet use in China).
- One school discovered at the onset of the transition to digital teaching that a good proportion of their staff did not have home computers, so they had to find ways to get them technology to support teaching from home.
- Most schools had some experience with digital technologies and instruction already in place, while at least one had almost none.

Educator-Reported Facilitators and Barriers to Digital Teaching and Learning

IB educators were asked to describe facilitators and barriers they experienced in the process of implementing digital teaching and learning strategies. Common experiences are noted below.

Facilitators

- School-Level
 - Clear communication and support from school leadership and IT departments
 - Flexibility and trust from leadership around trying new strategies and practices
 - Allocation of resources and investments in technology and resources to support digital teaching
- Teacher-Level
 - Teachers experienced with online learning supporting teachers with less experience
 - Instructional videos for using communication/collaboration platforms, classroom applications, and other shared content area resources
 - Teacher empathy and emphasis on adult and student social-emotional well-being
- Student-Level
 - Student feedback about strategies and practices they enjoyed and found useful/helpful
 - Students excited to explore and use new technologies
- Parent/Guardian-Level
 - Increased online communication and feedback
 - Trust and from parents/guardians that teachers were doing their best

- Parents/guardians available to support students, especially those able to sit with younger children and assist in their learning

Barriers

- School-Level
 - Schools with little prior experience in and infrastructure for online learning
 - Switching to new communication/collaboration platforms or strategies
 - Local rules limiting online access to students or Internet content
- Teacher-Level
 - General fatigue (physical, mental, and screen) and feelings of being overwhelmed
 - Too many digital teaching and learning options from which to choose
 - Effective assessment and differentiation of instruction
 - Initial lack of appropriate technology
- Student-Level
 - Depression, isolation, and lack of social contact
 - Students not wanting to turn on cameras during online synchronous work
 - Students uncomfortable with online class participation or engaging in group work (e.g., breakout rooms)
 - Lack of familiarity with accessing and managing new technology for collaboration, especially younger students
 - Maintaining student engagement in online environment
- Parent/Guardian-Level
 - Variation in parent availability to assist students in online learning

Leveraging Experience with Digital Teaching and Learning Moving Forward

At the time virtual visits were conducted by the research team, many educators were already back in the classroom. These educators were given time to reflect on their experiences through participation in focus groups and interviews and to tell us about how they can/ are leveraging their experiences as they continue to move forward whether that be in face-to-face or hybrid classrooms. IB educators were asked to reflect on positive changes they saw in their schools, and other lessons learned during this time and transition.

Positive Changes

We asked IB educators to consider positive changes that occurred throughout their journey in distance and hybrid learning. It was difficult for many to highlight the positive changes when the barriers seemed to carry more weight. Many educators who participated in our focus groups explained to us their school's lack of experience with technology prior to the pandemic. Though this created an added burden to this already difficult and unprecedented situation, many educators were able to appreciate their school's rapid technological advancements.

Well, the most obvious thing is the amount of knowledge that we now have on IT tools, techniques and that it was really something outstanding. We wouldn't have this kind of

growth in knowledge if it was not because of the pandemic... I think that even though they were far apart from each other, the students, the teachers, how we were able to get stronger as a community by one helping the other, even though we were not physically together. So I think that's it. I think that the pandemic made us somehow stronger. Somehow the team, I had to trust them. I had to delegate because I wasn't... I knew that it wasn't possible for me to do everything all by myself, and it's very good experiencing this when you think about this trusting and to build up as a team, as a leadership team. ~ IB Educator, Private National, Brazil, Multiple Programmes

Although distance learning was continuously described as a struggle by interviewed educators, many acknowledged the benefit for students of being physically apart from each other on their ultimate return to the classroom. Not only were their relationships described as having grown closer as they navigated distance learning, but IB educators in the focus groups also described the positive impact that distance had on students upon their return.

I think that the kids were a lot happier coming in. I did hear from parents that they saw a difference in their children, The children were happier. They got to meet kids, they got to meet... It was funny because they'd only seen a child on the screen, so sometimes they're like, "Oh, I can actually see your whole body now," actually making that connection. You could tell that they were a lot happier being in the building and coming in, even if it was for that last semester. - IB Educator, Public (U.S.), USA, PYP

Many educators noticed increased parent participation with their child's education during their remote learning experience. An educator at the Private International school in India (Multiple Programmes) shared, "A practical example would be the parent-teacher conferences. We sort of went to an online platform for that, and we had a lot more parents who were able to attend because of that." Another educator attributes the higher levels of family engagement to the fact that teachers simply "became more accessible" (IB educator, Private International, India, Multiple Programmes).

Since my students were so tiny, I think the feedback from the families... That feedback was really important for me, hearing from the parents that the kids are like, "What time does class start? Is it now? It's over already. Oh, no." Hearing that from the families and the kids that I was like okay, I'm going the right way. - IB Educator, Private National, Brazil, Multiple Programmes

It is also important to note that some groups were not able to come up with any positive changes from their distance learning experiences. Some educators were more straightforward in saying they simply "hate digital learning." Other impacts of digital teaching and learning drew back to those challenges stated before. An educator from the Private International school in Germany (MYP) noted, "Sort of collectively, the most positive thing was that everybody shared an understanding about how challenging this was. So, people would work together to try to find solutions, and that's about it." Shared experiences in this sense was a recurring theme with educator responses around positive outcomes.

Lessons Learned

IB educators were asked to reflect on lessons learned in their experience with digital teaching and learning. One common theme that emerged was how teaching during the pandemic really allowed educators to reflect on personal and professional attitudes and perceptions that affect their roles as educators. Patience, tolerance for uncertainty, flexibility, risk taking, thinking outside of the box, and the ability to be resourceful were topics mentioned across schools. In addition, many educators reported that they felt it was important for school leadership to acknowledge, support, and trust teacher autonomy. The idea that it is just as important for the adults to be able to make mistakes was seen as providing good modeling for students. Many educators also expressed the desire to continue to connect and network with other educators more, both within and across schools.

There's no question that if you teach a kid standardized tests and they do exam, practice, exam, practice, exam, practice, they're going to do well on the test. But what happens when life comes along and it's no longer answering an equation but solving. You're an architect and you have to figure out how to build a bridge between point a and b, or you're a lawyer and you have to do conflict resolution, you're a doctor and you have to make a decision about how to proceed. I feel like standardized tests are still a long way from that reality. They're still a long way from what I think education should be for the future. I think the IB is well positioned to make that quantum leap of faith and pioneer something that will definitely influence for the benefit of all: the education. That's the takeaway from [the pandemic experience]. ~ IB Educator, Private National, Colombia, Multiple Programmes

In terms of lessons learned about the design of instruction, IB educators agreed they will likely continue to use more digital tools in their regular in-person instruction to create a more active learning environment, increase student engagement, and differentiate instruction. One educator at the Private International school in China (Multiple Programmes) noted this is a digital generation of students who expect to use a variety of technologies in school. However, educators also agreed it will be important to find the right balance. Many educators suggested there should be more explicit instruction around how to use technology and social media appropriately, as well as including technology as a topic when teaching ethics.

It is moving us towards a more active learning environment. I think technology and blended learning and those ideas, they're not new that have been going on for a while and that were slowly being implemented by teachers, I think that it was a push towards that movement. With this, we've got new forms of differentiation in classrooms. That's something that we've been working on in the past few months and moving towards a more active approach and a more diverse lesson, I think, with differentiation among students for example. ~IB Educator, Private National, Brazil, Multiple Programmes

Another common theme among educators about the design of instruction learned during the pandemic was the importance of taking the time to reflect and self-evaluate. As educators had to work to ensure that their online lessons provided the most critical aspects of the content they needed to impart, many noted they would continue to reimagine how the time in an in-person lesson is being

used and structure lessons to be mindful of the use of time. Many educators also reported the digital teaching experience reinforced the importance of ensuring that learning outcomes are clear and instructional materials are available to students and families.

I think one of the things that I've really learned and that I think is more traditional, I think, is going back to basics. We need to be really aware that we're breaking up a class. I know that we did this shift [during the pandemic] where we ended up being online. A lot of my classes, I'd look up and I had been talking for 40 minutes. I don't want to run my classes that way. I wouldn't run my classes like this in school in a face-to-face situation so why am I running them like this online? I think it was that awareness of really making sure we're hitting those different learning styles in the class and setting up different activities that get kids off screens, and moving around, and in different parts of the classroom. I think for me, it's really just that wake-up call or that reminder that we need to be really careful about how we structure our lessons so that it's not all talk and talk. It's a mixture of different learning styles. ~ IB Educator, Private International, China, Multiple Programmes

IB educators were reminded of the importance of the in-person school experience during the shift to digital teaching and learning. The interactions and relationships between all of the members of the school community were noted as critical components of student social and emotional well-being, and many educators discussed how moving forward they do not want to lose sight of this element of school in favor of solely stressing academic success. While all educators agreed with the importance of the physical school community, some also noted they learned that schools and learning also happen *beyond* the building and need to reflect on how best to use this knowledge to support student learning across multiple environments. An educator at the Private National school in Mexico (PYP) noted, "A school doesn't need a building. A school is beyond the building. The definition of the school has to change because we were a school and we never came to the building."

This is maybe not even something super new but I was definitely made aware of it again that it's not always the subject, the academics, it's the well-being of the student. The middle schoolers, they took it pretty well and did it, but there were quite a few [students] I had last year, and some of them were really not doing well mindset/psychological wise. And then one of them said, "Okay, what is the most important, that you learn how to write a correct sentence in German or that you go outside and get some fresh air and some daylight and take care of yourself?" My subject is my subject, but I'm just not taking myself and my area too seriously. It is after all, the well-being of the single individual. ~IB Educator, Private International, Germany, Multiple Programmes

Another theme among IB educators about lessons learned from digital teaching was the increased comfort with allowing students to evidence learning using a variety of assignment choices and multiple modes of presentation. Many educators agreed students often felt empowered and demonstrated increased comfort with independent learning when given the opportunity and appropriate supports. An educator from the Private International school in India (Multiple Programmes) commented, "[Students] took ownership of their own learning according to their own age level and grade level because that was an option that was given to them at the end of the first

year of the pandemic. That again, helped them to be responsible learners.” While this was not the case for all students, as some struggled with the transition to digital learning, educators were able to see how some of the autonomy required for digital learning might be incorporated into in-person teaching and learning.

Kids really had a deeper understanding and could grasp their own learning in ways that in a classroom, it's kind of like you're just here and then you go. I don't know. It had a deeper level. And I'm not saying that was the same for everybody. Everyone's experience is different. For example, I remember there being several kids who I gave them a platform, but they came back with something new and said, “Hey, I researched and found [something new].” They step out and take charge of their own independent learning. ~ IB Educator, Public (U.S.), USA, PYP

Finally, IB educators described how their relationships with parents and families could be strengthened by continuing the consistent communications that were enacted as part of the transition to digital teaching. Educators acknowledged that their school populations ensure that they typically have a higher degree of engagement with families than other schools in their areas, but even so, there was room to engage parents and families more actively, especially for those who could not often attend school events due to work and/or family responsibilities.

Appendix G: Phase 2 Survey

Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

Background

In 2022 the International Baccalaureate (IB) Research team partnered with Inflexion to explore the digital innovations in teaching and learning that resulted from the transition to online learning during the COVID-19 pandemic. We know teachers and schools faced unprecedented challenges during the pandemic but were also very resilient in addressing challenges and adapting. We would like to hear about the innovative ways in which you addressed the challenges you and your school experienced. Towards this end, Inflexion researchers have developed a survey to help us better understand:

- school and teacher journeys with the use of digital teaching and learning over the course of the pandemic;
- teachers' innovative approaches with digital teaching and learning strategies and practices; and
- the future-focused strategies and promising practices teachers might consider bringing into their schools and classrooms post-pandemic.

The survey will take approximately 20 minutes to complete, and it will help us explore how teachers' and schools' experiences with digital teaching and learning can be leveraged to inform innovative practices in IB classrooms and schools in the future.

Confidentiality

Inflexion will take all steps necessary to make sure that the results of this survey are kept confidential and available only to the research teams at Inflexion. Datasets will be provided to IB's Research and Design department at the conclusion of this project; however, all identifying information will be removed. Your IB World School Manager, programme relationship manager, and school will not see your individual responses. Further, your responses to this survey will not affect your relationship with the IB. Inflexion staff will conduct the statistical analyses on these online survey data. While the confidentiality of your responses will be protected once the data are downloaded from the Internet, there is always the possibility of hacking or other security breaches that could threaten the confidentiality of your responses. Please know that you are free to choose not to answer any question.

Terms of Consent

Completing this survey is voluntary. If you decide to complete the survey, you are free to stop at any time. Inflexion does not believe there are any risks related to your participation and believe that your survey responses will help the project team to learn more about innovative digital teaching and learning strategies and practices developed and used during the COVID-19 pandemic. This research will meet all requirements for protection of human subjects required by Inflexion's external Institutional Review Board (IRB), as well as all General Data Protection Regulations (GDPR) as stated in [IB's privacy policy](#).

If you have any questions regarding the survey or the research project, you may contact Dr. Jessica Jacovidis at +1-541-246-2643 or jessica.jacovidis@inflexion.org. For questions about the IB's status regarding the topic of this study, please contact the IB Research Manager, Sarah Manlove (sarah.manlove@ibo.org).

Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

Background and Experience

First, we would like to ask you a few questions about your professional background and experience.

* 1. IB School Code (look up [here](#))

* 2. IB School Name

3. Including the current academic year, how many years of experience do you have working with your **current school**?

- ☐ Less than 3 years
☐ 3-6 years
☐ 7 years or longer

4. Including the current academic year, how many years of experience do you have working **with the IB**?

- ☐ Less than 3 years
☐ 3-6 years
☐ 7 years or longer

* 5. In which **role(s)** did you serve in the last three years? Select all that apply.

- ☐ Head of School/Principal
☐ IB Programme Coordinator
☐ PYP Teacher
☐ MYP Teacher
☐ DP Teacher
☐ CP Teacher
☐ Other (please specify)

6. What **subject** do you teach? If you are a PYP teacher, please indicate if you specialize in a specific area or write Not Applicable. If you do not teach, please write Not Applicable.

7. **Prior to the pandemic**, how would you rate your level of experience in teaching in a digital environment? *A digital environment is a virtual or online space accessed or created through the use of one or more electronic devices such as a computer, tablet, or cell phone.*

Novice

Expert

8. How would you rate your **current level** of experience in teaching in a digital environment? *A digital environment is a virtual or online space accessed or created through the use of one or more electronic devices such as a computer, tablet, or cell phone.*

Novice

Expert

Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

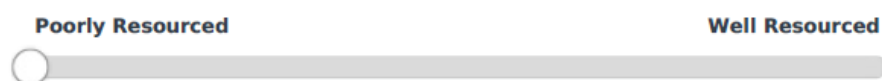
Journey of Transitioning to Digital Learning During the Pandemic

Now we'd like to ask you a few questions about your transition to digital learning during the pandemic. *Digital learning is any type of learning that is accompanied by technology or instructional practice that makes effective use of technology.*

9. Since the start of the pandemic, approximately how many months was your school physically closed in total (cumulative)?

- ☐ Less than 3 months
- ☐ 4 - 6 months
- ☐ 7 - 9 months
- ☐ 10 - 12 months
- ☐ 13 - 18 months
- ☐ 19 - 24 months
- ☐ More than 24 months

10. Prior to the COVID-19 pandemic, how would you describe your school's **overall resource level**? *Resources can include all things, such as money and materials, that is needed for the school to function properly.*



11. At the beginning of the pandemic, approximately what percentage of **teachers** had access to technology (e.g., computers, software, Internet) at home?



12. At the beginning of the pandemic, approximately what percentage of **students** had access to technology (e.g., computers, software, Internet) at home?



Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

Most Innovative Experience

Now, we would like to hear about your most innovative experience. As you answer the questions in this section, please think about **one innovation** that you would consider the best example or the one of which you are the proudest. Please answer the questions in this section about your selected innovation only.

Although there are many definitions of innovation, we use the definition that follows.

In simple terms, innovation means solving a real problem in a new way. Specific to education, an innovation is the creation, development, and/or implementation of a new or adapted/modified process or practice with the aim of improving efficiency, effectiveness, and/or achieving greater learning outcomes.

Innovations do not have to be extensive or time consuming. They can include the small solutions that schools and teachers implement every day to address the challenges they are experiencing.

Please share **one** innovation that you would consider the best example or the one that you are proudest of that your school implemented during the pandemic. For example, you might focus on the usefulness of a digital or technological solution you found or how a solution to a challenge you or your school faced improved effectiveness and/or greater learning outcomes.

13. General Description of the Innovation:

| |
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14. Problem: What problem were you trying to solve?

15. Solution: How did you solve the problem?

16. Lessons Learned: What would you do differently? What recommendation would you make to others in similar situations?

17. For which population(s) were this innovation designed? Please select all that apply.

- ☐ Administrators
- ☐ Teachers
- ☐ Other school staff
- ☐ Students (general)
- ☐ Students (targeted group)
- ☐ External school community
- ☐ Parents/guardians
- ☐ Other (please specify)

18. What is the current status of this innovation?

- ☐ Completely implemented and still up and running
- ☐ Partially implemented, with continuing improvements or extensions
- ☐ Abandoned/No longer necessary with the switch back to face-to-face instruction
- ☐ Other (please specify)

19. Which of the following methods (if any) did your school use to monitor or evaluate its innovations over the last three years? Please select all that apply.

☐ Formal monitoring and evaluation (through key indicators, attendance data, student performance data)

☐ Informal feedback from teachers and/or staff

☐ Informal feedback from students and/or parents/guardians

☐ Other (please specify)

☐ None

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Innovative Practices During the Pandemic – Assessment Practices

Now, we would like to hear about other innovative practices during the pandemic. As you answer the remaining questions on innovation, please think about any and all innovations that were implemented at your school during the pandemic.

First, tell us about your innovations related to assessment practice.

**We are interested in the practices that you and your school are using post-pandemic, if your school has returned to its traditional instructional model. However, we recognize that some regions are still experiencing the effects of the pandemic. If your school has not returned to its traditional instructional model, then tell us which practices you and your school plan to use post-pandemic.*

20. Which of the following strategies related to **assessment practice** did you use during the pandemic? Which strategies do you plan to use post-pandemic?

| | Did Not Use | Used During the Pandemic | Plan to Use Post-Pandemic* |
|---|--------------------------|--------------------------|----------------------------|
| Restructured assessments for the virtual environment (e.g., allowed open book or the use of resources, modified the types of questions). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Allowed students more flexibility and choice in the product they created (e.g., podcast, presentation, video, website) on formative assessments. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Allowed students more flexibility and choice in the product they created (e.g., podcast, presentation, video, website) on summative assessments. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other (please describe) | <input type="text"/> | | |

21. What else would you like to tell us about your innovations related to **assessment practice** (e.g., what problem did you experience and how did you solve it)?

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Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

Innovative Practices During the Pandemic – Classroom/Learning Environment

Tell us about your innovations related to the classroom/learning environment.

**We are interested in the practices that you and your school are using post-pandemic, if your school has returned to its traditional instructional model. However, we recognize that some regions are still experiencing the effects of the pandemic. If your school has not returned to its traditional instructional model, then tell us which practices you and your school plan to use post-pandemic.*

22. Which of the following strategies related to the **classroom/learning environment** did you use during the pandemic? Which strategies do you plan to use post-pandemic?

| | Did Not Use | Used During the Pandemic | Plan to Use Post-Pandemic* |
|--|--------------------------|--------------------------|----------------------------|
| Reduced synchronous class time to keep students engaged. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Minimized the amount of time the teacher was talking during the lesson. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Maximized the amount of time students were interacting with each other. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Created short videos that students could review and rewatch as needed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Delivered activities through social media. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Used multiple activities to break up instruction (e.g., direct instruction, group work, videos, online games, breaks). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Reduced assignments/homework to alleviate some of the burden on students. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Used team teaching and/or traded off lessons based on expertise. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Increased the number of cameras in the classrooms to allow for maximum visibility. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Provided opportunities for students to interact across grade levels. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Other (please describe)

23. What else would you like to tell us about your innovations related to the **classroom/learning environment** (e.g., what problem did you experience and how did you solve it)?

Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

Innovative Practices During the Pandemic – Instructional Strategies and Delivery

Tell us about your innovations related to instructional strategies and delivery.

**We are interested in the practices that you and your school are using post-pandemic, if your school has returned to its traditional instructional model. However, we recognize that some regions are still experiencing the effects of the pandemic. If your school has not returned to its traditional instructional model, then tell us which practices you and your school plan to use post-pandemic.*

24. Which of the following strategies related to **instructional strategies and delivery** did you use during the pandemic? Which strategies do you plan to use post-pandemic?

| | Did Not Use | Used During the Pandemic | Plan to Use Post-Pandemic* |
|--|--------------------------|--------------------------|----------------------------|
| Used different technology options (Pear Deck, Nearpod, breakout rooms etc.) to show student learning progression. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Provided curated sets of online materials (e.g., videos, websites, Duolingo) to supplement student learning. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Used intelligent tutors or adaptive learning technologies to supplement direct instruction. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Provided an electronic class notebook for each class. (Not a physical laptop) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Share student work online (e.g., online exhibitions). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Increased focus on student relationships and connection. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Intentionally grouped students to encourage student engagement. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Encouraged students to take breaks from the computer (e.g., stand up and walk away from the computers; do something physical). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Transitioned science experiments to | | | |

the online environment (e.g., thought through what experiments students could safely do at home with common household materials, used demonstrations rather than having the students do the experiment themselves, as well as using videos and simulations).

☐
☐
☐

Encouraged the use of home materials (e.g., rolled up socks substituting for balls) for physical education activities.

☐
☐
☐

Conducted virtual field trips or digital tours (e.g., art galleries, museums, talk to a scientist).

☐
☐
☐

Invited guest speakers to attend via virtual platforms.

☐
☐
☐

Other (please describe)

25. What else would you like to tell us about your innovations related to **instructional strategies and delivery** (e.g., what problem did you experience and how did you solve it)?

Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

Innovative Practices During the Pandemic – Parent Engagement

Tell us about your innovations around parent engagement.

**We are interested in the practices that you and your school are using post-pandemic, if your school has returned to its traditional instructional model. However, we recognize that some regions are still experiencing the effects of the pandemic. If your school has not returned to its traditional instructional model, then tell us which practices you and your school plan to use post-pandemic.*

26. Which of the following strategies related to **parent engagement** did you use during the pandemic? Which strategies do you plan to use post-pandemic?

| | Did Not Use | Used During the Pandemic | Plan to Use Post-Pandemic* |
|--|--------------------------|--------------------------|----------------------------|
| Used technology to engage parents (e.g., held virtual sessions, recorded videos). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Included parents in the learning activities (e.g., designed experiences where families could use materials in their own homes to complete assignments together). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Provided support to parents in accessing the schools' platforms (e.g., shared videos, provided technical support, called parents). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Other (please describe)

27. What else would you like to tell us about your innovations related to **parent engagement** (e.g., what problem did you experience and how did you solve it)?

Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

Innovative Practices During the Pandemic – Student Agency

Tell us about your innovations related to student agency.

**We are interested in the practices that you and your school are using post-pandemic, if your school has returned to its traditional instructional model. However, we recognize that some regions are still experiencing the effects of the pandemic. If your school has not returned to its traditional instructional model, then tell us which practices you and your school plan to use post-pandemic.*

28. Which of the following strategies related to **student agency** did you use during the pandemic? Which strategies do you plan to use post-pandemic?

| | Did Not Use | Used During the Pandemic | Plan to Use Post-Pandemic* |
|--|--------------------------|--------------------------|----------------------------|
| Allowed students choice to manage and organize their own work (e.g., provide students a list of lessons for the day and allow students to do them in the order they want). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Allowed students flexibility in timelines so that students can work at their own pace. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Allowed students to control their own schedules (e.g., students could sign up and attend classes that work for their schedules). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Other (please describe)

29. What else would you like to tell us about your innovations related to **student agency** (e.g., what problem did you experience and how did you solve it)?

Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

Innovative Practices During the Pandemic – Student Engagement

Tell us about your innovations related to student engagement.

**We are interested in the practices that you and your school are using post-pandemic, if your school has returned to its traditional instructional model. However, we recognize that some regions are still experiencing the effects of the pandemic. If your school has not returned to its traditional instructional model, then tell us which practices you and your school plan to use post-pandemic.*

30. Which of the following strategies related to **student engagement** did you use during the pandemic? Which strategies do you plan to use post-pandemic?

| | Did Not Use | Used During the Pandemic | Plan to Use Post-Pandemic* |
|--|--------------------------|--------------------------|----------------------------|
| Provided students control of how to participate (e.g., voice or chat; camera on or off, anonymous answers, full class participation with a poll or live word cloud). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Provided opportunities for student connection and wellbeing (e.g., opportunities to chat with friends, opportunities to be outdoors). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Shared materials and assignments with students through social media platforms (e.g., WhatsApp, TikTok). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Created spaces to provide more support to students (e.g., dedicated sessions to ask questions). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Provided opportunities for students to be heard and provided feedback (e.g., individual check-ins, phone calls to students, access to counseling sessions). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Held virtual sports days, competitions, and assemblies. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other (please describe) | <input type="text"/> | | |

31. What else would you like to tell us about your innovations related to **student engagement** (e.g., what problem did you experience and how did you solve it)?

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Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

Innovative Practices During the Pandemic – Teacher Collaboration

Tell us about your innovations related to teacher collaboration

**We are interested in the practices that you and your school are using post-pandemic, if your school has returned to its traditional instructional model. However, we recognize that some regions are still experiencing the effects of the pandemic. If your school has not returned to its traditional instructional model, then tell us which practices you and your school plan to use post-pandemic.*

32. Which of the following strategies related to **teacher collaboration** did you use during the pandemic? Which strategies do you plan to use post-pandemic?

| | Did Not Use | Used During the Pandemic | Plan to Use Post-Pandemic* |
|--|--------------------------|--------------------------|----------------------------|
| Provided a dedicated and protected time and space for collaboration (e.g., communities of practice, common planning, team meetings). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Used online platforms (e.g., Google docs, Microsoft Teams, Zoom) to collaborate and share materials. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Created social media groups (e.g., Facebook and WhatsApp) to collaborate and share materials. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Create content area networks with other content teachers to share resources and tips. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Provided flexibility in virtual meeting times that allowed for collaboration across schools and regions. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Other (please describe)

33. What else would you like to tell us about your innovations related to **teacher collaboration** (e.g., what problem did you experience and how did you solve it)?

Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

Innovative Practices During the Pandemic – Technology

Tell us about your innovations related to technology.

**We are interested in the practices that you and your school are using post-pandemic, if your school has returned to its traditional instructional model. However, we recognize that some regions are still experiencing the effects of the pandemic. If your school has not returned to its traditional instructional model, then tell us which practices you and your school plan to use post-pandemic.*

34. Which of the following strategies related to **technology** did you use during the pandemic? Which strategies do you plan to use post-pandemic?

| | Did Not Use | Used During the Pandemic | Plan to Use Post-Pandemic* |
|---|--------------------------|--------------------------|----------------------------|
| Provided technology (e.g., computers, software, Wi-Fi hotspots) for teachers. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Provided technology (e.g., computers, software, Wi-Fi hotspots) for students. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Provided professional learning to teachers on technology platforms. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Allowed students to use cellphones to access materials and connect to class sessions. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Other (please describe)

35. What else would you like to tell us about your innovations related to **technology** (e.g., what problem did you experience and how did you solve it)?

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Facilitators and Barriers to Innovation

The next set of questions asks about facilitators and barriers to innovation. As you answer these questions, think across the various innovative practices your school was able to implement during the pandemic.

36. What was the **single greatest factor** that **facilitated** your ability to innovate during the pandemic?

37. What was the **single greatest factor** that **hindered** your ability to innovate during the pandemic?

Digital Innovations in Teaching and Learning During COVID: Phase 2 IB School Staff Survey

Willingness to Participate in Phase 3

We are looking for volunteers to participate in the next phase of this research! The following question is intended to gauge your interest in participating in additional data collection.

38. As part of this research, we will be collecting additional data through interviews and focus groups. Would your school be willing to participate in additional data collection activities for the following groups? Please select all that apply.

- ☐ Heads of School
- ☐ Programme Coordinators
- ☐ IB Teachers
- ☐ IB Students
- ☐ IB Parents

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Wrap Up

Finally, we would like to give you an opportunity to share anything else you may like to share.

39. Is there anything else you would like to share about your thoughts on your experience with innovative teaching and learning strategies and practice during the pandemic?

Thank you for your participation.

Appendix H: Phase 2 Survey Results Summary

Phase 2 of this study expanded on the activities conducted in Phase 1 by constructing and administering a comprehensive survey of innovative digital teaching and learning practices. The following section presents the overall survey results.

Background and Experience

The first section of the survey asked respondents about the number of years they have been at their current school, the number of years they have worked with the IB, and the roles they have held during the last three years (start of the pandemic to present). Overall, there was good representation across experience levels and roles. See Table H1 for more information on the background and experience of survey respondents.

Table H1. Background and Experience of Survey Respondents

| Background and Experience | N | % |
|-------------------------------------|-----|-------|
| Years at Current School | | |
| Less than 3 years | 178 | 22.8% |
| 3 – 6 years | 240 | 30.7% |
| 7 years or longer | 361 | 46.2% |
| No Response | 3 | 0.4% |
| Years Working with IB | | |
| Less than 3 years | 164 | 21.0% |
| 3 – 6 years | 274 | 35.0% |
| 7 years or longer | 338 | 43.2% |
| No Response | 6 | 0.8% |
| Role (Select All That Apply) | | |
| Head of School/Principal | 29 | 3.7% |
| IB Programme Coordinator | 200 | 25.6% |
| PYP Teacher | 217 | 27.7% |
| MYP Teacher | 214 | 27.4% |
| DP Teacher | 354 | 45.3% |
| CP Teacher | 20 | 2.6% |

Note. Percentages may not total 100 due to rounding.

Respondents were asked about their level of experience in teaching in a digital environment prior to the pandemic and at the point in time when they completed the survey on a 10-point scale ranging from *Novice* (1) to *Expert* (10). A *Not Applicable* response option was available for respondents who did not feel the questions applied to them. Figure H1 shows respondents' ratings of their level of experience in teaching in a digital environment increased substantially from 5.25 (SD = 2.60) at the beginning of the pandemic to 7.59 (SD = 1.82) three years into the pandemic. *Not Applicable* responses were excluded from analyses.

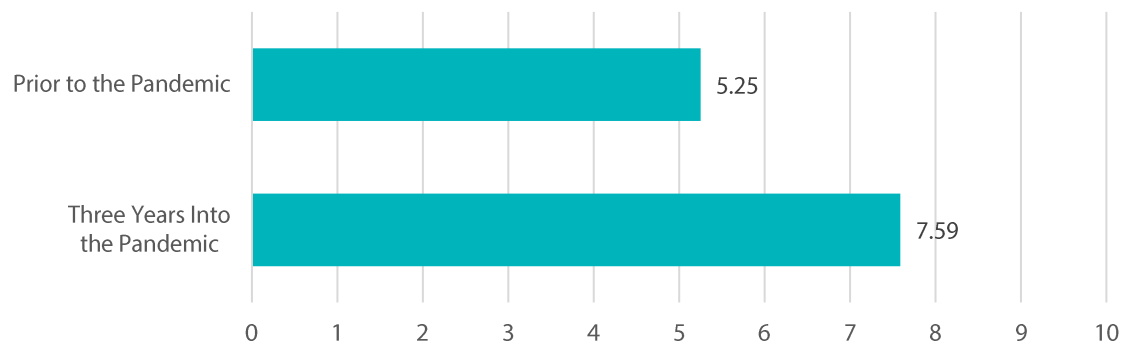


Figure H1. Average respondent ratings of their level of experience in teaching in a digital environment, from novice to expert.

Journey of Transitioning to Digital Learning During the Pandemic

The next section of the survey queried respondents about their journey of transitioning to digital learning during the pandemic. Specifically, respondents shared the length of time their school was physically closed during the pandemic, perceptions of their school's overall resource levels prior to the pandemic and estimates of the percentage of teachers and students who had access to technology (e.g., computers, software, Internet) at home at the beginning of the pandemic. Overall, there was substantial variation in the length of time schools were closed (see Table H2), with more than a third reporting they were closed for 6 months or less and another third reporting they were closed for 10–18 months. Generally, schools reported moderate overall resource levels ($M = 6.99$ on a 10-point scale) before the pandemic, and most teachers (83.74%) and students (80.52%) had access to technology (e.g., computers, software, Internet) at home.

Table H2. School Journey of Transitioning to Digital Learning During the Pandemic

| | N | % |
|---|-----|-------|
| Months Schools Were Physically Closed Throughout the Pandemic | | |
| Less than 3 months | 115 | 14.7% |
| 4 – 6 months | 184 | 23.5% |
| 7 – 9 months | 85 | 10.9% |

| | <i>N</i> | % |
|---|----------|-----------|
| 10 – 12 months | 123 | 15.7% |
| 13 – 18 months | 161 | 20.6% |
| 19 – 24 months | 62 | 7.9% |
| More than 24 months | 10 | 1.3% |
| No Response | 42 | 5.4% |
| | <i>M</i> | <i>SD</i> |
| School's Overall Resource Levels Pre-Pandemic | | |
| Overall Resource Levels | 6.99 | 2.32 |
| Percentage with Access to Technology (e.g., Computers, Software, Internet) At Home | | |
| Teachers | 83.74 | 20.69 |
| Students | 80.52 | 23.47 |

Most Innovative Experience

Survey respondents were asked to share about one innovation they or their school implemented during the pandemic. They were prompted to choose the innovation they considered the best example or the one their school implemented of which they were most proud. Respondents were asked to identify the problem they were trying to solve with the innovation, describe the innovation and the solution it provided, and any lessons learned and /or recommendations to share from the act of implementing the innovation.

Overall, 484 respondents provided *complete* comments to the items regarding problem/solution/lessons learned. Some respondents' comments were coded in more than one category, thus leading to a total number of coded comments (519) more than the total number of respondents for both facilitators and barriers to innovation.

In terms of identified problems educators were trying to solve with their innovations (see Table H3), the overwhelming majority of problems described along with their solutions related to technology, including the hardware, software, connectivity, and other assorted issues related to digital teaching and learning. Student engagement and motivation was the second most frequently reported problem addressed by educators with innovations in digital teaching and learning. Further, the percentages of responses in the problem categories of classroom/learning environment and instructional strategies/delivery were similar, as educators reported attempting to innovate the structure of the newly designed digital classroom environments *and* the instructional strategies used to deliver the content and allow students to access the learning materials. See Appendix I for more information on the analyses of solutions and lessons learned by coded problem category.

Table H3. Innovations/Problems Coded by Category

| Category | N | % | Representative Comments |
|------------------------------------|-----|-----|--|
| Technology | 207 | 40% | <ul style="list-style-type: none"> • Implementation of Microsoft Teams • Many teachers were using different tools, which challenged the teachers (finding and paying for the tools) and the students (managing many different tools) • Remote learning because of lockdown. Internet connectivity was an issue. They could easily be distracted during online class. • Family financial problems to buy a computer for each child |
| Student Engagement | 106 | 20% | <ul style="list-style-type: none"> • Learners' engagements and participation during the pandemic. • Students were feeling low motivated and the school had the goal to rise morale. • Trying to reach out to students effectively and see that there is no learning loss of students in the time of pandemic. • I was trying to attract my learners and grab their attention to watch my educational videos and increase their understanding. |
| Classroom/ Learning Environment | 71 | 14% | <ul style="list-style-type: none"> • Length of screen time for students. Ensuring the amount of work/ student remains manageable from home and through balanced teaching length of times. • Children missing out on learning experiences and parents being unable to work with the children on set tasks due to their own work. • Make the classes more appealing and interesting. • Giving students a learning environment/classroom set-up the same as a physical set-up so that students do not have any learning loss. |
| Instructional Strategies/ Delivery | 69 | 13% | <ul style="list-style-type: none"> • Not having access to physical laboratory in pandemic. • How to perform collaborative work where ideas were exposed on a board, as well as the elaboration of drawings and schemes in a freer way. • Differentiated instruction and group work. • Give classes with greater interactivity, more dynamics and not only presentations in PowerPoint. |
| Assessment Practices | 33 | 6% | <ul style="list-style-type: none"> • Academic misconduct while virtual assessment. • Conducting examination/tests in a virtual setting. Academic integrity in question. • How to continue to prepare students for in-person, hand-written exams while not in person and using computers. |
| Teacher Collaboration | 12 | 2% | <ul style="list-style-type: none"> • Some of the teachers were encouraged to give the newly learned info to other teachers who tend to hesitate or struggle with digitalization. • Sharing physical material with other teachers was impossible during lockdowns, especially in terms of printed books, teacher-made materials and games used in learning centers, realia etc. • We were trying to empower digital literacy among teachers. |

| Category | N | % | Representative Comments |
|-------------------|----|----|--|
| Parent Engagement | 11 | 2% | <ul style="list-style-type: none"> We were struggling with staying in touch with parents we were not able to see in person. We also didn't have our normal phone infrastructure as we were all off site. Even before the pandemic though, we struggled with parent engagement. To motivate and boost the morale of our parents, who were locked up so long with no contact with friends. We needed to find a solution to support them as well. |
| Student Agency | 10 | 2% | <ul style="list-style-type: none"> Student must develop alternative personal learning methods using critical thinking. Students struggled to work individually. |

Note. Percentages may not total 100 due to rounding.

Survey respondents were also asked to share additional information about the innovation they or their school implemented during the pandemic, including the population for which the innovation was designed, the current status of the innovation at their school, and the monitoring and evaluation methods being used to provide feedback to educators as to the effectiveness of the innovation (see Table H4). The majority of innovations described by survey respondents were designed to support the teacher (73%) and the general student population (74%). At the time of the survey administration, 42% of the innovations used during the pandemic and described by educators in this report were either no longer in use or no longer necessary with the return to face-to-face teaching. Since returning to face-to-face instruction, 51% of the innovations developed during the pandemic were reported as completely or partially still in use. For teaching and learning innovations developed and implemented during the pandemic, 55% of educators reported there was a formal system of monitoring and evaluation of the practice or strategy in place, while other educators reported an informal system of monitoring and evaluation, either through feedback from teachers and staff (61%) or through feedback from students and/or parents/guardians (52%).

Table H4. Innovation Descriptors and Status

| | N | % |
|---|-----|-----|
| Population for which the Innovation was Designed | | |
| Administrators | 123 | 25% |
| Teachers | 355 | 73% |
| Other school staff | 73 | 15% |
| Students (general) | 359 | 74% |
| Students (targeted group) | 152 | 31% |
| External school community | 36 | 7% |
| Parents/guardians | 145 | 30% |

| | N | % |
|--|-----|-----|
| Other (please describe) | 7 | 1% |
| Status of Innovation | | |
| Completely implemented and still up and running | 107 | 22% |
| Partially implemented, with continuing improvements or extensions | 141 | 29% |
| Abandoned/No longer necessary with the switch back to face-to-face instruction | 201 | 42% |
| Other (please describe) | 30 | 6% |
| Monitoring and Evaluating Methods | | |
| Formal monitoring and evaluation (through key indicators, attendance data, student performance data) | 267 | 55% |
| Informal feedback from teachers and/or staff | 297 | 61% |
| Informal feedback from students and/or parents/guardians | 252 | 52% |
| Other (please describe) | 24 | 5% |
| None | 22 | 5% |

Note. Percentages may not total 100 due to rounding.

Innovative Practices During the Pandemic

Respondents were asked to indicate which innovative strategies they used during the pandemic and which they plan to use post-pandemic. The specific innovations were organized around the eight categories that emerged from the Phase 1 work: assessment practices, classroom/learning environment, instructional strategies and delivery, parent engagement, student agency, student engagement, teacher collaboration, and technology. Respondents were also provided an opportunity to share additional information about their innovations in each of these areas. The sections below summarize the most commonly used innovations in each category.

Assessment Practices

Respondents were presented with three innovations related to assessment practice. More than half of respondents reported using these innovations *during* the pandemic and about a third of respondents reported they *plan to use* the two most relevant innovations post-pandemic. These results suggest the pandemic had a positive effect on student flexibility and choice related to assessment and the products that students create to evidence learning. Figure H2 displays the ranked assessment-related innovations. Further, an examination of the data by region, strand, and programme revealed a substantially higher percentage of Public ROW respondents allowed students more flexibility and choice in the product they created (e.g., podcast, presentation, video, website) on formative **and**

summative assessments compared to the average. See Appendix D for more information on the analyses by region, strand, and programme.

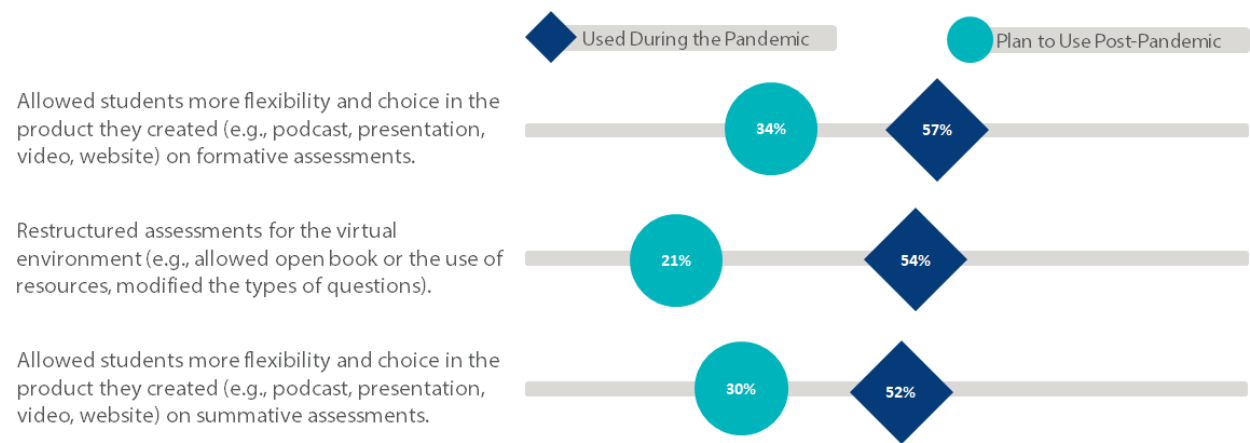


Figure H2. Most common innovative strategies related to assessment practices.

Respondents were also given an opportunity to share other assessment-related innovations they used during the pandemic. Overall, 20 respondents provided comments to this open-ended question. As shown in Table H5, a total of 15 innovations emerged centering on addressing two main problems: assessment implementation (5) and academic misconduct (10).

Table H5. Emerging Assessment-Related Innovations

| Assessment-Related Innovations |
|---|
| Assessment Implementation |
| Eliminated summative assessment to focus on keeping the subject area enthusiastic and engaging. |
| Provided flexibility by allowing more time to complete assessments during class and/or by adjusting due dates for submitted work. |
| Conducted online assessments using digital technologies (exam.net, AssessPrep) rather than paper-based exams. |
| Implemented common assessment tools across classrooms to alleviate some of the assessment burden. |
| Implemented assessments for primary students that did not require typing (e.g., multiple choice, audio answers, videos, handwriting and scanning work). |
| Academic Misconduct |
| Created multiple sets of questions (assessment forms) and shuffled the order of the items. |
| Implemented timed assessments to ensure students did not have time to look up answers. |
| Implemented oral exams during class time to prevent cheating and plagiarism. |

Assessment-Related Innovations

Implemented online exam procedures where students received sealed exam packs and students were monitored online while completing the exam.

Used multiple devices/cameras: one to show the student's face and body and the other to show their screen and/or desk area.

Increased monitoring by ensuring at least two teachers monitored every assessment.

Used software (e.g., Zoom, Teams, AssessPrep) to monitor/invigilate assessments and instructed students to have their camera and microphones on during testing.

Used an online testing platform that allowed browser lockdowns and/or used blocking systems to prevent students opening other tabs during the assessment.

Used academic honesty software (e.g., Turnitin.com, Page, GoGuardian) to prevent cheating and plagiarism.

Conducted training with the school teaching staff to increase ability to detect academic dishonesty.

Classroom/Learning Environment

Ten innovations related to the classroom and learning environment emerged from Phase 1 work and were included on the Phase 2 survey. The top three innovations selected by respondents are presented in Figure H3. Again, more than half of respondents reported using these top three innovations *during* the pandemic and more than a third of respondents reported they *plan to use* multiple activities to break up instruction post-pandemic. Further, an examination of the data by region, strand, and programme revealed some variability in responses, particularly for strand. A higher percentage of Public ROW respondents reported using the listed innovations during the pandemic, while a lower percentage of Public U.S. respondents reported they will continue to use the strategies post-pandemic. Additionally, a higher percentage of private international respondents reported increasing the number of cameras in the classrooms to allow for maximum visibility *during* the pandemic. Further, more CP respondents noted they delivered activities through social media and provided opportunities for students to interact across grade levels than the average for all sampled IB programmes and these respondents plan to continue to use these strategies post-pandemic at much higher rates.

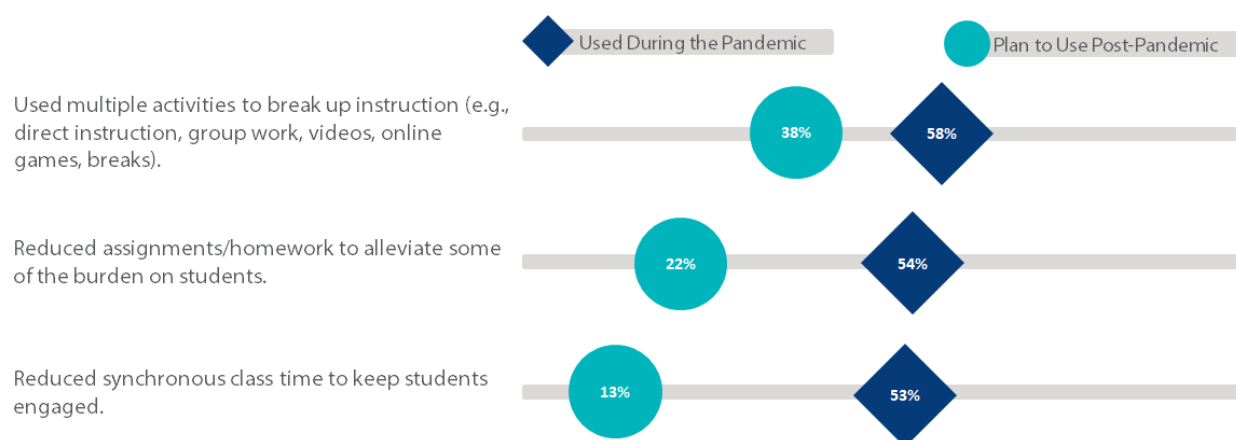


Figure H3. Most common innovative strategies related to classroom/learning environment.

Additionally, respondents were given an opportunity to share other classroom and learning environment-related innovations they used during the pandemic. Overall, 12 respondents provided comments; however, most of the innovations shared were designed to increase student engagement (see student engagement section below). Two new innovations emerged from respondent comments (Table H6).

Table H6. Emerging Classroom/Learning Environment Innovations

| Classroom/Learning Environment Innovations |
|--|
| Tracked attendance by activity (rather than overall) using the same digital platform used by the teacher for other class activities. |
| Adjusted schedules, school hours, and office hours to better meet the needs of students. |

Instructional Strategies and Delivery

Respondents were provided 12 innovations related to instructional strategies and delivery. Figure H4 displays the top three innovations selected by respondents. Perhaps unsurprisingly, the highest percentage of respondents reported providing curated sets of online materials to supplement student learning *during* the pandemic. A little more surprising is that more than a third of respondents report they plan to *continue* using this strategy post-pandemic. Further, an examination of the data by region, strand, and programme revealed some variability in responses, particularly for strand. Compared to the average, a higher percentage of Public ROW, Public U.S., and CP respondents reported engaging in the listed instructional strategies and delivery innovations. Additionally, a higher percentage of respondents from private international schools reported inviting guest speakers to attend via virtual platforms and a lower percentage of IB AP respondents reported encouraging the use of home materials (e.g., rolled up socks substituting for balls) for physical education activities.

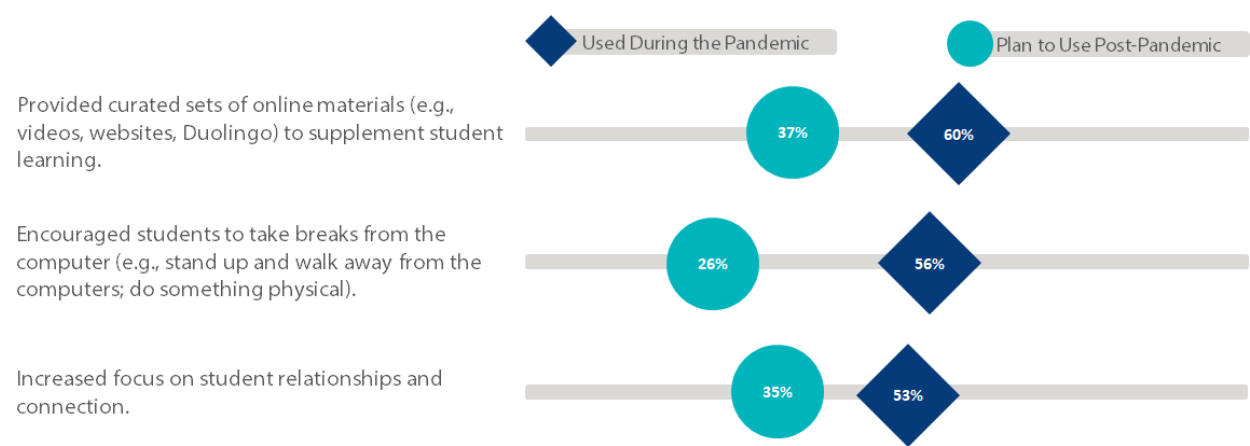


Figure H4. Most common innovative strategies related to instructional strategies and delivery.

Nine respondents provided comments; however, most of the innovations shared were designed to increase student engagement (see student engagement section below). As shown in Table H7, two new innovations emerged from respondent comments.

Table H7. Emerging Instructional Strategies and Delivery Innovations

| Instructional Strategies and Delivery Innovations |
|---|
| Used short anonymous surveys at the end of lessons to gauge student understanding, enjoyment, progress, and feedback to inform changes to instruction and delivery. |
| Assembled and couriered lab kits to students to ensure access to all necessary lab equipment and supplies. |

Parent Engagement

Respondents were presented with three parent engagement innovations. More than half of respondents reported using two of these innovations *during* the pandemic and almost a third of respondents reported they *plan to use* those same two innovations post-pandemic. Figure H5 displays the ranked parent engagement innovations. Further, an examination of the data by region, strand, and programme revealed that a higher percentage of Public ROW and CP respondents reported using the various parent engagement strategies, while IB Asia Pacific reported less use of the strategies, especially including parents in the learning activities (e.g., designed experiences where families could use materials in their own homes to complete assignments together).

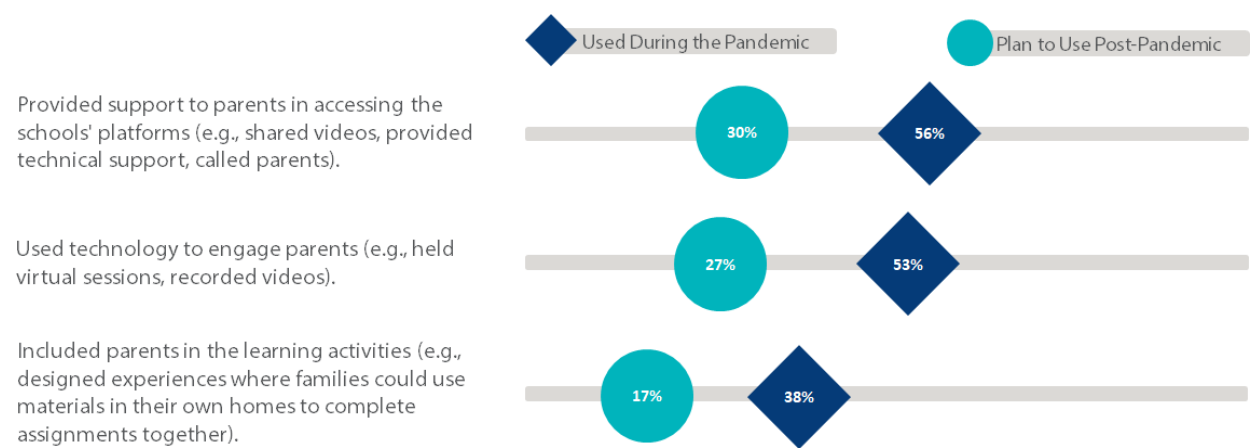


Figure H5. Most common innovative strategies related to parent engagement.

Respondents were given an opportunity to share other parent engagement innovations they used during the pandemic. Overall, eight respondents provided comments to this open-ended question. Many of the comments focused on the challenges associated with parent engagement, including parents providing too much support (e.g., doing the work for their child) and parents providing too little support (e.g., not assisting younger students, not ensuring students attended class and completed assignments). Two innovations emerged focused on parent engagement (see Table H8).

Table H8. Emerging Parent Engagement Innovations

| Parent Engagement Innovations |
|---|
| Provided information to parents on how to set up the best learning environment for their child(ren). |
| Actively discouraged activities that required parental involvement (due to other parent stressors and the impacts on family relationships) and/or designed activities to limit reliance on parents. |

Student Agency

Similarly, respondents were presented with three innovations related to student agency. More than half of respondents reported allowing students flexibility in timelines so that students can work at their own pace during the pandemic, while only a quarter of respondents indicated they allowed students to control their own schedules during the pandemic. Further, respondents plan to continue using these strategies at lower rates than other strategies. Figure H6 displays the ranked student agency innovations. Further, an examination of the data by region, strand, and programme revealed a higher percentage of CP respondents reporting use of the student agency innovations during the pandemic; there was little variability across region and strand.

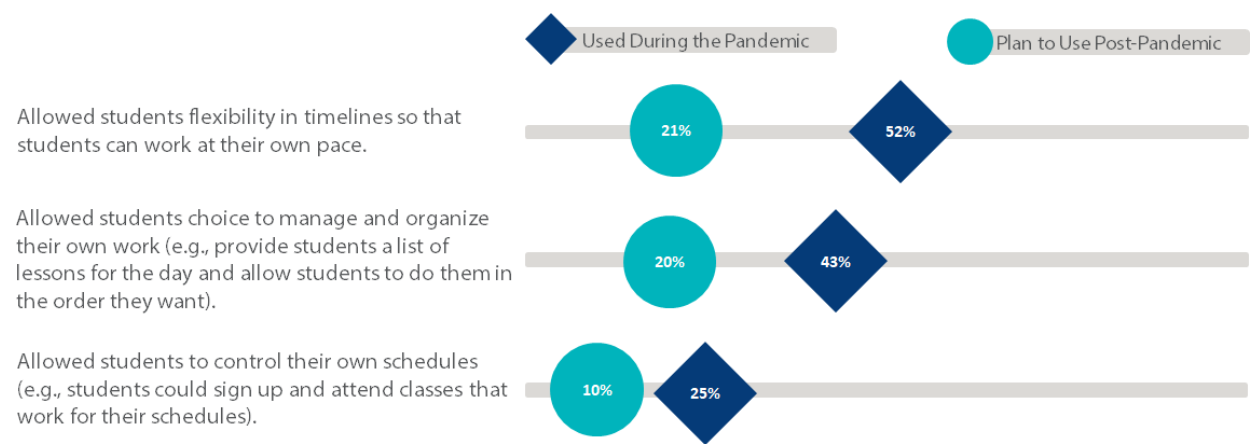


Figure H6. Most common innovative strategies related to student agency.

Additionally, respondents were given an opportunity to share other innovations they used during the pandemic to facilitate student agency. Five respondents provided comments to this open-ended question. As shown in Table H9, three innovations emerged designed to increase student agency.

Table H9. Emerging Student Agency Innovations

| Student Agency Innovations |
|--|
| Provide presentations to students on topics related to self-agency (e.g., motivation, self-regulation, and autonomous learning). |
| Provided time and space for students to receive individual feedback from teachers. |
| Eliminated deadlines or provided flexible deadlines/extended time to give students more ownership of their work. |

Student Engagement

Six innovations related to student engagement emerged from Phase 1 work and were included on the Phase 2 survey. The top three innovations selected by respondents are presented in Figure H7. More than half of respondents reported using these top three innovations *during* the pandemic and more than a quarter of respondents reported they *plan to use* two of the innovations post-pandemic. Only a small percentage of respondents plan to continue to provide students control of how to participate post-pandemic. An examination of the data by region, strand, and programme revealed some variability in responses, particularly for strand. Public ROW respondents reported higher rates of creating spaces to provide more support to students, and Public ROW and Public U.S. respondents indicated higher levels of virtual sports days, competitions, and assemblies. Additionally, a higher percentage of CP respondents reported using the various student engagement strategies during the pandemic. Further, IB Asia Pacific respondents reported substantial lower use of virtual sports days, competitions, and assemblies.

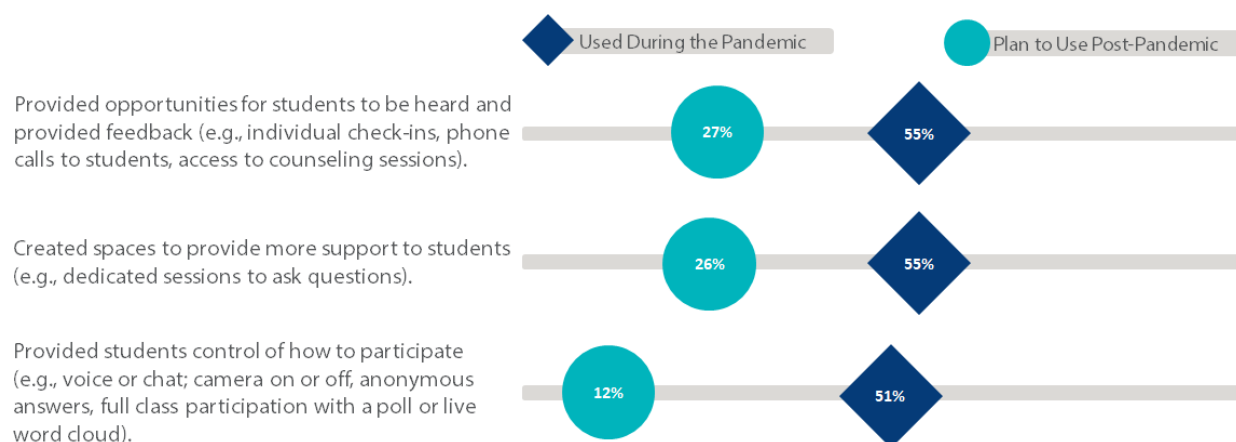


Figure H7. Most common innovative strategies related to student engagement.

Respondents were given an opportunity to share other student engagement innovations they used during the pandemic. Overall, 12 respondents provided comments to this open-ended question. Many of the comments focused on the challenges associated with students' unwillingness to turn on their camera and microphone. Coupled with the student engagement-related innovations from classroom/learning environment and instructional strategies and delivery comments, eight innovations emerged designed to increase student engagement (see Table H10).

Table H10. Emerging Student Engagement Innovations

| Student Engagement Innovations |
|---|
| Use contests and friendly competition to encourage engagement with the content. |
| Allowed students to create and demonstrate classroom activities and games. |
| Provided students with multiple activities that they could do as their homework to review what they learned in class. |
| Provide time and space for students to engage with each other in non-class time (e.g., unstructured time during instruction hours, open breakout rooms during breaks and lunch). |
| Allowed students to develop their own afterschool and lunch clubs. |
| Incentivize attendance and participation (e.g., provided extra credit, allowed students to earn points to "purchase" a reward). |
| Provided opportunities for students to "teach" (e.g., give "how to" presentations on new technologies, host yoga sessions, give guitar lessons). |
| Created a systematic and intentional method for connecting with students and ensuring each student received individual attention (e.g., assigning each student a mentor teacher to discuss problems and get advice/support when needed, calling each student at least once every two weeks to connect). |

Teacher Collaboration

Respondents were provided five teacher collaboration innovations; Figure H8 displays the top three innovations selected by respondents. Perhaps unsurprisingly, the highest percentage of respondents reported using online platforms to collaborate and share materials *during* the pandemic. More than a third of respondents reported they plan to *continue* using this strategy post-pandemic. An examination of the data by region, strand, and programme revealed little variability in responses. Similar to other categories, a higher percentage of CP respondents reported using teacher collaboration innovations *during* the pandemic. Additionally, Public ROW respondents indicated higher rates of providing flexibility in virtual meeting times that allowed for collaboration across schools and regions. Public U.S. respondents indicated higher rates of creating social media groups to collaborate and share materials. Further, the Public U.S. respondents plan to continue to use this strategy post-pandemic.

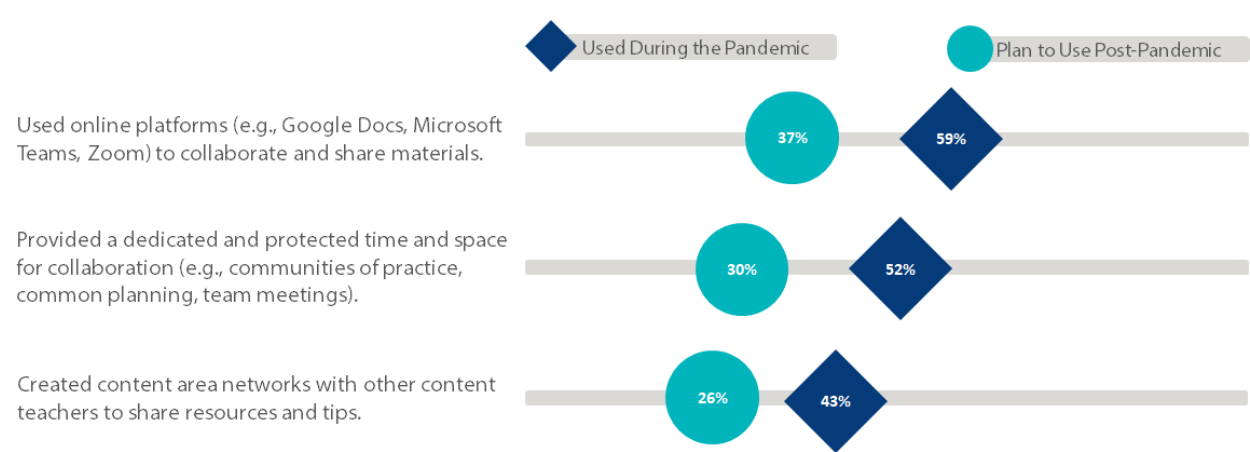


Figure H8. Most common innovative strategies related to teacher collaboration.

Further, respondents were given an opportunity to share other teacher collaboration innovations they used during the pandemic. Six respondents provided comments for a total of three emergent innovations. See Table H11 for a list of emerging teacher collaboration innovations.

Table H11. Emerging Teacher Collaboration Innovations

| Teacher Collaboration Innovations |
|---|
| Provided time and space for teacher to build personal connection and interact with colleagues (e.g., digital lunch breaks, coffee or tea breaks, morning mindfulness breaks). |
| Provided time and space for teachers to share best practices and lessons learned from their digital experiences. |
| Invited external professionals to meet with teachers to share their expertise. |

Technology

Similarly, respondents were presented with four innovations related to technology. More than half of respondents reported using the top three innovations during the pandemic, while about a third of respondents plan to continue using the top two innovations post-pandemic. Figure H9 displays the ranked technology innovations. An examination of the data by region, strand, and programme revealed a higher percentage of CP respondents reporting use of the listed technology innovations during the pandemic. Additionally, PYP respondents reported higher levels of allowing students to use cellphones to access materials and connect to class sessions. Public ROW respondents provided professional learning to teachers on technology platforms at higher rates than average. Public U.S. respondents provided technology (e.g., computers, software, Wi-Fi hotspots) for students at lower rates than average. Public U.S. respondents also indicated they plan to continue to provide technology (e.g., computers, software, Wi-Fi hotspots) for students and allow students to use cellphones to access materials and connect to class sessions at lower rates post-pandemic than did personnel from other types of schools.

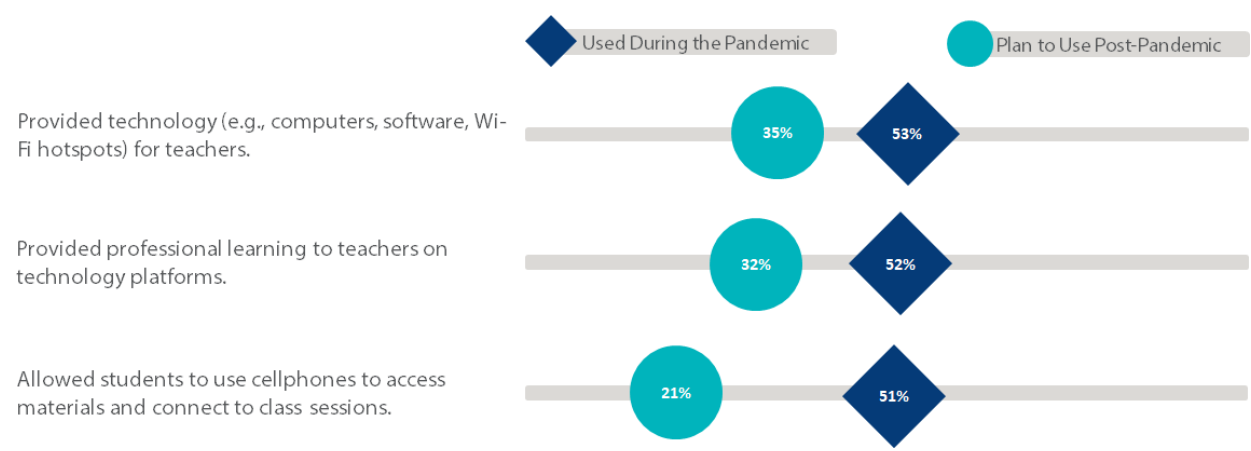


Figure H9. Most common innovative strategies related to technology.

Respondents were also given an opportunity to share other technology-related innovations they used during the pandemic. Overall, nine respondents provided comments to this open-ended question. As shown in Table H12, a total of six innovations emerged focused on providing access to technology to teachers and students.

Table H12. Emerging Technology-Related Innovations

| Technology-Related Innovations |
|---|
| Allowed teachers and/or students to use their own technology. |
| Implemented a computer loan program for staff and/or students. |
| <u>Provided financial scholarship students to purchase technology for digital learning.</u> |

Technology-Related Innovations

Provided reimbursement to teachers for their Internet bills.

Provided a space at school for teachers to work to ensure access to technology.

Provided flexible schedules for students who shared technology with other family members.

Top Innovations Across Categories

Overall, respondents reviewed 46 innovations across 8 categories. Table H13 presents the most frequently used innovations during the pandemic across categories. The most commonly used innovations included providing curated sets of online materials (e.g., videos, websites, Duolingo) to supplement student learning and using online platforms (e.g., Google Docs, Microsoft Teams, Zoom) to collaborate and share materials.

Table H13. Most Frequently Used Innovations During the Pandemic

| Rank | Category | Innovation | % |
|------|---------------------------------------|---|-----|
| 1 | Instructional Strategies and Delivery | Provided curated sets of online materials (e.g., videos, websites, Duolingo) to supplement student learning. | 60% |
| 2 | Teacher Collaboration | Used online platforms (e.g., Google Docs, Microsoft Teams, Zoom) to collaborate and share materials. | 59% |
| 3 | Classroom/ Learning Environment | Used multiple activities to break up instruction (e.g., direct instruction, group work, videos, online games, breaks). | 58% |
| 4 | Assessment Practices | Allowed students more flexibility and choice in the product they created (e.g., podcast, presentation, video, website) on formative assessments. | 57% |
| 5 | Instructional Strategies and Delivery | Encouraged students to take breaks from the computer (e.g., stand up and walk away from the computers; do something physical). | 56% |
| 6 | Parent Engagement | Provided support to parents in accessing the schools' platforms (e.g., shared videos, provided technical support, called parents). | 56% |
| 7 | Student Engagement | Provided opportunities for students to be heard and provided feedback (e.g., individual check-ins, phone calls to students, access to counseling sessions). | 55% |
| 8 | Student Engagement | Created spaces to provide more support to students (e.g., dedicated sessions to ask questions). | 55% |

Across the 46 innovations, far fewer respondents indicated they plan to continue using the identified innovations post-pandemic. The most common innovations respondents plan to use post-pandemic

include using multiple activities to break up instruction, using online platforms to collaborate and share materials, intentionally grouping students to encourage student engagement, and providing curated sets of online materials to supplement student learning. Table H14 presents the innovations that respondents plan to use post-pandemic.

Table H14. Top Innovations Respondents Plan to Use Innovations Post-Pandemic

| Rank | Category | Innovation | % |
|------|---|--|-----|
| 1 | Classroom/ Learning Environment | Used multiple activities to break up instruction (e.g., direct instruction, group work, videos, online games, breaks). | 38% |
| 2 | Teacher Collaboration | Used online platforms (e.g., Google docs, Microsoft Teams, Zoom) to collaborate and share materials. | 37% |
| 3 | Instructional Strategies and Delivery | Intentionally grouped students to encourage student engagement. | 37% |
| 4 | Instructional Strategies and Delivery | Provided curated sets of online materials (e.g., videos, websites, Duolingo) to supplement student learning. | 37% |
| 5 | Technology | Provided technology (e.g., computers, software, Wi-Fi hotspots) for teachers. | 35% |
| 6 | Classroom/ Learning Environment | Maximized the amount of time students were interacting with each other. | 35% |
| 7 | Instructional Strategies and Delivery | Increased focus on student relationships and connection. | 35% |
| 8 | Assessment Practices | Allowed students more flexibility and choice in the product they created (e.g., podcast, presentation, video, website) on formative assessments. | 34% |

Facilitators and Barriers to Innovation

In the final section of the survey, respondents were given an opportunity to share the factors that both facilitated and hindered their ability to innovate during the pandemic. Overall, 384 respondents provided comments to the item regarding facilitating factors, and 365 respondents provided comments regarding factors that were hindrances to innovation. Some respondents' comments were coded in more than one category, thus leading to a total number of coded comments more than total number of respondents for both facilitators (465) and barriers (406) to innovation.

In terms of facilitators to innovation (see Table H15), the access to the tools needed to participate in online teaching and learning (e.g., computers, Internet access, video cameras) and the applications for instructional delivery (e.g., Microsoft Teams, Zoom, video, etc.) was the most commonly reported

facilitator. The professional development training and collaboration activities offered or identified by respondents' schools were also noted as effective facilitators to implementing innovative practices during the pandemic. Finally, educators' own perceptions of their experience and work ethic were reported as characteristics that allowed them to successfully innovate skills and practices to confront pandemic-related challenges.

Table H15. Facilitators to Innovation During the Pandemic

| Category | N | % | Representative Comments |
|--|-----|-----|--|
| Access to technology tools and resources | 102 | 22% | <ul style="list-style-type: none"> • Having a school issued laptop and home Wi-Fi was the most important. • The great variety of virtual pedagogical tools that exist. • More companies allowed their online services for free to teachers and students. • Microsoft Teams/Zoom. |
| Professional development training and collaboration activities | 81 | 17% | <ul style="list-style-type: none"> • It was a combination of the given: exchanging information with colleagues, attending trainings, researching. • Professional development helped me to find ways to engage students in a lively way. I attended more virtual PDs for teachers than I ever had opportunity to do before and this helped with engaging in innovative practices. • The help, experience, and knowledge that the Tech Department provided us teachers. |
| Educator experience/ Persistence/Creativity | 63 | 14% | <ul style="list-style-type: none"> • My previous experience with the necessary technology to teach from my home. • I believe the single greatest factor that facilitated my ability to innovate during the pandemic is that I have implemented lots of projects and know how I should use the digitals to disseminate the project results. • Urge to learn new things and implement them for a better learning environment. • Creativity, experience and teaching professionalism. |

| Category | N | % | Representative Comments |
|--|----|-----|--|
| Supportive school leadership/Teacher agency | 57 | 12% | <ul style="list-style-type: none"> Because the situation was so unique, there was a lot of freedom to try new things. We discovered many new apps that we continued using during the post-pandemic time and we became more creative in the way we taught our kids. Administrators that encouraged and modeled innovation. Being left alone by management and told, "Don't worry about following subject guides and rules, just make learning happen the best way you can for as many children as you can." I felt I had more agency to solve problems, and although there were admin burdens, there was an explicit focus on maintaining staff well-being and engagement (from managers) which meant I felt supported and valued in a way I have never felt before or since. |
| Educator commitment to students/education | 51 | 11% | <ul style="list-style-type: none"> The greatest factor that facilitated me was that the learning for the learners should continue and should not stop at any cost. Our school community was motivated to learn to stay abreast and to ensure our children were taught and supported in this difficult period. Passion for my teaching job and happiness to see my students. |
| Immediacy of pressure/urgency | 38 | 8% | <ul style="list-style-type: none"> Necessity, this is the greatest factor, when solutions are absolutely needed, they will be found. The circumstances themselves, we innovated or left the students behind (it was not an option). |
| Online learning infrastructure already in place | 25 | 5% | <ul style="list-style-type: none"> Our students and teachers were already using computers and student management platforms that helped us in shifting to online teaching without any delays. Being a tech savvy school the transition from physical to virtual was very smooth. The school had previously trained teachers on issues related to the implementation of technological tools, so the adaptation was relatively easy. |
| Ability of educators/students/parents to change/pivot to online learning | 23 | 5% | <ul style="list-style-type: none"> Ability to quickly change to online format when needed and iterate during the process to find out what worked and did not. Accepting, Learning & Adapting to different challenges. Improvising daily to make things effective. |
| Access to funds for resources | 12 | 3% | <ul style="list-style-type: none"> Funds allocation for purchasing resources, Sustainability plan. Money to invest in technology. |

| Category | N | % | Representative Comments |
|-----------------------------------|---|----|--|
| Student motivation and engagement | 8 | 1% | <ul style="list-style-type: none"> The students I had were motivated and willing to try new things so it allowed me to work with them in finding new ways to connect and learn. |
| No facilitators | 5 | 1% | <ul style="list-style-type: none"> We failed to educate during the pandemic. Everything we tried, anything we tried, could not overcome the message that education did not matter—the message we sent the moment we closed our doors. |

Note. Percentages may not total 100 due to rounding.

In terms of barriers to innovation (see Table H16), by far the most reported category of issues that hindered the implementation of innovation during the pandemic was using or accessing technology needed to participate in online teaching and learning. Educators also noted the well-being (physical, emotional, and mental) of both educators and students had an adverse effect on the participation in and sustainability of online education. Further, the lack of student motivation and engagement was perceived as a significant deterrent to implementing innovative teaching and learning practices to support students in online learning during the pandemic.

Table H16. Barriers to Innovation During the Pandemic

| Category | N | % | Representative Comments |
|---|-----|-----|---|
| Issues with using or accessing technology | 118 | 29% | <ul style="list-style-type: none"> Poor Internet connection. In some cases lack of knowledge of how to use the software or unaware of its full capabilities and functions. Lack of updated devices. |
| Teacher and student well-being | 57 | 14% | <ul style="list-style-type: none"> The bigger mental picture of how the situation affected students, staff, and more. Managing work-life balance by working from home. The fear of COVID. The work overload and the constant adaptation that teachers needed to go through drained their energy. |
| Student motivation and engagement | 48 | 12% | <ul style="list-style-type: none"> Lack of commitment from some students. The students had too many distractions while working at the computer and unfortunately, a lot of them succumbed to them. Not all students learn well virtually and some students either fell behind on their learning or would not login to complete virtual assignments from home. After months of remote classes, most students seemed tired and discouraged to do even the innovating [IBID] lessons. Absenteeism. |
| Lack of skill/knowledge with online teaching and learning pedagogy/best practices | 42 | 10% | <ul style="list-style-type: none"> My personal lack of knowledge of how to use digital resources as platforms and resources. Not having the skill set in place already to navigate how to do things online without significant trial and error. |

| Category | N | % | Representative Comments |
|---|----|----|--|
| No barriers experienced | 27 | 7% | <ul style="list-style-type: none"> Nothing really, just got on with it alongside several interested colleagues. |
| Time | 24 | 6% | <ul style="list-style-type: none"> The lack of time to experiment and create new learning experiences with all the new technology knowledge and skills learned. Time, because it took us by surprise to perform virtual classes from one moment to another. |
| Lack of physical connection/ engagement | 22 | 5% | <ul style="list-style-type: none"> Not being able to be with the students every day. Limitation to be dependent on virtual world/technology to connect to students. |
| Pandemic related uncertainty/ disruptions | 20 | 5% | <ul style="list-style-type: none"> Restrictions from the government. Movement restrictions, external factors. |
| Lack of leadership and/or collaboration | 14 | 3% | <ul style="list-style-type: none"> Once trust was taken away and all teachers were forced into a box, the ability to be effective online began to dissipate. No set standards for remote learning. Constantly changing guidelines for instructional practices. |
| Resistance to change | 9 | 2% | <ul style="list-style-type: none"> Some administrators, parents, school leadership communities were not open to change during the pandemic and that caused a discord between online teaching experience and the teacher's ability to use innovation to engage. |
| Screen time concerns | 9 | 2% | <ul style="list-style-type: none"> Excessive screen time was one of the issues. At the end of the day, teachers would get tired to think creatively. |
| Parent engagement | 8 | 2% | <ul style="list-style-type: none"> Parental involvement, attendance, lack of participation. |
| Lack of funding/money for resources | 8 | 2% | <ul style="list-style-type: none"> Some platforms and/or applications had a cost to achieve better use. Free versions were quite limited as to what could be done. Shortage of funds. |

Note. Percentages may not total 100 due to rounding.

Wrap Up

In the final section of the survey, respondents were given an opportunity to share anything else about their experience with innovative teaching and learning strategies and practice during the pandemic. Overall, 106 respondents provided comments to this open-ended question. Note that some respondents' comments were coded in more than one category, thus leading to a total of coded comments (110) more than total number of respondents (see Table H17). The majority of final comments made by respondents focused on the general increase in problem-solving skills and lessons learned that educators experienced during the pandemic, particularly given the urgency and lack of preparation schools had to make the change to digital teaching and learning environments.

Another set of responses indicated many educators experienced specific skill and knowledge acquisition around the use of the technologies introduced to them to support digital teaching and learning. Further, many respondents reported a shift in their perceptions about best practices in digital teaching and learning pedagogies and the ways in which these pedagogies/skills can be applied in the regular face-to-face learning environment.

Table H17. Final Thoughts from Survey Respondents

| Category | N | % | Representative Comments |
|--|----|-----|---|
| Gain in problem solving skills/general learning | 32 | 29% | <ul style="list-style-type: none"> The pandemic has made us learn many lessons, both negative and positive. I see the strengths in what we learned and adapted to upscale ourselves to give our best to society. I believe in life-long learning, and as team leaders, we should keep encouraging and supporting the team with resources in the school's best interest. At the same time, we should also cater to the well-being of teachers and not pressurize them fully. The pandemic has equipped us with innovative ideas to face challenges to meet students' requirements and well-being too. |
| Change in understanding of technology solutions/knowledge | 28 | 25% | <ul style="list-style-type: none"> The use of digital technology has become an important tool in the classroom. The new generation of students is comfortable with digital technology, and teachers must be well-equipped and updated. |
| Change in understanding of digital teaching and learning pedagogy/skills | 20 | 18% | <ul style="list-style-type: none"> The experience of distance learning is a unique experience that added to the teachers of many experiences and changed many of our ideas about the learning process |
| Importance of collaboration/sharing resources | 10 | 9% | <ul style="list-style-type: none"> I believe cooperation and collaboration are keys to making any transition smooth. IB students were also open to change and able to transition without any major challenges. |
| Importance of connections and relationships in teaching and learning | 6 | 5% | <ul style="list-style-type: none"> The importance of human connection and team building - leaders, teachers, students, parents is essential under all circumstances and seemed to become a higher priority at some moments. |
| Negative experience with online teaching and learning during pandemic | 6 | 5% | <ul style="list-style-type: none"> I did not enjoy teaching online and felt very disconnected from the students. My hope is to never engage in online teaching again. |
| Other comments | 8 | 7% | <ul style="list-style-type: none"> I wasn't at the school during the pandemic. |

Note. Percentages may not total 100 due to rounding.

Appendix I: Problem Solution Table

Assessment Practices

- Restructured assessments for the virtual environment (e.g., allowed open book or the use of resources, modified the types of questions).
- Allowed students more flexibility and choice in the product they created (e.g., podcast, presentation, video, website) on **formative** assessments.
- Allowed students more flexibility and choice in the product they created (e.g., podcast, presentation, video, website) on **summative** assessments.
- Eliminated summative assessment to focus on keeping the subject area enthusiastic and engaging.
- Provided flexibility by allowing more time to complete assessments during class and/or by adjusting due dates for submitted work.
- Conducted online assessments using digital technologies (exam.net, AssessPrep) rather than paper-based exams.
- Implemented common assessment tools across classrooms to alleviate some of the assessment burden.
- Implemented assessments for primary students that did not require typing (e.g., multiple choice, audio answers, videos, handwriting and scanning work).
- Created multiple sets of questions (assessment forms) and shuffled the order of the items.
- Implemented timed assessments to ensure students did not have time to look up answers.
- Implemented oral exams during class time to prevent cheating and plagiarism.
- Implemented online exam procedures where students received sealed exam packs and students were monitored online while completing the exam.
- Used multiple devices/cameras: one to show the student's face and body and the other to show their screen and/or desk area.
- Increased monitoring by ensuring at least two teachers monitored every assessment.
- Used software (e.g., Zoom, Teams, AssessPrep) to monitor/invigilate assessments and instructed students to have their camera and microphones on during testing,
- Used an online testing platform that allowed browser lockdowns and/or used blocking systems to prevent students opening other tabs during the assessment.
- Used academic honesty software (e.g., Turnitin.com, Page, GoGuardian) to prevent cheating and plagiarism.
- Conducted training with the school teaching staff to increase ability to detect academic dishonesty.

Classroom/Learning Environment

- Reduced synchronous class time to keep students engaged.
- Minimized the amount of time the teacher was talking during the lesson.
- Maximized the amount of time students were interacting with each other.

- Created short videos students could review and rewatch as needed.
- Delivered activities through social media.
- Used multiple activities to break up instruction (e.g., direct instruction, group work, videos, online games, breaks).
- Reduced assignments/homework to alleviate some of the burden on students.
- Used team teaching and/or traded off lessons based on expertise.
- Increased the number of cameras in the classrooms to allow for maximum visibility.
- Provided opportunities for students to interact across grade levels.
- Tracked attendance by activity (rather than overall) using the same digital platform used by the teacher for other class activities.
- Adjusted schedules, school hours, and office hours to better meet the needs of students.

Instructional Strategies and Delivery

- Used different technology options (Pair Deck, Nearpod, breakout rooms etc.) to show student learning progression.
- Provided curated sets of online materials (e.g., videos, websites, Duolingo) to supplement student learning.
- Provided an online class notebook for each class.
- Shared student work online (e.g., online exhibitions).
- Increased focus on student relationships and connection.
- Intentionally grouped students to encourage student engagement.
- Encouraged students to take breaks from the computer (e.g., stand up and walk away from the computers; do something physical).
- Transitioned science experiments to the online environment (e.g., thought through what experiments students could safely do at home with common household materials, used demonstrations rather than having the students do the experiment themselves, as well as using videos and simulations).
- Encouraged the use of home materials (e.g., rolled up socks substituting for balls) for physical education activities.
- Conducted virtual field trips or digital tours (e.g., art galleries, museums, talk to a scientist).
- Invited guest speakers to attend via virtual platforms.
- Used short anonymous surveys at the end of lessons to gauge student understanding, enjoyment, progress, and feedback to inform changes to instruction and delivery.
- Assembled and couriered lab kits to students to ensure access to all necessary lab equipment and supplies.

Parent Engagement

- Used technology to engage parents (e.g., held virtual sessions, recorded videos).
- Included parents in the learning activities (e.g., designed experiences where families could use materials in their own homes to complete assignments together).

- Provided support to parents in accessing the schools' platforms (e.g., shared videos, provided technical support, called parents).
- Provided information to parents on how to set up the best learning environment for their child(ren).
- Actively discouraged activities that required parental involvement (due to other parent stressors and the effects on family relationships) and/or designed activities to limit reliance on parents.

Student Agency

- Allowed students choice to manage and organize their own work (e.g., provide students a list of lessons for the day and allow students to do them in the order they want).
- Allowed students flexibility in timelines so students could work at their own pace.
- Allowed students to control their own schedules (e.g., students could sign up and attend classes that work for their schedules).
- Provided presentations to students on topics related to self-agency (e.g., motivation, self-regulation, and autonomous learning).
- Provided time and space for students to receive individual feedback from teachers.
- Eliminated deadlines or provided flexible deadlines/extended time to give students more ownership of their work.

Student Engagement

- Provided students control of how to participate (e.g., voice or chat; camera on or off, anonymous answers, full class participation with a poll or live word cloud).
- Provided opportunities for student connection and well-being (e.g., opportunities to chat with friends, opportunities to be outdoors).
- Shared materials and assignments through social media platforms (e.g., WhatsApp, TikTok).
- Created spaces to provide more support to students (e.g., dedicated sessions to ask questions).
- Provided opportunities for students to be heard and provided feedback (e.g., individual check-ins, phone calls to students, access to counseling sessions).
- Held virtual sports days, competitions, and assemblies.
- Used contests and friendly competition to encourage engagement with the content.
- Allowed students to create and demonstrate classroom activities and games.
- Provided students with multiple activities they could do as their homework to review what they learned in class.
- Provided time and space for students to engage with each other in non-class time (e.g., unstructured time during instruction hours, open breakout rooms during breaks and lunch).
- Allowed students to develop their own afterschool and lunch clubs.
- Incentivized attendance and participation (e.g., provided extra credit, allowed students to earn points to "purchase" a reward).

- Provided opportunities for students to "teach" (e.g., give "how-to" presentations on new technologies, host yoga sessions, give guitar lessons).
- Created a systematic and intentional method for connecting with students and ensuring each student received individual attention (e.g., assigning each student a mentor teacher to discuss problems and get advice/support when needed, calling each student at least once every two weeks to connect).

Teacher Collaboration

- Provided a dedicated and protected time and space for collaboration (e.g., communities of practice, common planning, team meetings).
- Used online platforms (e.g., Google Docs, Microsoft Teams, Zoom) to collaborate and share materials.
- Created social media groups (e.g., Facebook and WhatsApp) to collaborate and share materials.
- Created content area networks with other content teachers to share resources and tips.
- Provided flexibility in virtual meeting times that allowed for collaboration across schools and regions.
- Provided time and space for teachers to build personal connections and interact with colleagues (e.g., digital lunch breaks, coffee or tea breaks, morning mindfulness breaks).
- Provided time and space for teachers to share best practices and lessons learned from their digital experiences.
- Invited external professionals to meet with teachers to share their expertise.

Technology

- Provided technology (e.g., computers, software, hotspots) for teachers.
- Provided technology (e.g., computers, software, hotspots) for students.
- Provided professional learning to teachers on technology platforms.
- Allowed students to use cellphones to access materials and connect to class sessions.
- Allowed teachers and/or students to use their own technology.
- Implemented a computer loan program for staff and/or students.
- Provided financial scholarship for students to purchase technology for digital learning.
- Provided reimbursement to teachers for their Internet bills.
- Provided a space at school for teachers to work to ensure access to technology.
- Provided flexible schedules for students who shared technology with other family members.

