

Toward a K-12 Blended Learning Framework for Saudi Arabia



وزارة التعليم
Ministry of Education



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1818 H Street NW, Washington, DC 20433

Telephone: [+1] 202-473-1000; Internet: www.worldbank.org

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The MOE supervision and coordination team was led by Dr. Auhood Al-Faries and Dr. Nora AlMuhanna (former and current General Supervisor of the General Department of E-Learning, respectively), and included Dr. Abdulah Al-Mohaya, Dr. Bader Abdullah Alsaleh, Dr. Talal Abozandah, Dr. Manal Alothman, Dr. Aysha Bajabaa, Dr. Khalid Alasfor, Dr. Sahar Al-Masoud, Dr. May Abdulrahman, and Dr. Maryam Alotaibi.

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Executive Summary

The COVID-19 pandemic has accelerated the pace of innovation in digital education services around the world, advancing the use of technology to enable flexible learning environments. The Kingdom of Saudi Arabia (KSA)'s unique response to the pandemic through rapidly providing digital and distance education solutions for all students has been characterized by significant flexibility and innovation ([World Bank 2022](#)). Moving from emergency distance education, blended learning options have now become a strategic consideration for the transformation of KSA's education sector.

This document proposes a preliminary guiding framework to define and deploy blended learning models at the K–12 level in KSA. Drawing lessons from international examples and good practices, the proposed framework aims to provide key considerations for the strategic and effective use and integration of Information and Communications Technology (ICT) in K-12 schools.

Blended learning is an instructional approach that combines in-person teaching with remote learning activities. **Section 1** of this report provides key definitions of blended learning, describes some of the main models, and explores different combinations of blended models depending on the context, use of time, and space. With blended learning, diverse arrangements of in-person and remote instruction are possible, supporting a hybrid of synchronous and asynchronous learning methods. The thoughtful consideration of the different possible blended learning implementations depends on factors such as the needs of students, the availability of digital resources, and teachers' capacity to create carefully calibrated and engaging learning experiences.

For blended learning to be implemented effectively and successfully at the K–12 level in KSA, a number of critical conditions and elements should be considered for high-quality learning outcomes. **Section 2** describes six enabling factors needed for a meaningful deployment of blended learning: (1) A *shared national vision* that is clearly articulated for the purpose, use, and expected outcomes of blended learning; (2) *ICT and digital resources* that are accessible, effectively designed and implemented, and integrated carefully to enhance traditional teaching; (3) Dedicated *teacher training* and adequate support to empower teachers and enhance their capacity to effectively use technologies and design student-centered learning experiences that meet all student needs; (4) *Teaching and learning practices* and strategies that engage learners' interaction and foster autonomous learning; (5) Adequate *student learning support* and guidance that enables students to develop the skills required to use technologies to support, direct, and reflect on their own learning; and (6) *Monitoring and assessment* of learning and student progress that appropriately uses formative and summative assessments, as well as quality-assurance processes.

As the specifics of a blended learning program design directly impact the effectiveness of blended learning interventions, **Section 3** provides a closer look at some good practices and key considerations, specifically in employing the six critical elements to guide and support a meaningful adoption of blended learning that improves learning outcomes. Examples include: Identifying a clear policy and

priority areas for blended learning; ensuring equity of access to technology; effectively adapting learning content; empowering teachers; fostering student interaction and securing engagement; tracking student learning; and developing quality assurance mechanisms.

The alignment and integration of the six aforementioned components can allow for the deployment of different possible combinations of blended education. **Section 4** explores the distribution of these combinations along a phased progression of blended learning models, depending on blended learning readiness — moving from a highly regulated early phase of deployment to more flexible approaches in the use of time, space, and interaction within learning experiences in the later stages. Experiences from different countries highlight international examples of blended learning at different stages. Exploring a gradual approach to blended learning deployment and adoption can allow KSA policymakers and educators to explore, test, and reflect on the options that suit them best following national education priorities, aspirations, and capacity.

Finally, **Section 5** presents possible next steps and activities to guide the implementation of blended learning at the K–12 level in KSA, based on an extensive number of examples and lessons learned from reports to study or support blended learning implementation. These examples aim to guide KSA policymakers in their choice of blended learning and flexible delivery approaches. In considering how international practices translate into the national context, decision-makers should explore the feasibility of blended learning models across the different stages of progression, and identify the relevance of international examples to determine the optimal distribution of blended education. The guiding components presented in this report can be used to assess current needs, resources, and capacities in order to test the most suitable approaches for the local context and decide how to phase deployment over time, while ensuring the engagement of key stakeholders. This will help determine how best to adapt and gradually integrate blended learning approaches in a way that provides high-quality education for all KSA students.

Introduction

The Covid-19 pandemic — and the subsequent school closures it caused — led to a shock transition to distance learning across many countries. In response, teachers, students, and school managers explored innovative ways to sustain student learning, many of which have shown promise even after students have been able to return to classrooms. The experimentation and innovation in the use of technology during the pandemic could potentially enable learning environments that go beyond the classic divisions between “online” and “offline” learning. In the (potential) aftermath of the pandemic, there are lessons to be learned about how technology was and can be used to enable blended learning.

In response to the pandemic, the Kingdom of Saudi Arabia (KSA) embarked on a unique journey, rapidly deploying digital and distance education at a large scale across the nation to ensure the continuity of the educational process. The Kingdom’s ability to move its K–12 education services online for all students was made possible primarily due to significant previous investments in e-learning and education technologies. KSA’s fast-paced and unique model to transform its education sector and widely provide distance education was studied by international organizations ([UNESCO](#), [World Bank](#), [OECD](#), [OLC](#)). The studies highlighted various strengths of KSA’s journey, praising the Kingdom’s remarkable flexibility, innovation, and speed of response, while sharing lessons learned and opportunities to continue promoting innovative learning and teaching for the future. Through enabling flexible learning models, KSA’s education sector witnessed several successes, such as fostering innovation at all levels of the education system, enhancing teaching practices, advancing the acquisition of digital skills, enriching interactions, and enabling the provision of equal opportunities to all students.

Capitalizing on these successes, the KSA MOE is continuing its efforts to explore flexible learning modalities to boost innovation and spread a culture of digital transformation in the education sector — both to create richer student learning experiences, and to keep abreast with the requirements of the twenty-first century and global trends in education in light of technology developments. As such, the option to integrate innovative forms of flexible digital learning along with face-to-face instruction has now become a strategic choice for the KSA education sector.

In this respect, the MOE is developing a Framework for E-Learning, which aims to present and explore different options and types for e-learning models in the Kingdom. After conducting a comprehensive review of national, regional, and international experiences of technology-enhanced learning, this framework proposes three e-learning modalities for the KSA, and describes key aspects related to their conceptualization and implementation: (1) Technology-enhanced education (whereby technologies are used to enhance the in-person education process); (2) Blended education (combining both in-person and remote learning); and, (3) Fully online (E-learning, where students are taught entirely remotely, via synchronous or asynchronous methods).

Blended learning aims to maximize the benefits of technology and digital resources to improve the differentiation of instruction, promote classroom interaction, and adapt teaching to students’ learning

levels. It does not refer to a single model or approach but a diversity of options that change the way in which schools, teachers, and students use and incorporate technologies for learning. Given this diversity, the adoption of the different models of blended learning will require carefully calibrated methods to deliver high quality learning experiences.

This proposed framework (a) includes a set of key definitions, (b) describes six enabling factors to consider when implementing blended learning at the K–12 level, (c) presents good practices, and (d) provides an overview of three stages of progression in implementing blended learning. A selection of key international experiences is presented throughout the framework to highlight important considerations and international lessons learned from the planning and implementation of blended learning. These guiding components aim to help policymakers and educators to determine how best to adapt and integrate student-centered learning approaches in blended learning environments.

1 Defining blended learning at the K-12 level

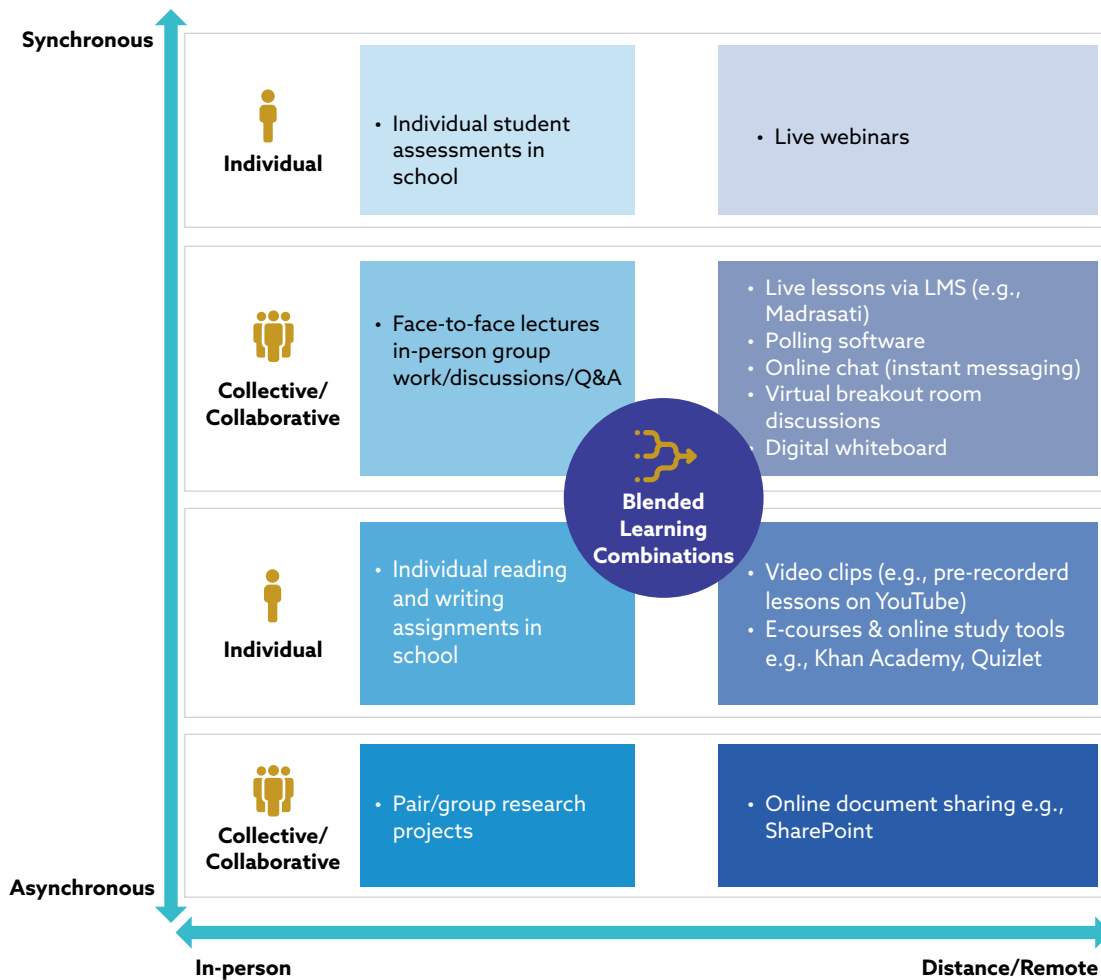
Blended learning combines in-person teaching with remote learning activities. Teaching activities are designed to effectively use media and ICT settings depending on the context and requirements of learning activities: in-person synchronous or asynchronous, one-way interaction, bi-directional (two-way interaction) or multi-directional (many-to-many interaction), highly or loosely structured. The pedagogical focus is learner-centered while recognizing the key role of teachers and support staff. Students have more control over the time, place, path, or pace of study. A glossary of terms related to blended learning is provided in appendix A.

Table 1. Time, space, and interaction dimensions of blended learning

DIMENSION	DESCRIPTION
Time (<i>when</i>):	Learning can be synchronous (at the same time, also known as “real-time”) or asynchronous (sequential, at different times) or it can be a combination of both.
Space (<i>where</i>):	Learning can be in-person (people sharing the same physical location) or can be remote (two or more people in different physical locations).
Interaction (<i>how</i>):	Learning can be structured in terms of the direction of the communication (one-way, bi-directional, or multi-directional) or type of engagement, from no-participation (an individual is learning alone), limited participation (where the interaction with others is limited/controlled), or high participation (active and dynamic exchange with others).

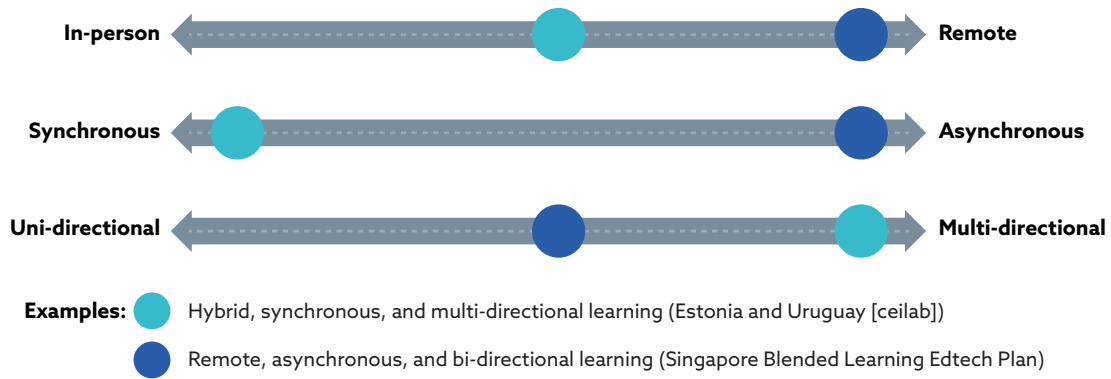
There are three dimensions that determine the different types of blended learning: the (a) use of time (b) use of space, and (c) form of interaction between and among teachers and students (table 1). Considering these dimensions and their subcomponents, a variety of blended learning combinations exist (figure 1). The combination of these three dimensions could offer a variety of possible blended learning implementations. The most effective combination of the three dimensions of blended learning will depend on several factors, including the content being taught, teacher and student readiness, and the available infrastructure.

Figure 1. Blended learning mixes synchronous and asynchronous learning through activities implemented in-person and at a distance



Blended learning therefore moves beyond a “pick-and-mix” concept of combining in-person teaching and remote learning. It requires a thoughtful integration of in-person teaching supplemented by digital resources to cater learning to students’ learning levels. It exists on a continuum that allows for the thoughtful use of synchronous and asynchronous learning as well as in-person and remote activities. Figure 2 presents the scales of these three dimensions and highlights two examples of combinations (a description of these country examples is provided in table 6). Box 1 explains some of the most common blended learning models.

Figure 2. Blended learning mixes synchronous and asynchronous learning through activities implemented in-person and at a distance



Box 1. Common blended learning models

Blended learning exists on a continuum based on the use of time, space, and interaction (table 1). The choice of how to use each of those dimensions will depend on the needs of students, the available resources, and the teachers' knowledge and experience in using the resources. While various models are elaborated below, these represent only a few of the possible combinations:

- **Station Rotation:** Students move through a series of centers or activity stations in the classroom on a set schedule with at least one remote learning station.
- **Lab Rotation:** Students move through a series of activity stations on a set schedule including time for remote learning in a computer lab.
- **Individual Rotation:** Students move through activity stations on individual schedules set by a teacher or software algorithm. Students visit stations specific to their needs and may not rotate through all activities offered during the rotation.
- **Flipped Classroom:** Students complete basic instruction at home through remote course work and lectures and use regular class time for teacher-guided practice and projects.
- **Flex:** Remote learning serves as the “backbone” of instruction as students move through learning activities on fluid schedules according to their needs. Teachers provide in-person support as needed while students work through content at school.
- **A La Carte:** Students take an online course led by a teacher located remotely in addition to in-person courses with teachers in their school.
- **Enriched Virtual:** Students complete most of their course work remotely outside of school but attend in-person learning sessions at school, which may not occur daily.

In deciding which combination of approaches to use, the implementation requirements — including the ratio of students to teachers, the amount of autonomous online time per day, student engagement, and student performance — would need to be considered. Table 2 gives an example of how implementation considerations could differ among selected models.

Source: [Clayton Christensen Institute, n.d.](#)

Table 2. The device, human capital, and facilities required for selecting blended learning approaches

	DEVICES	HUMAN CAPITAL	FACILITIES
Station Rotation	Up to 3:1 devices ratio may be sufficient, depending on group size and how much time is spent online	May require para-professionals to support one or more learning stations	Minimal—retains traditional classroom structure
Lab Rotation	Up to 3:1 device ratio may be sufficient, depending on rotation schedule and group size	May require para-professionals to support students in the lab	Retains classrooms, but significant investments may be required to create learning labs
Individual Rotation/Flex	Works best in a 1:1 environment	Significant flexibility to develop innovative staffing models	Breaks down traditional classroom, structure; significant investments to create new learning environments
A la Carte/Self-Blend	Works best in a 1:1 environment, especially at the high school level	Varies depending on implementation, amount of time spent online and on site	Reduces demand for classroom space; may need to create lab or “ciber-lounge”
Enhanced Virtual	Requires a 1:1 environment	Varies depending on implementation, amount of time spent on site	Greatly reduced demand for classroom space

Source: [Bailey, Duty, Ellis, et al. 2018](#).

2

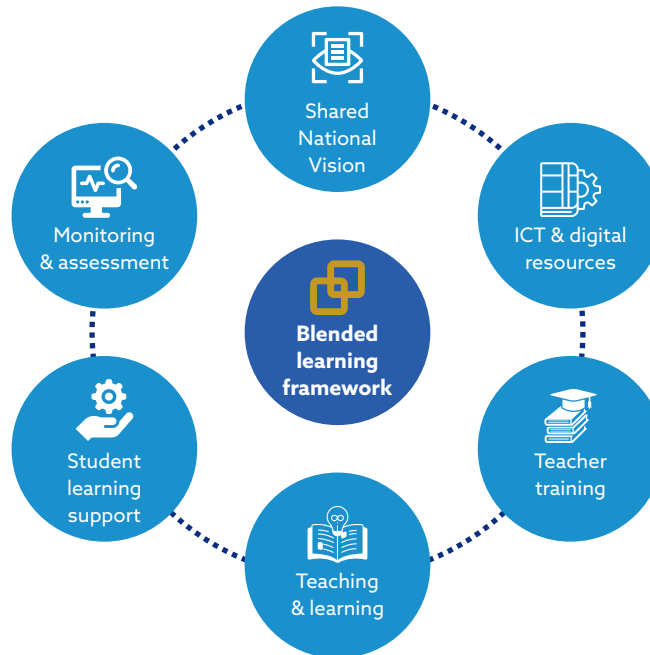
Enabling factors for an effective K–12 blended learning framework

The successful implementation of blended learning at the K–12 level depends on national strategies, digital infrastructure, teaching and learning resources, quality assurance processes, and support to professional development. These conditions — along with other factors in the national context — can influence the culture, outcomes, and the maturity of a blended learning system. Six enabling factors that are critical to the success of a blended learning system at the K–12 level in the KSA are outlined in this section.

Meaningful adoption of blended learning requires that all enabling factors within the education system are aligned toward implementation and adoption (figure 3). The six enabling factors that are of highest relevance to securing quality learning outcomes in the KSA context, and that should feature in a framework for blended learning are:

1. Shared national vision
2. ICT and digital resources
3. Teacher training
4. Teaching and learning
5. Student learning support
6. Monitoring and assessment

Figure 3. Six enabling factors for an effective K–12 blended learning framework



2.1. Shared national vision

For blended learning to be successful at the K–12 level, it must be part of a national vision on how ICT-enabled learning activities can advance student learning outcomes. As blended learning is being introduced in classrooms, the capacity of teachers and students to adopt blended learning, as well as the underlying technologies that facilitate it, will advance. New interpretations on the use and limits of blended learning — including types of activities and the balance between synchronous and asynchronous activities — will arise as the capacity advances.

Within this context, a clearly articulated national vision for the use and expected outcomes of blended learning would allow all stakeholders — from regional authorities to teachers in the classrooms — to align their actions toward a common goal. The shared national vision would clarify institutional structures, relationships, and committees that support high-quality blended learning design, development, implementation, monitoring, and revision. As such, a national vision should align national policy, teaching and learning needs within the classroom, and institutional structures to encourage teachers and school leaders to engage in effective blended learning practices (table 3).

Table 3. Key components of a shared national vision on blended learning

COMPONENT	DESCRIPTION
National coordination	Establishment of national committee — consisting of members from across key stakeholders — to guide and support blended learning initiatives in schools. This committee would have strategic leadership responsibility to provide oversight for blended learning initiatives, facilitate collaboration, and oversee the development of shared standards. ¹
Governance and policies	Establishment of policies for deploying K–12 blended learning. Governance of institutional structures, relationships, and committees that support autonomy at national and institutional levels for high-quality blended learning design, implementation, monitoring, and revision. Execution of the regulatory and educational policies to support the implementation of blended learning with efficiency, financial stability, and improvement of students’ learning outcomes. ²
Setting standards	Establishment of standards on content development, follow-up and evaluation processes, technical and technological competencies of teachers and learners, and infrastructure maintenance. ³
ICT and digital resources	Definition of a strategy to select, adopt, manage, and sustain the necessary infrastructure, hardware, software, servers, databases, and network security. ⁴
Learning needs	Design of curricula and blended learning activities that match the needs of learners and prepare learners to excel in a blended environment. ⁵
School readiness	Assessment of readiness of human and infrastructure resources in schools to effectively implement blended learning by outlining administrative and academic standards, the deployment of human and technical resources, and sustainable financing. ⁶
Ethics and equity	Guidance or a set of criteria to respect cultural diversity and different learning needs while ensuring all learners have equal opportunity to learn, and guidelines related to the ethics of using digital devices and access to the Internet. ⁷

1 See section 3.1 for good practices related to a shared national vision.

2 See section 3.1.1 on identifying a clear policy and masterplan, and table 4.

3 See appendix D on categorizing KSA’s criteria for excellence in K–12 online learning by criteria developed in the proposed framework.

4 See appendix B. Comparing ICTs and their impact on learning, also box 3 and good practices from 3.2

5 See appendix C for a checklist for developing blended learning lesson plans.

6 See good practices and tools to monitor readiness in section 3.6.1. on assessing ICT in education readiness.

7 See box 5 for guidance on how to foster an inclusive blended learning environment.

2.2. ICT and digital resources

Blended learning aims to maximize the benefits of technology and digital resources to improve the differentiation of instruction, promote classroom interaction, and adapt teaching to students' learning levels. Within this context, the presence of technology alone is not sufficient to drive change in the education system.⁸

For blended learning to be successful, technology should adapt and improve teaching and learning activities and free up teachers' time for various combinations of interactive class activities. Through careful integration, technology can supplement traditional teaching to enhance interactive classroom activities and allow learning to happen at the pace of the student. Technology needs to be meaningfully deployed by trained and prepared teachers to facilitate teaching and learning. Teachers and students also need to be supplied with technologies of sufficient capacity and reliability to meet their needs.

To this end, blended learning at the K–12 level requires the conscientious management of the necessary:

1. Infrastructure and devices
2. Learning Management Systems (LMS)
3. Technical and service support
4. Adequate financial resources to maintain and update available resources

2.2.1. Infrastructure and devices

The success of blended learning hinges on student and teacher access to relevant and adequate infrastructure and devices. This includes:

1. Adequate broadband connection — with sufficient Internet connectivity speed to process blended learning solutions — both within the physical classroom and in students' homes
2. Digital learning device ownership schemes for teachers and students
3. Redesigned classrooms with interactive technologies — such as interactive whiteboards — that allow for learning activities to happen simultaneously within the classroom and in students' homes

Regional authorities and schools must work collaboratively to ensure that all students, teachers, and classrooms have access to the necessary physical hardware, and they must develop policies and guidance on how these resources can be allocated across students and classrooms on an equitable basis. Examples come from the U.K. Department for Education ([Government of the United Kingdom 2021](#)), Canada's Ministry of Education ([Government of Ontario 2020](#)), and Singapore's Ministry of

⁸ See table 2 for the relationship between technology and pedagogy; box 3 for principles to support teaching and learning in a blended environment; and appendix B for a comparison of various ICTs and their impact on learning

Education ([Government of Singapore 2022](#)). These technologies also need to be scalable such that infrastructure and facilities can grow as usage increases and be updated as teaching and learning methods evolve.⁹

2.2.2. Learning Management Systems (LMS)

To manage digital resources as part of blended learning activities, an LMS (e.g., Madrasati, Moodle, and Blackboard Learn) provides the tools needed for the development and delivery of learning activities. This includes administering courses, managing assignments, tracking progress, grading student performance, and encouraging student collaboration. An LMS can therefore serve to either supplement teaching — for example in giving students access to homework or assessments from the LMS that teachers can grade — or it can be used to replace the in-person classroom experience, especially when used for asynchronous or online-only activities.¹⁰

2.2.3. Technical and service support

Technical experts are needed to support teachers and schools to implement the appropriate technology. These experts can play a critical role in designing both physical classroom setups and blended learning activities by interpreting teaching needs and specifying systems that will address those needs. The support required is an extension of teacher training and will comprise both step-by-step instructions to design and implement learning activities as well as troubleshooting to resolve issues that arise. As technology evolves, support will also be necessary to ensure that teachers and the classrooms they teach in are prepared to adapt to evolving technologies, including to demonstrate what is technologically feasible and how ICT solutions may be used in a blended learning context.

2.3. Teacher training

Teaching in a blended environment requires different qualities and approaches than teaching in a traditional classroom. Adequate support for teachers and school leaders is essential if they are to maintain blended learning practices or effectively adapt their practices to meet all needs within their classrooms. As this framework has highlighted, what may work in a traditional classroom may not work in a blended environment, and the addition of technology alone does not enhance either the teaching or learning experiences (see box 3 on principles to support teaching and learning in a blended environment).

When preparing teachers for implementing blended learning, technology and technical training are auxiliary to the key elements of teacher professional development. Technology enables a shift to blended learning — and is meant to facilitate both teaching and learning — but it functions as a tool through which blended learning activities are delivered. The success of a blended learning approach instead depends on a teacher’s capacity to use the appropriate technology to (1) design a student-

⁹ Appendix B provides a comparison table of various ICTs and their impact on learning.

¹⁰ The main tools and features offered through LMS platforms are the management of courses and users, management and organization of contents, incentives to drive engagement, collaboration and communication, learning assessment, and usage reporting (e.g., de Carvalho and Jose (2022, 7)7). According to [an estimate in 2019](#), there are over 800 LMS vendors around the world; therefore, it is critical to carry out a comparative analysis on popular solutions based on [factors](#) such as the open source vs. propriety, licensing, key features, integration, hosting, support, scalability, security. Refer to [Salah and Thabet \(2021\)](#) and [Saidi et al. \(2021\)](#) for comparisons of well-known LMSs.

centered learning experience, (2) monitor students' engagement and progress, and (3) modify learning activities when needed.¹¹

Teachers need to be supported to independently design, deliver, and coordinate learning activities both in-person and at a distance. Blended learning activities should be purposeful in terms of prioritizing student engagement both in the design and implementation. This will ensure that students do not lose focus and motivation, especially when alternating between synchronous and asynchronous activities.¹²

In addition to teacher training, structural support to schools is critical for blended learning practices to be sustainable and scalable. This includes creating an enabling environment to:

1. Address gaps between the MOE's expectations for blended learning and current teacher and student capacity
2. Allow staff sufficient time and opportunities for training and to design blended learning activities
3. Provide sufficient support and infrastructure for teachers to redesign their lessons to a blended format.

2.4. Teaching and learning

Blended learning approaches will differ based on the (1) student's age, and (2) subject matter being taught. Younger students require additional attention to acquire the basic skills that will lead to higher level skills in later years, and the ability to become active and autonomous learners. Therefore, when adopting blended learning, the balance between in-person and remote learning activities should consider the best ways to equip students with the cumulative cross-curricula skills that younger students need to succeed.¹³

When the necessary enabling conditions exist, blended learning — and its individualized learning options — can provide a way to engage students beyond what is possible in traditional classrooms. However, as highlighted throughout this framework, the quality of the teaching and learning experiences are more important than the media through which lessons are delivered. When new technologies and programs are imposed on teachers without adequate preparation and training, teachers may feel overwhelmed with the additional burden. Similarly, when programs or learning activities are imposed on students without deliberate consideration of their individual learning needs, their learning outcomes are impacted.¹⁴ Blended learning offers the variety and individual attention that students require to develop critical skills, but the technology and approaches need to be implemented within a context that allows both teachers and students to thrive (see box 3).

11 Section 3.6 discusses monitoring teacher readiness.

12 For examples related to fostering student engagement, see sections 3.2, 3.4, and 4.1.1.

13 A checklist of items to consider when planning blended learning lessons is provided in appendix C.

14 See, for example, "Eveswell and Somerton Primary Schools' Home Learning and Blended Learning Policy" (Government of Wales 2020). http://d6vsczyu1rky0.cloudfront.net/44527_b/wp-content/uploads/2020/12/Blended-learning.pdf.

Box 2. Principles to support teaching and learning in a blended environment

In a blended learning environment, the teacher is actively and collaboratively designing, facilitating, and directing learning activities. This box highlights some principles for teachers to apply within such a dynamic environment.

- 1. Design for open communication and trust:** Open communication means all matters related to the course and the course material are available for discussion. Concerns are raised openly by teachers or students.
- 2. Design for critical reflection and discourse:** It is important that students learn to think carefully about what they believe to be true, and to share their ideas carefully and thoughtfully. It is a way to consider their own learning, and the amount and type of knowledge they are gaining.
- 3. Create and sustain a sense of community:** Learning is enhanced through the collaborative engagement of learning with one another. As learners review and share the course material through online postings, the ensuing dialogue (whether in person or remotely) is where knowledge is constructed and assimilated. Teachers can support the development of healthy community relations by allowing for and encouraging open communication.
- 4. Support purposeful inquiry:** Teachers provide more facilitation of learning than direct instruction. Students are offered multiple, flexible ways to approach the problem, issue, or question. Inquiry leads students to build knowledge that brings about deep understanding.
- 5. Ensure students sustain collaboration:** Blended learning presents more ways for students to connect and communicate, both in-person and remotely. This can be difficult to accomplish in large classes, but technology provides new opportunities for project-based group work.
- 6. Ensure that inquiry moves to resolution:** Facilitation becomes more directive and the teacher moves students to complete, or resolve, the inquiry under study. The teacher is specifically tasked with ensuring systematic and structured exploration (investigation) that moves participants through the inquiry phases in a timely manner.
- 7. Ensure assessment is congruent with intended learning outcomes:**
 - Self-assessment: Students are encouraged to reflect on and measure their own learning progress throughout the course
 - Peer assessment: Can be informal and formative, with students responding to each other's work in individual or group assignments, or it can be formal and summative, where peer evaluation is used as part of the grade for a course
 - Teacher assessment through assignments and examinations should be explicit in reference to learning outcomes. Planning detailed learning outcomes, ensuring the design of activities that lead to attaining these outcomes and, most importantly, ensuring their alignment with learning assessment are the marks of a sound and effective blended learning environment.

Source: Cleveland-Innes and Wilton 2018.

Such learner-centered practices include teachers showing students how to make learning choices and to monitor the consequences of their choices. Students benefit from targeted support to reflect on their own work or to consider the strategies to use when engaging in challenging learning activities. This is a trial-and-error process that allows students to build the skills and behaviors to help them gradually become more autonomous learners. Like building literacy or numeracy skills, not all students will reach the same skill level at the same age. Blended learning needs to be implemented in a way that allows students to take more responsibility for their own learning while ensuring that they are acquiring the cumulative skills they need to succeed.¹⁵

The same approach applies to the choice of subject matter when implementing blended learning. There is evidence that blended learning — when deployed in a cooperative learning environment — can have positive outcomes in science, technology, engineering, and mathematics (STEM) subjects (Capone 2020). In addition, gamification of learning activities supports vocabulary learning in second languages, though there is limited evidence that it may improve learning in other subjects. Similarly, using technology to help students identify their level of learning can help them retain key concepts, but it is not a replacement for other forms of assessment. Each subject matter curriculum should be examined to determine where the enabling conditions exist, and blended learning approaches can be useful in building the desired skill among students.¹⁶

2.5. Student learning support

Blended learning involves the use of both in-person and remote learning environments; but remote learning may not be the best option for all students when in-person learning is possible.¹⁷ Even when students are accustomed to using digital technology, they need the technical support and guidance to develop the skills required to use that technology to support their learning. They also need the appropriate guidance to learn independently and at their own pace using those technologies, including the necessary skills to engage in self-regulated learning and prevent feelings of isolation. Schools need to foster these behaviors by giving increasing opportunities for student agency, including appropriate choice and responsible control, as they progress through school levels.

2.6. Monitoring and assessment

The appropriate use of formative and summative assessments allows teachers to create engaging assignments, determine students' levels of learning, and monitor student progress. Formative assessments place learners at the heart of the system: they ask (1) where learners are in their learning, (2) where they are going, and (3) what they need to get there. Through this process and routine of feedback, learners can sort out small problems and misunderstandings, and form better links between ideas. For high achievers, it offers a more challenging curriculum that focuses on their progress rather

15 For further examples of how to foster students' agency, see box 2; examples described in section 3.4; section 3.5, and country examples described in 4.3.1, especially Sweden and the Republic of Korea.

16 Additional guidance and relevant experiences are provided in boxes 2, 3 and 4; examples described in sections 3.4 and 3.5 as well as appendix C.

17 Few high-quality studies have looked at remote or blended learning for school-aged students, and many of the relevant studies extrapolate evidence from tertiary education and adult learning to school-aged education. In the absence of convincing evidence, careful consideration is required in assessing the appropriateness and implementation of this approach for the youngest students.

than simply meeting targets. This develops the learner and prevents them losing sight of their long-term goal.

Formative assessments in a blended learning approach therefore allow teachers to determine the instructional level of each student and design personalized learning plans that are catered to the individual student. The consistent use of formative assessments also allows teachers and parents to monitor student progress and gauge whether students are meeting their learning expectations. The regular feedback that students receive highlights areas for improvement, suggestions on how to improve, and learning goals that change with new learning outcomes.¹⁸

Blended learning also expands learning opportunities by allowing students to provide support to one another. For example, blended learning facilitates collaborative learning and peer-to-peer interaction during learning activities by creating intentional channels for these to occur, including message platforms and online forums. Peer assessment and feedback strategies or anonymous peer-marking of learning activities lead to positive learning outcomes especially when supported by teachers. To ensure the success of a blended learning approach, learning activities should be intentional and harness the opportunities that blended learning offers that traditional learning may not be able to as easily.¹⁹

Putting formative assessment into practice demands a culture shift on the part of schools, teachers, and supervisors. Schools and supervisors need to prioritize a formative approach to assessment and ensure that other initiatives do not clash with its implementation. Teachers need to be encouraged to minimize their reliance on summative assessments that tell students how they are performing in relation to the K–12 curriculum. Instead, students need to know whether they are making progress and where they need to improve. The emphasis needs to be placed on helping all students develop and sustain a capacity to learn.

18 More information on this topic is provided in box 6, along with good practices in sections 3.4.3 and 3.6.2.

19 For additional examples and guidance on engaging and/or effective teaching practices, see boxes 2–4 and good practices in sections 3.4 and 3.5.

3 Good practices and key considerations in implementing a blended learning framework

Blended learning, when implemented appropriately, could be at least as effective as learning in traditional in-person or remote courses.²⁰ However, not all blended learning studies are conclusive. While some blended learning interventions improve outcomes, the existence of a positive effect varies for different interventions and domains of achievement (Institute of Education Sciences, n.d.). Some challenges include:

- Poor integration between digital curriculum programs and other systems such as learning management systems
- Tension between the need to address standards and personalizing instruction through competency-based progression and student choice
- Limited time to develop personalized learning experiences
- Limited teacher and student support
- Poor flexibility for students or groups with special needs
- Fear, uncertainty, or resistance to change
- Unequal access to enabling conditions: infrastructure (access to connectivity, devices) or digital literacy

To mitigate these challenges, special attention is needed at the system level to the specifics of the blended learning program design and the way that impacts teaching and learning. Below is a series of guiding notes collected from rigorous investigations and policy reports designed to study or support the implementation of blended learning. The guidance and supporting evidence provided are structured under the six enabling factors of the blended learning framework.

²⁰ See, for example, Bazalais and Doleck (2018).

	SIX ENABLING FACTORS	GOOD PRACTICES AND KEY CONSIDERATIONS
3.1	Shared national vision	<p>3.1.1. Identifying policy and masterplan</p> <p>3.1.2. Setting standards</p> <p>3.1.3. Demonstrating strong leadership</p>
3.2	ICT and digital resources	<p>3.2.1. Ensuring equity of access to technology</p> <p>3.2.2. Using the LMS effectively</p> <p>3.2.3. Adapting contents</p>
3.3	Teacher training	<p>3.3.1. Empowering teachers</p> <p>3.3.2. Implementing teacher professional development dedicated to blended learning</p>
3.4	Teaching and learning	<p>3.4.1. Teaching self-directed learning strategies explicitly</p> <p>3.4.2. Engaging interaction</p> <p>3.4.3. Asking students to reflect on their own learning</p> <p>3.4.4. Further examples</p>
3.5	Student learning support	<p>3.5.1. Planning for in-person vs. remote activities</p> <p>3.5.2. Designing for engagement</p> <p>3.5.3. Offering differentiated learning opportunities</p> <p>3.5.4. Ensuring the effective use of time</p>
3.6	Monitoring and assessment	<p>3.6.1. Assessing ICT in education readiness</p> <p>3.6.2. Tracking student formative learning</p> <p>3.6.3. Developing quality assurance</p>

3.1. Shared national vision

3.1.1. Identifying a clear policy and masterplan.

A policy on the implementation of a blended learning vision should express a clearly articulated view of what should change and what the result should be when the policy is successfully implemented (UNESCO 2022). It is essential to define the priority areas to ensure that the vision of the ICT in education policy is in line and synchronized with the education priorities defined by the country and the competent organizations (e.g., MOE, National eLearning Center in KSA.). The vision for blended learning needs to also be translated into a masterplan, which clearly specifies the mid- or long-term plan for guiding the transformation needed in the sector through establishing the expected results for each enabling factor, then setting indicators, and defining timeframes (UNESCO 2022; NELC, n.d.a). The masterplan should identify what needs to be changed (e.g., ICT and digital resources; teacher training; teaching and learning resources; student learning support; and monitoring and assessment). These changes will imply learning and human development outcomes; learning resources; expected pedagogical practices; teachers' competences of making effective pedagogical use of ICT; and appropriate technologies.

3.1.2. Setting standards.

Establishing standards on content development, follow-up, and evaluation, can help guide education departments and schools to provide quality remote and blended learning.²¹

3.1.3. Demonstrating strong leadership.

In implementing innovative and complex education system change, effective leadership is paramount to success. Successful blended learning implementation requires having a strong leadership team to drive the changes and evaluate alignment between the implementation of blended learning and changes in students' learning. A study in Japan (2020) showed the importance of clear and consistent school leadership to guide change management in relation to the introduction of blended learning (Yeigh, Lynch, Turner, et al. 2020). A key recommendation of the report is that schools need to contextualize blended learning to maximize its success. Further, research shows that a traditional top-down approach to leadership may not always be effective at leading education system change, as it may lack the innovation, flexibility, and local knowledge needed for the demands of the 21st century. To ensure effective change is implemented across the system when adopting a national blended learning strategy, it is important to ensure deliberate engagement from the “middle” (district level) in order to achieve strong internal system coherence, capacity, commitment, and sustained improvement. Engaging partners at the “middle” level can help pursue greater performance, as they link “downward” with school communities, and “upward” with the state government to implement systemic changes.²² Table 4 provides examples of the division of roles to encourage student success through “middle” leadership.

21 See, for example, US National Standards for Quality Online Learning: <https://www.nsqol.org/about/>.

22 See, for example, Hargreaves and Ainscow (2015); Hargreaves and Shirley (2020); Leithwood, Louis, Anderson et al. (2004); Fullan (2015).

3.2. ICT and digital resources

3.2.1. Ensuring equity of access to technology.

Whether in school or at home, student access to technology and to the internet must be a top priority in a blended learning environment, and plans must be created and implemented to ensure equity of access for all students (box 5).

Table 4. Example of division of roles to encourage student success through “middle” leadership

EXAMPLE RESPONSIBILITIES THIS IS NOT AN INCLUSIVE LIST OF RECOMMENDED RESPONSIBILITIES. RESPONSIBILITIES SHOULD BE APPROPRIATE FOR THE CONTEXT.	
District Responsibilities	<ul style="list-style-type: none"> • Develop thoughtful, accessible remote learning plans using stakeholder input, when possible. • Support schools in planning and implementing remote learning plans. • Help schools identify needed resources in the community (academic, health, social, emotional).
School Responsibilities	<ul style="list-style-type: none"> • Implement remote learning plans • Communicate regularly with all stakeholders. • Support teachers in planning and implementing remote learning plans. Help families find needed resources in the community (academic, health, social).
Teacher Responsibilities	<ul style="list-style-type: none"> • Make remote learning activities available in a timely manner. • Be available at scheduled times to answer student/caregiver questions. • Provide timely feedback on student work. • Communicate regularly with students. • Provide a range of meaningful learning opportunities that meet the needs of all learners during the period of closure. • Provide regular feedback to students on progress related to learning activities.
Student Responsibilities	<ul style="list-style-type: none"> • Review assigned work. • Complete your assigned work by the due date. • Ask clarifying questions when you need help or don't understand • Be respectful to yourself teachers and peers.

Source: Illinois State (US) Board of Education 2020.

3.2.2. Using the LMS effectively.

Some strategies to plan for an effective use of the LMS (Madrasati) include (Nevada Department of Education 2021):

- Breaking instructional activities, content, and videos into [smaller segments](#) to focus on the objectives in a way that meets the needs of the students, enables engagement, or reduces anxiety.
- Providing [repetition of content using multiple modalities](#) when providing instruction. Capitalize on the wide variety of multimedia capabilities afforded by the remote or blended environments to help demonstrate content concepts.
- [Providing copies of handouts](#), lectures, and notes including multiple representations (graph, text, video, etc.) when teaching a topic to support the need for processing information differently and assist with notetaking in class.
- Providing students a choice menu of technology tools that they can use to present their learning such as [creating a digital storyboard](#), [designing a report or comic](#), or explaining their thinking using an online recording tool.
- Having students work with peers or mentors, when appropriate, so they have another perspective on the academic content. [Using discussion board/chats/forums, or video conferencing features that are part of the online or blended environment](#) will allow students the opportunity to socially interact as they collaboratively work through assignments.

3.2.3. Effectively adapting contents.

Many studies show that online or blended instruction can be as or more effective than in-classroom learning alone (Darling-Hammond, Schachner, and Edgerton 2020). The effectiveness of the learning is not necessarily determined only by the learning setting but by an interaction of factors (box 3).

3.3. Teacher training

3.3.1. Empowering teachers.

The actions of the teacher during the implementation of a blended learning course are of special relevance while the learning is taking place remotely. These actions can help students feel that they have the needed support and that they are not alone, both essential aspects to securing students' engagement. Teachers are also expected to learn while implementing blended learning. The exploration of different modalities of blended learning will allow them to test, adjust, and learn what works and under what circumstances. However, it will be important for teachers to feel that it is safe to make mistakes, ask for help (from peers as well as from the education system), and receive the needed guidance.

3.3.2. Implementing teacher professional development dedicated to blended learning.

Blended learning with a digital component requires educators to think differently about how students traditionally attend school and allows for more flexibility in scheduling. However, consideration must be given to the needs of the students and their teachers. Dedicated teacher training and teacher collaboration are essential elements to consider, as well as the need to include practical applications that can be embedded in an action research cycle to build progressive teacher confidence (Yeigh,

Box 3. Good practices and examples of selecting the platform and content for Blended Learning

When designing blended learning models, it is suggested to start with the goals of the blended learning first; then choosing the appropriate platform; then the content (see below); and final the device — keeping in mind the interdependence of these components. Decisions related to the platforms and devices will influence the type of content that can be offered during the blended learning experience. At the same time, the type of content might limit or influence the options for devices and platforms. The better the integration of all these components (platform, content, and devices), the more transparent and effective the teaching and learning experiences.

The specification of platforms, content, and devices needs to account for the “blended learning model” (see box 1, table 2).

a. Platforms: There is an ever-changing market of options to consider. Platforms should ideally be planned in a systemic way to secure the effective integration of Learning Management Systems with other software and apps. When choosing technology there are a number of dimensions to consider (e.g., flexibility, cost, user experience, accessibility, data protection, etc.). From the system support perspective, there are additional aspects to address; for instance, single sign-on, quality reporting, and technical support. Some of the (many) examples of platforms available to support remote and blended learning include:

1. Learning management systems incorporating learning objects and learner profiles (e.g., [BrainHoney](#), [EdGenuity](#), [Desire2Learn](#))
2. Social learning platforms adding functionality (e.g., [Edmodo](#), [PowerSchool](#))
3. Instructional improvement systems (e.g., [EdPower](#))
4. Learning management systems incorporating learning objects and learner profiles (e.g., [BrainHoney](#), [EdGenuity](#), [Desire2Learn](#))
5. Social learning platforms adding functionality (e.g., [Edmodo](#), [PowerSchool](#))
6. Instructional improvement systems (e.g., [EdPower](#))
7. Online learning providers (e.g., [Apex](#), [Florida Virtual](#), [K-12](#))
8. Adaptive content providers (e.g., [ALEKS](#), [Matific](#), [Math-Whizz](#))
9. Assessment and data platforms (e.g., [Assistments](#), [MasteryConnect](#))
10. Grade-level collections and tablet bundles (e.g., [PowerMyLearning](#), [Amplify](#))

b. Content: It is best to prioritize content that is platform neutral (or that can be use in different devices and platforms). Content can be identified under distinct categories (which are not mutually exclusive), as follows:

b.1) “Premium Content” to be acquired, for instance via subscription, that are specifically prepared for a blended learning experience, offering engaging curriculum, and aligned content that promotes autonomous study. For instance, content with embedded assessments including simulations and games provide instant feedback and promote persistence or, contents for adaptive instruction combining adaptive assessment and targeted instruction.

b.2) “Teacher-Developed Content” via harnessing the power of the internet to enable teachers to play a fundamentally different role in the process. Here, teachers are encouraged to select, adapt, and/or share resources and lessons (examples of platforms to access these sorts of teacher-developed content include [Edmodo](#), [BetterLesson](#), [TeachersPayTeachers](#), [ShareMyLesson](#), and [WeAreTeachers](#)). Careful following of the copyright restrictions of each platform is recommended.

b.3) “Open educational resources” are learning, teaching, and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation, and redistribution by others. There is a growing number of collections of open resources for instructional material. Here are just a few of the sites that teachers can tap into for open educational resources: [CK12.org](#); [PowerMyLearning.org](#); [GooruLearning.org](#); [KhanAcademy.org](#); [Curriki.org](#); [TheGateway.org](#).

Source: Adaptation from Bailey, Duty, Ellis, et al. 2015.

Lynch, Turner, et al 2020). School leaders and supervisors must ensure that teachers are adequately trained and prepared to teach with technology; for example, by integrating the pedagogical use of ICT into teachers’ appraisals. In addition, teachers must plan meaningful ways for students to engage in the content and with one another and the teacher.

3.4. Teaching and learning

3.4.1. Teaching self-directed learning strategies explicitly.

Students who receive instruction in self-regulating learning strategies, such as managing study time, goal- setting, and self-evaluation, perform better in remote learning.²³ Students can effectively learn at their own pace, on their own time, when they have some choice over their learning strategies, and when materials enable them to engage deeply and critically with course content. Student control over when and how to use other learning materials can enhance motivation and performance.

3.4.2. Engaging interaction.

A critical step to ensure student engagement and participation in a blended environment with a digital component is to foster open lines of communication with both students and parents to establish trust and build relationships. Frequent, direct, and meaningful interaction is critical. Interaction should focus on solving problems and developing ideas. Opportunities for students to engage in interdependent cooperative learning are important. This includes group engagement in shared projects and presentations as well as opportunities to interact with peers and the teacher in multiple formats.

²³ The points in this section draw on Darling-Hammond, Schachner, and Edgerton (2020).

3.4.3. Asking students to reflect on their own learning

Opportunities for formative feedback, reflection, and revision could enhance learning. There are positive effects on remote learning of a variety of reflection tools, ranging from prompts asking students to reflect on their problem-solving activities to prompts asking them to provide explanations regarding their work, as well as student reflection exercises during and after remote learning activities.

3.4.4. Further examples for effective teaching and learning in a blended environment

Box 4 presents a few guiding principles for an effective blended learning pedagogy based on an example from Australia. Box 2 provides further detail on key principles to support teaching and learning in a blended environment (Cleveland-Innes and Wilton 2018).

Box 4. Example of an effective blended learning pedagogy documented by the Department of Education and Early Childhood Development, Victoria, Australia (State of Victoria 2012):

Key guiding principles:

- **Authorship and flexibility:** An appropriate integration of blended learning allows learners to practice technology skills in navigating online course materials and creating their own digital content for assessment; to increase student-teacher and student-student interaction through the use of communication tools; the ability to reserve in-person time for interactive activities, such as higher-level discussions, small group work, debates, demonstrations, or lab activities. Students can benefit from higher levels of flexibility and the freedom to learn anytime, anywhere; but also, some level of control over the pacing of their learning.
- **Virtual experiences:** For instance, learners could have the opportunity to engage and draw on expertise that would otherwise not be available to them without costly travel, such as virtual conferencing with zoo/museum/galley staff or virtual excursions to overseas historical or culturally significant landmarks.
- **Effective (re)design:** It is important to mention that teaching using a blended approach can be challenging for some as it may require the acquisition of different teaching skills, re-designing the curriculum and the inclusion of new teaching and learning opportunities, managing the learning content remote, in-class and beyond the classroom walls, and preparing students to work in blended modes. One key factor of success is to effectively design the learning experience and distinguish what learning activities need to take place remotely and what need to be done in-person.
- **Start with the learning outcome:** It takes a great deal of thought and careful planning to deliver a quality learning experience regardless of the mode of delivery. Adopting a blended learning approach must start with a re-examination of the intended learning outcomes. The teacher needs to design learning activities that support these intended learning outcomes, personalize or differentiate learning and then integrate these activities effectively with the required assessment tools.
- **Define and socialize the changing role:** Teachers should prepare their students for the blended learning style and discuss the new roles and responsibilities. Some students won't be used to working independently or may be unfamiliar with some of the technologies, so support mechanisms will need to be put in place for these students.

3.5. Student learning support

3.5.1. Planning for in-person vs. remote activities.

When planning for digital learning, consideration must be given to the mode of attendance: whether students will attend remotely, in person, or using a hybrid approach. Research shows that in-person students and remote students experience courses differently in a blended synchronous situation (Raes 2022). However, the design of the learning space plays a critical role during remote learning experiences, where interaction and collaboration are paramount. Students following courses through live stream without interaction or visibility to the teachers had the lowest level of engagement: digital tools used in synchronous blended environments that mimic in-person delivery can help students maintain closer connections. However, it is important to note that the teaching method should define the learning experience, not the technology. An innovative digital infrastructure alone will not guarantee a successful learning experience.

3.5.2. Designing for engagement.

Engagement is a key enabler to effective blended learning. When designing one-to-many learning experiences (e.g., large student groups, or live stream classes), it will be important to design and incorporate live engagement; e.g., through polls and/or quizzes (Raes 2022). The higher the disconnection (e.g., in time or space), the more important it will be to incorporate strategies to secure an effective engagement. In other words, when designing supportive blended learning and teaching, it is crucial to find an appropriate balance between the flexibilities offered by the technology with the needed pedagogical, social, and academic considerations.

3.5.3. Offering differentiated learning opportunities.

Research conducted in the State of Texas (US) found that blended learning [was more effective in facilitating growth in math learning as compared to meeting grade-level criteria](#). Therefore, schools can benefit from implementing blended learning particularly for students who are behind academically and need additional academic growth in one school year. Within blended learning, students can directly access the content and can advance through learning at their own pace based on their academic level, where the online digital content is able to adapt to the student's learning needs. This in turn allows the teacher to create differentiated learning opportunities for all students (Deschaine 2018).

3.5.4. Ensuring the effective use of time.

Synchronous and asynchronous instruction should be integrated strategically. Combining synchronous activities, in which students meet remotely or in person with their teachers and peers, with asynchronous activities, in which students engage with both the subject matter and groups of peers, could be more effective than fully synchronous online courses (Cleveland-Innes and Wilton 2018).

3.6. Monitoring and assessment

3.6.1. Assessing ICT in education readiness

Policymakers need to examine and assess the local ICT readiness of the school community and make appropriate decisions on the most applicable technological and pedagogical approaches needed to test blended learning (UNESCO 2022). Understanding the ICT in education readiness of the country or targeted local regions, to inform the policy as it is developed, should be considered as one of the earliest steps to roll out blended learning. This should involve a combined qualitative and quantitative assessment of the school's current situation, to identify gaps and potential areas for improvement, and to help MOE technical teams to understand what needs to be done (and what can be done) in the current context. Existing examples of ICT in education readiness and monitoring tools are: [EU Digital skills for teachers](#); [EdTech Readiness Index](#); [SELFIE](#), [Digital Learning Progress Rubric For Schools](#), among others.

3.6.2. Tracking students' formative learning

The use of ICT to assess student learning should be integrated to monitor different modalities (and stages) of blended learning. Assessment can be used to measure whether students have achieved a specific knowledge or competence, or to diagnose the extent to which the students understood a set of lesson units offered in different learning settings (e.g., in-person or remote; synchronously or asynchronously). A good practice is to regularly track students' formative learning outcomes in relation to school resources, which has relevant potential for both feedback and educational management (UNESCO 2022). ICT-based formative assessments in public schools via evaluation platforms can be used for students to reflect on their own learning (meta-cognition) and to understand the effectiveness of blended learning (ANEP, n.d.; Chan 2021). ICT-based formative assessments could provide teachers with both individualized and aggregated reports that profile students' learning outcomes including the curricular objectives they have achieved and the main challenges they are facing, and a comparison of these with their past performance (e.g., before deploying blended learning and after).

3.6.3. Developing quality assurance to evaluate and monitor blended learning.

Quality assurance standards and rubrics can ensure ongoing monitoring of blended learning programs' implementation (box 6).²⁴

²⁴ See, for examples, Perris and Mohee (2022); Blended Learning Evaluation Checklist” at the following URL: http://oasis.col.org/bitstream/handle/11599/2941/2018_COL_Blended-Course-Learnability-Evaluation-Checklist.pdf?sequence=1&isAllowed=y.

Box 5. Fostering an inclusive blended learning environment

Any comprehensive technology-enhanced learning initiative should aim to be flexible and user-centered, with an emphasis on equity and inclusion. If this is not considered from the very beginning, educational technologies could exacerbate inequities in the education system, or unintentionally affect those who are living in the most challenging environments (World Bank 2020). Beginning the design process with considerations of how technology can be utilized for all will lead to initiatives that are more equitable and adaptable to specific contexts. Inclusion should not only be considered from the socioeconomic perspective but also considering the geographical location (urban-rural) as well as learners with a disability or with special needs (World Bank 2021).

An inclusive approach to blended learning involves designing and implementing high-quality digital and blended learning experiences that revolve around providing equitable and accessible learning environments for all students. A thoughtful design of blended learning experiences that take into account the needs of each student should be followed up with intentional opportunities for inclusive access, interaction, and participation in the digital environment. This can include:

1. Design:

- Review internet infrastructure and identify any barriers to digital or technology access, and develop plans to enhance internet connection and access to devices to improve accessibility to the required devices and connectivity at home and in school
- Plan to deliver content and materials in accessible and efficient ways. Consider providing low-tech solutions or alternatives for areas with weaker internet infrastructure
- Gather information about students to understand their needs. Consider learners with varying abilities to determine what accommodations are needed
- Test applications across platforms and in limited bandwidth environments for students in areas with low internet access. Plan for students who may be more at risk of getting disconnected during an online class
- Design opportunities and activities for students to have more flexibility, control, and options regarding when and how they learn to cater to students' different circumstances and ensure students' equitable access to education

2. Implementation:

- Integrate opportunities to build student engagement and a sense of community through inclusive interactions in the digital environment (e.g., implementing active learning experiences such as group class discussions, group activities using interactive virtual whiteboards, etc.)
- Foster equal student participation; encourage those who may be more reluctant to participate through engaging them in discussions and learning activities
- Provide targeted and individualized support to students through multiple resources. Ensure that teachers are easily accessible to students, through providing multiple regular opportunities to connect with them via email, in person, or through virtual meetings (e.g., offer alternatives for students unable to access Madrasati due to the lack of a device or connectivity such as receiving hard copies of materials and checking in with their teachers in an asynchronous mode)

- Share recorded sessions so that students can view them asynchronously (or offline)
- Use assistive technologies to enhance accessibility of documents for students with any physical, mental, or development disabilities
- Pay attention to early warning signs that some students may be struggling; check in with students periodically to see if they can access the applications and/or materials they need; adapt how materials are presented and shared accordingly
- Provide opportunities for live technical support or ways for participants to report technology issues during a session

3. Monitoring:

- Survey students periodically to better understand what digital access and participation they have faced
- Regularly monitor and reflect on student participation — follow up with students who were not able to participate to understand reasons and identify barriers, and reflect on future improvements for accessibility and inclusion

Source: [Ahmad 2015](#); [IREX 2021](#); [David, Pellini, Jordan, et al. 2020](#).

Box 6. Continuous formative assessment during blended learning

Formative assessments during blended learning could enrich the perspective of the learning experience. Technology in the classroom means teachers are gathering data all the time, which plays a critical role in blended learning. Formative evaluation is carried out at each learning step (but also in different learning settings such as remote or in-person) during the whole learning process.

Continuous formative assessment is central to blended learning approaches, supporting students' learning and awareness of their learning strengths and areas for improvement. Blended teaching consists of three main formative assessment stages: pre-teaching, teaching, and post-teaching.

a) Pre-teaching

Typically, this phase of teaching allows assessing students' prior knowledge as a starting point for teaching. However, the evaluation of prior knowledge is not the only possibility of evaluation in the pre-teaching phase of blended instruction. Teachers can also test students after they interact with assigned video lessons, an interview, or an article to pre-teach concepts.

This step is important to find the starting point for the students and inform the instructor on how to structure the classes. Teachers can use online resources (e.g., LMS, apps, etc.) to collect quantitative and qualitative data from students.

b) Teaching

Teachers must combine activities and lessons to help students build on the ideas they have learned during the pre-teaching phase. In this sense, formative assessment provides an

opportunity to assess whether students are effectively understanding and applying the concepts discussed in class.

In addition, blended learning gives students more autonomy. During this phase of blended learning, students can choose the online resources and tools that better help them to achieve their learning objectives. Analysis of the learning outcomes gives teachers and students a deeper understanding of whether they need to rethink concepts or enhance their learning experiences.

c) Post-teaching

In the final phase of blended learning, learners expand their learning by applying new concepts into new situations. For example, when students discuss in the classroom what they learned remotely. Teachers can ask their students to submit what they think is the most challenging aspect of the lesson or something they thought was unclear.

The formative assessment provides useful information for teachers to create or choose content to assign to individual students. This ensures that teachers understand their students' progression and helps students to reach understand what they need to do to meet the expected learning goals.

4 | Country examples: stages of blended learning readiness

The effective integration of the six components described in the previous section progresses across stages of readiness. Table 5 illustrates three stages of progression and readiness. In the early phase, the distribution of in-person and synchronous/asynchronous learning is highly regulated. In later phases, more flexible adoptions take place, with teachers and schools exploring and combining approaches considering contextual factors such as student age, subject being taught, use of time and space, digital skills of teachers, and students' metacognitive learning.²⁵

It is critical to allow for a gradual adoption of blended learning models whereby schools can explore, test, and reflect on the options that suit them best. Not all students or teachers are predisposed to remote or blended learning. Whether seen as natural or abrupt, a shift from the classroom (in-person) to a blended remote (non-in-person) setting necessitates stakeholders' (parents, teachers, and students) understanding of the entire change in practice. If not, confusion and pressure can halt the undertaking or even deter performance expectations (Ibrahim, Padilla-Valdez, and Rosli 2022). This inclusive model of blended learning allows the MOE to define the national strategy and for schools — with adequate preparation and support — to test the most suitable approaches.

It is important that each of the progressive phases described in table 5 reflects the goals described in the overall K–12 education plan. While the phases of implementing blended learning may be universal, metrics of success will depend on the national goals, capacity, and aspirations of individual education systems. The National eLearning Center (NELC), for example, has set out the [Criteria for Excellence in K–12 Online Learning in the KSA](#). To support the adoption of this proposed framework to the national context, appendix D provides a proposed recategorization of the NELC's criteria for excellence structured under the criteria and phases of blended learning developed in this document.

25 See section 3.6.1 for good practices on tools to monitor education system, teacher, and student readiness.

Table 5. High-level overview of three progressive stages in the implementation of blended learning

	STAGE 1	STAGE 2	STAGE 3
Shared national vision	Provide prescriptive guidance to integrate remote learning solutions in the classroom (provide options for learning that combines in-person and remote)	Experiment with different blended learning models and define changes needed for successful implementation (after a blended learning readiness assessment)	Blended learning is embedded in the national framework for education (definition of a strategy, deep redefinitions enriched by the experimentation), and students are granted higher levels of agency and thought to learn on their own and with others.
ICT and digital resources	The use of online tools enhances the in-person experience	Deliberate increase in choices of digital tools and resources to ensure appropriateness of different blended learning models	Resources are adapted based on user context and needs. Localization, production, and curation of digital resources are encouraged.
Teacher Training	Teacher receives professional development (TPD) on the use of online resources (including administration through e-courses)	Teacher receives professional development on the implementation of blended learning and the monitoring of student outcomes	Systematic teacher professional development is offered. Teaching is enriched by regular in-person and remote monitoring. TPD is enriched by a community of practice that supports and enriches teaching practice.
Teaching and Learning	Directed by teacher. Learner is dependent (e.g., the learner replicates what the teacher does)	Teacher is an enabler and facilitator — learners have increasing agency (enriching)	Teacher is an active collaborator. Self-driven student learning (a personalized learning experience) is encouraged
Student Learning Support	Students are provided with general support and remediation	Students receive increasingly personalized learning options and parents receive feedback on student performance and further guidance on supporting students	Students have higher self-awareness and know how to get or provide help from/to peers. Teachers provide students with individualized support to meet their needs, and parents team up with teachers and students to support learning
Monitoring and assessment	Traditional online assessment	Traditional online assessment and badges: learning outcomes are agreed with student	Transformative assessments are administered combining intrinsic and extrinsic incentives (higher personalization, and time- and context-relevant achievements are assessed)

Table 6. Detailed description of the three progressive stages in adopting blended learning, along with a selection of examples from other countries

4.1. Stage 1

Shared National Vision: The vision takes advantage of digital resources and platforms to enhance in-person learning. The quality of the learning experience relies mostly on teacher preparation. However, in this stage there is limited opportunity to personalize engagement with learning and teaching. The vision provides students with the needed guidance and the same resources. Teaching is designed to be experienced by a cohort primarily under synchronous lessons.

ICT and Digital Resources: Traditional textbooks and printed materials are the default learning resources. The digital resources do not deviate significantly from the content or learning resources prepared for in-person lessons. Some course-related information — such as handbooks or regulations — may be also accessible digitally. A virtual learning environment may be provided but will primarily be used as a repository for course documentation, allowing students to access this if they choose to.

Teacher Training: Traditional in-person training is provided to teachers, supporting materials can be either in print or as digital resources. There are no major changes in the traditional teaching practice. Teachers are trained to design, conduct, and lead lectures. Teachers are trained with fundamental digital skills.

Teaching and Learning: Learning and teaching activities are designed to be delivered and engaged with in-person in the classroom or laboratory at the school, emphasizing the physical, in-person aspects of learning. Lectures and tutorials are expected to be delivered in-person, involving skills instruction or other laboratory/workshop/studio/performance space sessions.

Student Learning Support: Support is primarily offered to students in-person. Students may be able to access some support digitally via email, smartphone, or videoconference. Teachers are the main source of student support.

Monitoring and Assessment: Assessments are designed to be undertaken and submitted in an analogue format, although some digital submission of assessed work may be permitted.

4.1.1. Country Examples for Stage One:

The following countries are highlighted for their current status where digital resources and platforms are heavily leveraged during traditional in-person as well as emergency hybrid learning. All three countries have announced relevant roadmaps on personalized and blended learning that would transition them to the next stage.

Japan: In January 2022, the Japanese government released [a Roadmap for the Utilization of Educational Data](#), outlining a national plan to establish “a society where anyone can learn in their own way, anytime, anywhere, with anyone” by harnessing ICT. It is a follow up to the GIGA School Initiative that granted one computer per student (96 percent complete as of September

2021) and aimed to provide a learner-centered education where teachers could allocate time to teaching using ICT. The roadmap runs until 2030 and prioritizes [teacher buy-in](#), which was identified as the greatest implementation challenge. This analytical report elaborated by the Tokyo Foundation for Policy Research: “[Comparison Chart Compiled from the Digitalization Roadmap](#)” highlights the differences between current and future schools.

Korea: Korea Education and Research Information Service ([KERIS](#)), the EdTech arm of the Ministry of Education, updates Master Plans for ICT education every 4–5 years, and is currently executing its [sixth iteration \(2019–2023\)](#). It aims to create an “environment for people-centered ICT-leveraged future education” by disseminating digital textbooks, expanding the use of LMS, and establishing wireless infrastructure in public schools (among other initiatives). In Spring 2022, schools resumed in-person learning and, if more than [3 percent of students were infected](#), had the flexibility to shift into a hybrid model. In November 2021, the MOE released the outline of a 2022 curriculum reform, which highlighted a “[High School Credit Scheme](#)”, a new policy that allows students to choose individual courses instead of taking traditional subjects. It reflected the public demand collected from the national survey on digital learning transformation (May 2021), which called for more self-guided learning (66 percent).

During the pandemic, the Korean government also provided free digital device rental services for low-income families and adopted a zero-rating policy to allow students to get free mobile data access to education websites with support from the three major telecommunications companies (KT, LG, and SK). The government also [supported lower-income families](#) by installing internet service at their homes for a monthly subsidy. The government has also shared relevant guidelines and provided real-time [support](#) to teachers, parents, and students to use online education platforms. A group called “the Community of 10,000 Representative Teachers” was formed to help build teaching capability by encouraging teachers to share their ideas and information about online education.

India: During the pandemic, the government launched several initiatives, summarized in the [India Report on Digital Education](#). In 2021, the government announced the launch of the [National Digital Educational Architecture](#) (NDEAR), an architectural blueprint for the development of digital solutions in education. The NDEAR aims to outline a framework to energize and catalyze the digital education ecosystem to deliver innovative solutions to benefit the whole educational community. The government introduced DIKSHA (Digital Infrastructure for Knowledge Sharing), a national portal for school education, to offer school curriculum-based engaging learning materials to students, teachers, and parents. Also, the “[National Teacher Platform](#)” aims to be a large technology-enabled collaborative platform to enable improvement of learning for children through training teachers at scale. [The National Initiative for School Heads and Teachers Holistic Advancement \(NISHTHA\)](#) launched in 2019 to improve learning outcomes through integrated teacher training. Training modules are developed at a national level; and activity-based modules include educational games and quizzes, social-emotional learning, motivational interactions, team building, preparation for school-based assessment, in-built continuous feedback mechanism, remote monitoring and support system, training need, and impact analysis (pre- and post-training). Open educational resource programs, such as the [Karnataka Open Educational Resources \(KOER\)](#), to pioneer a new model of teacher education, where teachers can collaborate, create, and share digital learning resources.

4.2. Stage 2

Shared National Vision: The vision allows schools to be able to experiment with different models to increase the use of technology and offer higher flexibility during the learning experience (e.g., adoption of different modalities of blended learning). Learning and teaching activities are designed to be delivered and engaged in-person, with digital activities being included as integral parts of these activities.

ICT and Digital Resources: Teachers strategically select what resources to be used remote and in-person depending on the modality of blended learning chosen. Teaching and learning materials, such as lecture notes, are adapted (e.g., length, type of contents) to be available digitally and to be used either synchronous or asynchronously. A virtual learning environment facilitates digital teaching and learning activities. Platforms are increasingly used to support both asynchronous and synchronous activities. While there is access to a repository of digital information, students are encouraged to engage with the digital tools available when undertaking most of their teaching and learning activities. Most of the course-related information, such as handbooks or regulations, are also accessible digitally.

Teacher Training: Training is provided to teachers to effectively integrate digital technologies for teaching. Training is offered to prepare teachers for teaching in blended contexts and to be able to critically select and adapt content to be delivered in-person and remote (e.g., synchronous or asynchronous, remote, in-person); however, student participation is expected to be regulated or supervised. Teachers develop new digital skills and are ready to help others in the use and adaptation of technologies for teaching. Teachers are expected to promote and facilitate increasing levels of student agency.

Teaching and Learning: The teaching and learning activities focused on the development of practical skills take place in-person. However, there are more opportunities to blend remote and in-person delivery of lectures, tutorials, and seminars. Following some predefined quality standards, students can determine how, and when, they want to engage with remote or in-person learning and teaching activities. Teachers are provided with a menu of pedagogical options to implement blended learning, and experiment with different modalities of blended learning. Teachers receive feedback from students on the most effective approaches. All students are offered some level of customization or personalization of the learning experience (e.g., some learning activities can be conducted in-person or remote).

Student Learning Support: Support is offered to students in-person and remotely. Students may be offered follow-up remote support after engaging initially in-person. Remote support may be offered when in-person support is not available.

Monitoring and assessment: Assessments are designed in a blended manner to be undertaken and submitted in either digital or analogue format, with some digital approaches to marking being designed. Formative assessment is key to monitor student progression while learning in blended contexts.

4.2.1. Country Examples for Stage Two:

The following countries are selected for their current status where the access to technology — both the infrastructure and content — is readily available, and the hybrid learning is practiced as a permanent part of the education system. It is mostly offered at the secondary school level.

Singapore: Since 1997, the MOE has implemented [Masterplans for ICT-in-Education](#), which are blueprints for developing ICT enriched environments for learning. There have been 4 Masterplans so far, and it was renamed to [EdTech Plan](#) in 2019 covering the period of 2020–2030, which included four pillars of “Self-Directed, Personalized, Connected, and Human-Centered Learning.” Since 2021, [blended learning](#) has been introduced in secondary schools as a regular feature of the schooling experience, and schools determine [the frequency](#), structure, and subjects that could be delivered remotely. Students are granted personal learning devices and learn what is prescribed by the curriculum through a mix of home-based and in-school activities. This experience will also be complemented and personalized via an AI-enabled [Student Learning Space](#), a remote learning platform that offers curriculum-aligned resources in major subjects from primary to pre-university level, in line with the development of [21st Century Competencies](#).

Canada: In the summer of 2021, the province of Ontario introduced “[Policy/Program Memorandum \(PPM\) No. 164: Requirements for Remote Learning](#)” and made remote learning a permanent part of the education system. The policy outlined the minimum requirements for engaging students during remote learning, daily minimum synchronous time across different education levels, protocols for communication, assessment, as well as mechanisms for securing devices and connectivity for all students. During the fall, [the hybrid model was put into practice](#) where one teacher was simultaneously instructing in-person students and those logging on from home. It allowed to keep remote learners connected to familiar teachers and their regular school communities, and for schools to be well prepared when sudden shifts between in-person and remote learning are to occur. In February 2022, [the province](#) also mandated that students earn a minimum of two online learning credits to receive an Ontario Secondary School Diploma.

Estonia: The [keyword for Estonia between 2021 and 2035](#) is flexible learning pathways and lifelong learning in a seamless learning environment that enables personalization. Learners can design their learning path according to their needs and abilities by learning in smaller modules (micro-credentials, learning bites) that can form part of the formal curriculum. During COVID, many Estonian schools practiced [hybrid and personalized learning](#) where fewer students were at school at the same time and the rest connecting online. Each school was required to check their infrastructural readiness in the classrooms as well as students’ homes and rented out computers for those who needed them. Students had independent study weeks where they set goals and planned their learning, and their progress was checked with teachers every Monday. Parents were assisted virtually, and teachers accessed schools’ virtual teacher room to communicate and collaborate with fellow teachers.

Scotland: Scotland’s [Glow Connect](#) is a national platform that offers an online environment for educators, learners, and parents to communicate and collaborate. It is funded by the Scottish Government and managed by Education Scotland. [Scotland Learns](#) offers a range of ideas and activities to help practitioners support learning at home and provides a resource bank of learning at home activities for literacy, numeracy, health and wellbeing, and themed/

inter-disciplinary learning to support teachers as well as parents in delivering a blended model of learning for general education. The [National e-Learning Offer](#) also aims to complement the delivery of teaching and learning by schools and settings, local authorities, and Regional Improvement Collaboratives in Scotland, and offers resources to support learning across the curriculum. The government also made available several resources to guide teachers in their delivery of online education as well as professional development programs, for instance, a [Professional Learning and Leadership Support 2022](#) portal to develop the skills and confidence of educators in the appropriate and effective use of digital technology to support learning and teaching. The [digilearnscot](#) also contains professional learning programs designed to enhance educators' knowledge and skills in order to develop their learning, teaching, and assessment with digital technology. The [National Improvement Hub](#) provides information and support that enables practitioners to improve their practice and improve the quality of learners' experiences and outcomes. It provides access to self-evaluation and improvement frameworks; research, teaching and assessment resources; exemplars of practice; and support for online collaboration and networks.

Bangladesh: The Bangladesh government has taken several steps toward a national vision for blended learning to ensure meaningful, equitable, and inclusive education. The [Blended Education for All \(BEFA\) Framework](#) (2022) aims to provide strategic direction for education, ensuring that the enabling factors of blended education are considered during planning and implementation through an effective combination of high-tech, low-tech and no-tech modalities. The BEFA framework comprises 5 pillars: teaching-learning activities; content and resources; assessment; teachers' capacity development; and inclusive infrastructure, as well as three enabling factors: policy, management, and partnership. Bangladesh also developed the National Blended Education Masterplan (2022–2041) based on the BEFA framework to (1) ensure that all enabling factors of blended education are considered during planning, implementation, and progress monitoring; and (b) generate blended education solutions for all learners through an effective blend of high-tech, low-tech, and no-tech educational modalities with full understanding of the learners' context and needs leaving no one behind. The e-learning platform [MuktoPaath](#) hosts online courses and virtual classes with over 690,000 subscribers. [Konnnect](#) serves millions of learners with thousands of online learning content and live classes. The [Skills Portal](#) provides technical and vocational students with online content and live classes. The government also launched the [Teacher's Portal](#), designed for teachers to retrieve, and store digital education content and offering an extensive range of materials.

4.3. Stage 3

Shared National Vision: The entire learning experience is designed to cater to the needs of individual students. Students, with the assistance of their teachers, are expected to define their learning goals and to identify how to effectively engage with every aspect of blended learning to meet their expectations. The selection of remote and in-person learning is based on lessons learned from previous experiences (as schools transitioned from stage 1 and 2). Students can access additional learning options and choose what learning experiences should go remote, in-person, or blended. Higher autonomy (self-directed learning) is encouraged and valued.

ICT and Digital Resources: While digital resources are available to all students, not all students engage with those resources in the same way. Teaching is designed to be experienced by a cohort asynchronously with students learning at their own pace. Resources and content are subject to a thorough revision (following guidance and recommendations) to critically analyze what courses, subjects, and contents need to be taught both in-person and remotely, and synchronously and asynchronously. Constant teacher and student curation and adaptation of new digital resources is also considered part of the learning experience. Students are encouraged to build their own personalized learning environment to learn on their own and with others. The virtual learning environment is fully integrated with a whole digital ecosystem of tools and solutions. Technology is adaptive and enables personalization, and platforms provide students with opportunities to further engage with their learning.

Teacher Training: Training is provided to teachers on navigating blended environments. Training materials are provided primarily through digital resources. Training is provided to teachers to effectively integrate digital technologies for teaching in blended contexts. Teachers are prepared to guide and facilitate the learning of the students in blended contexts. Teachers know how to support students with resources to have a more personalized learning (one-to-one or one-to-few) in blended learning environments. Teachers are prepared to prioritize and support students' self-driven learning. Teachers have developed advanced "digital fluency" (e.g., pedagogical readiness to distinguish which contexts are most appropriate to offer different options of learning). Teachers are "blended fluent" and know how to design, share, and improve contextually and pedagogically relevant blended learning experiences.

Teaching and Learning: Teaching and learning activities are designed to be engaged with digitally, emphasizing the personal experience in learning. Students are expected to access digital resources to supplement their learning regardless of the place (in-person or remote) or time (synchronous or asynchronous). Students have developed the skills and experience to define when learning is more appropriate to be conducted remote, in-person, independently, or collectively. Teachers' lectures (one-to-many) are less common. Teachers adapt and adopt the contents to provide multiple options of learning (synchronous or asynchronous, remote, enabling with high student participation) offering different options of personalization based on the students' needs and interests (e.g., personal learning trajectories).

Student Learning Support: Remote support is likely to be offered to students digitally through the virtual learning environment but enriched by a whole digital ecosystem of tools and solutions, such as apps, email, phone, videoconference, chat, among others. Students may be

able to request some in-person support, but this could be delivered by staff or at the virtual learning environment (online platform or other digital information and communication tool). Students know how to get help but also how to provide support for their peers: (1) students can receive individualized tutoring support, and (2) students can receive automated learning support based on areas identified as needing strengthening.

Monitoring and assessment: Teachers are expected to promote and facilitate increasing student agency (e.g., higher levels of personalization in the evaluation). Teachers are trained to co-design the learning experience gathering feedback from students (e.g., considering intrinsic and extrinsic motivation and personal development). Teachers are prepared to provide options for students for different blended learning experiences. Students are expected to reflect on their own learning (e.g., reflecting how the context, time, and space or interactions impact his/her learning). Students and parents receive continuous formative feedback on student learning against goals, and clear individual plans are proposed to support students to reach their goals.

4.3.1. Country Examples for Stage Three:

There are no identified countries at stage 3 at the system level. However, the experimental schools described below demonstrate relevant elements of stage 3. Common features include hybrid, project-based, and personalized learning with increased student autonomy and agency.

Kunskapsskolan (Sweden): [Kunskapsskolan schools](#), originally from Sweden, have [over 100 schools](#) located across the United Kingdom, the Netherlands, USA, [India](#), and the [Middle East](#). Its approach locates [students at the center of learning](#) and strongly promotes student agency. Schools offer [personalized learning](#) where all resources including teachers, subjects, time, space, etc. are carefully designed and organized around the [students' needs and abilities](#). Teachers mainly serve as [coaches](#) to help students set goals and check progress. Subjects are structured in steps, which allow students to study at their own pace, and the use of time matches students' learning profiles and is not restricted by the collective timetable. The school architecture also mirrors the optimization of personalized learning: [the space is purposefully designed](#) with multifunctional facilities for lectures, group sessions, and individual studies. All materials are uploaded on the learning portal and therefore accessible without any limitation to time and space (this [paper](#) introduces their project-based learning).

CeiLab (Uruguay): The Digital Laboratories [CeiLab](#) is based on the “makerspace” concept, a collaborative workspace where students take the initiative in learning, and they learn by doing. These labs are located across [multiple schools](#) in Uruguay and leverage other methodologies such as design-thinking and [project-based learning](#). Students first embark on a project by defining the problem, understanding the context, then move on to exploring different options, evaluating them, and deciding on a particular solution, which will lead to prototyping and testing. The project culminates by reflecting and disseminating the result. The use of [technology](#) also plays a central role in learning: drones, robotics kits, 3D printers, etc. are available in the classroom to develop digital literacy, computational thinking skills, and other 21st century skills linked to spatial understanding, logical thinking, and trial and error. [Teachers are continuously trained](#) to develop new skills and also to transition from their traditional role to become active

collaborators in the creation of new knowledge (these videos in Spanish show how the [kitchen](#) and [school garden](#) are turned into a collaborative learning space.)

TUMO (Armenia): The [TUMO Center for Creative Technologies](#) is a free-of-charge, after-school education program in Armenia that puts youth (12–18 years of age) in charge of their own learning. Its learning program is made up of self-learning activities, [workshops](#), and project labs that revolve around [14 learning targets](#) (game development, graphic design, 3D modeling, programming, robotic, motion graphics, etc.). Students combine these into personal learning paths that adapt to their evolving preferences and rate of progress. The learning plan is a constantly evolving timeline that can span over 2+ years. As students proceed through the timeline, completing projects and leveling up, they build up a portfolio of results that becomes their “living” diploma (the institution does not issue diplomas upon graduation). Since March 2020, TUMO has made the entirety of its program available online and has added new tools and approaches, including the [MyTUMO mobile app](#) and a program of hardware lending, to keep learners active during lockdown.

G-School (Korea): [G-School](#) is an experimental school founded by an award-winning NGO [Future Class Network](#) based in Korea. G stands for the word “Flipped” in Korean, and it runs based on the student tuition as well as the tech grants from IT companies in Korea — it is not eligible for government financing as it is not an accredited institution. It provides secondary education, and operates on [9 principles](#), which include no grade, no exams, no school wall (learning can take place anywhere), multiple learning paths, teachers as facilitators, to name a few. School curriculum places heavy emphasis on self-guided and project-based learning, and teachers are committed to helping students discover their potential and grow at their own pace. Once a student finds a topic of interest, they can develop it into a project, and the school also introduces them to experts in the field to evolve it into a business and at times, finances up to US\$4,000.

5 | Proposed next steps

This closing section provides an overview of some possible next steps that can guide the implementation of blended learning at the K–12 level in the KSA. Although it is not the goal of this document to provide a detailed implementation masterplan, lessons learned from existing experiences are highlighted in this section and results from research and policy guidance that are presented to provide a point of reference to analyze the opportunities of deploying blended learning across the education system.

This framework has been developed to guide decision-makers to “translate” and “enable” international practices into the national context. Transitioning into the adoption of blended learning at the system level implies navigating toward uncharted territories. The education system will need to become a learning organization, to learn-on-the-go and learn-by-doing; ready to experiment, document, and fix unexpected mistakes or potential overlaps. Like any other major change that happens within the education system, changes of this nature can be incremental at most. That is why considering the deployment of blended learning in different stages of progression seems to be an effective way to secure that no one will be left behind.

While deploying blended learning at the K–12 level it will be critical to acknowledge the diversity of students, their different levels of digital proficiency, diversity in terms of maturity and contextual background that could impact student engagement with learning. Therefore, in addition to considering the definitions of choice of blended learning and flexible delivery approaches, it will also be key to monitor the barriers for students in regard to access and engagement with learning.²⁶ The following activities are intended to guide the transition from a blended learning framework to an action plan.

²⁶ Adaptations from the “Blended Learning Policy” elaborated by James Cook University in Australia were included in this section. For further details, see <https://www.jcu.edu.au/policy/learning-and-teaching/blended-learning-policy>.

ACTIVITY 5.1: Assess the needs and capabilities: define guiding principles; assess students' needs for remote and in-person learning; assess the accessibility and effectiveness of current remote learning solutions; assess teachers' capacity; assess availability of physical space for in-person and remote learning; assess availability and flexibility of support levers (e.g., enabling conditions, training, adaptation of the courses and contents, system level support) (UNESCO 2021). Key tasks would include:

- **5.1.a)** Conduct a review of the current teacher preparation and professional development system, including existing frameworks, curriculum, modalities of its delivery, policy and regulatory documents, certification, and provide recommendations (mapping) on existing blended learning practices within the system.
- **5.1.b)** Conduct a review of current functionalities related to teacher professional development in established digital platforms and define if changes are needed for the implementation of blended learning.
- **5.1.c)** Include opportunities to develop digital literacy of teachers and students through orientation to virtual environments used for learning and teaching.

ACTIVITY 5.2: Determine the blended education models: decide whether to distribute capacity evenly or prioritize certain segments; decide which grades to prioritize for in-person learning; define a blended education combination considering the school system context; decide how to phase in more students over time as more schools become familiarized with an increasing combination of in-person and remote learning experiences. Possible tasks to pursue:

- **5.2.a)** Conduct a series of workshops on designing blended learning content with a focus on pedagogy of self-paced and self-regulated learning for various education stakeholders (short-term), and teacher preparation and professional development systems (long-term with elements of ongoing support incorporated).
- **5.2.b)** Create, adapt, or expand appropriate ongoing professional development (and research) in blended and technology enhanced learning approaches to ensure the adoption of contemporary and best practice in teaching and learning.
- **5.2.c)** Ensure that learning management systems are sufficiently resourced to support blended learning and flexible delivery approaches in virtual and in-person environments. Enabling that a range of appropriate collaboration platforms and tools are built to support teachers and student virtual and in-person collaboration.
- **5.2.d)** Create linkages between the existing platform and teacher professional development opportunities, including the assessment and certification of courses on how to effectively teach in blended learning contexts.

ACTIVITY 5.3: Operationalize blended education methods for each grade level: to operationalize blended learning it will be necessary to explore the feasibility of each one of the 3 stages earlier described and identify how the international examples could be relevant; after conducting the readiness assessment to determine which learning activities should be prioritized for in-person learning; determine optimal distribution of blended education across age and subjects; organize a shift system that distributes access to in-person learning among students (e.g. half days); define the teacher allocation model between learning methods; and fill capability gaps to enable delivery of quality hybrid learning. Recommended tasks include:

- **5.3.a)** Develop content for workshops/courses on building the capacity of various education stakeholders in the basics of designing blended learning content in line with existing technology

enhanced learning initiatives currently implemented by MOE. Ensure staff are recruited, trained, supported, resourced, and recognized for effective and innovative blended learning approaches.

- **5.3.b)** Design courses where blended learning approaches are embedded in overall curriculum design and are logically linked to learning outcomes.
- **5.3.c)** Ensure learning technologies and in-person teaching approaches are chosen to best meet the desired course and subject learning outcomes and support student learning and engagement.
- **5.3.d)** Ensure that there are sufficient in-site spaces in the schools designed and equipped to maximize flexible and blended approaches to learning and teaching.
- **5.3.e)** Create and support advocacy events to introduce blended learning as one of most efficient and effective ways of building the future of education.
- **5.3.f)** Ensure that students are provided with consistent and easy access to guidance, information, tools, and resources necessary to facilitate and enable student learning and engagement.
- **5.3.g)** Provide recommendations on mainstreaming the approach within the overall teacher support system, specifically in relation to improving the existing platforms to include necessary functionalities as well as trainers' skills to provide ongoing support.

ACTIVITY 5.4: Evaluate different modalities of blended learning and adjust accordingly: design, select or adopt different tools to monitor blended learning in diverse environments. Considering that learning will take place in different environments, it will be key to adopt tools that allow monitoring not only of the quality of the learning experience but also the continuity of the learning in different settings. Classroom and virtual classroom observations (e.g. [in-person](#) and [remote](#)); consultations with students (e.g., formative online self-assessment), parents, and teachers are critical. Quality assurance tasks and recommendations include:

- **5.4.a)** Regularly review blended learning approaches used in subjects across the whole course of study for applicability, relevance, and best practice in relation to student needs and desired learning outcomes. Ensuring that subjects use an appropriate/effective mode of technology to enable blended learning.
- **5.4.b)** Evaluate the value and impact of the introduction of new technologies into subjects on student learning and engagement.
- **5.4.c)** Develop quality assurance standards for blended learning courses implemented at the national level and ensure those are applied to content developed by the national authorities (e.g., National e-Learning Center) and relevant institutions.
- **5.4.d)** Ensure ongoing monitoring, documenting, and evidence generation for scaling up the newly introduced approach.
- **5.4.e)** Create a dashboard of data collected while teachers and students develop remote activities. The feedback collected should be regularly revised and should be used as an important input to make the adaptations or improvements needed.

The general structure of a roadmap for blended learning implementation could be built around the following points: (1) Type of blended learning model to implement; (2) Stakeholders, roles and responsibilities; (3) Digital environment of blended learning; (4) Curriculum and pedagogical adaptations; (5) Implementation responsibilities; (6) Training of supervisory staff; (7) Agenda

management; (8) Risk management; (9) Cost management; (10) Monitoring and reporting; and (11) Reports, lessons learned and deliverable.^{27,28}

All the activities identified hereafter, and the associated key tasks could be organized in an operationalized action plan. This plan should specify the appropriate leading entity or agency as well as the timeframe when this task should be completed. The following outline is provided for illustrative purposes only; it does not describe the action plan to be developed by the MOE.

Table 7. Illustrative example of structure for elaborating

	ACTIVITY	LEAD AGENCY	KEY TASKS	TIMEFRAME
5.1	Assess the needs and capabilities	MOE	Define guiding principles; assess students' needs for remote and in-person learning; assess teachers' capacity; assess availability of physical space for in-person and remote learning; assess availability and flexibility of support levers	September – December 2022
5.1.a	<i>Revision of curriculum readiness and suitability of existing pedagogical practices</i>	MOE	Conduct a review of the current teacher preparation and professional development system, including existing frameworks, curriculum, modalities of its delivery, policy and regulatory documents, certification, and provide recommendations (mapping) on existing blended learning practices within the system.	September – December 2022
5.1.b	<i>Assess teachers' activities and uses of the online platform</i>	National eLearning Center KSA	Conduct a review of current functionalities related to teacher professional development in established digital platforms and define if changes are needed for the implementation of blended learning.	January – March 2023
5.1.c	<i>Identify existing (or needed) digital skills development opportunities</i>	National eLearning Center KSA	Include opportunities to develop digital literacy of teachers and students through orientation to virtual environments used for learning and teaching.	January – March 2023

Source: Republic of South Africa, n.d.

27 Adaptation from Henda (2020).

28 A useful resource for planning and defining implementation of blended learning can be found in Loshert (2018).

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Appendix A.

Glossary of terms

Blended learning

The thoughtful integration of classroom in-person learning experiences with remote learning experiences

[Garrison and Kanuka \(2004\)](#)

Hybrid learning

Hybrid learning is an educational model where some students attend class-in-person and others join the class virtually from home but at the same time. Under the hybrid learning model, teachers can simultaneously teach in-person and remote students through a mix of in-person and web-based, learner-driven activities.

[LearnPanda](#)

In-person learning

In-person learning refers to instruction at school in real time, with teachers and students interacting in person. Learning is typically a result of interactions between teachers, learners and their peers, and supported by parents, caregivers, learning resources, schools, and school leaders.

[World Bank, 2020b](#)

Remote learning

Learning that occurs when classes are taught at a distance and when students and educators are not in a conventional classroom setting. Remote learning takes place in times of extended interruption to in-person learning – for example, as a result of a pandemic or natural disaster. Classes can be synchronous or asynchronous and can be taught online through a Learning Management System (LMS) or by using videoconferencing tools. In some cases, they may be delivered through emails, print materials, broadcast media, or telephone calls.

[Ontario 2020](#)

E-learning

All forms of electronically supported teaching and learning, especially the web-based and computer-based acquisition of, and engagement with, knowledge and skills. It may take place in or out of the classroom. It is often an essential component of distant education and may involve virtual learning environments.

[UNESCO-IBE](#)

Technology-enhanced learning

The use of information and communication technologies as mediating devices supporting student learning that can include elements of assessment, tutoring, and instruction. It involves a wide set of applications and processes, such as web-based learning, computer-based learning, virtual classrooms and learning environments, and digital collaboration. It includes the delivery of content through a wide range of electronic media (e.g., internet, intranet/extranet, audio- and videotape, satellite broadcast, interactive television, etc.) and access to resources that inform learners of new ideas, which they can then reflect upon and integrate into their existing knowledge.

[Seel 2012](#)

Synchronous learning

Learning that happens in real time (also called “live”). Synchronous learning involves using text, video, or voice communication in a way that enables educators and other members of the school- or board-based team to instruct and connect with students in real time. Synchronous learning supports the well-being and academic achievement of all students, including students with special education needs, by providing educators and students with an interactive and engaging way to learn. It helps teachers provide immediate feedback to students and enables students to interact with one another.

[Ontario 2020](#)

Asynchronous learning

Learning that is not delivered in real time (learning that take place at the student’s own pace). Asynchronous learning may involve students watching pre-recorded video lessons, completing assigned tasks, or contributing to online discussion boards.

[Ontario 2020](#)

Child-centered approach

Placing the child at the notional center of the learning process in which they are active participants. Involves giving children choices of learning activities, with the teacher acting as facilitator of learning.

[UNESCO-IBE](#)

Collaborative learning

A process through which learners at various performance levels work together in small groups toward a common goal. Collaborative learning is a relationship among learners that fosters positive interdependence, individual accountability, and interpersonal skills.

[UNESCO-IBE](#)

Culturally responsive pedagogy

Teaching methodologies which address the need to be sensitive and responsive to cultural differences within the classroom.

[UNESCO-IBE](#)

Differentiated instruction

An approach to teaching that involves offering several different learning experiences and proactively addressing students’ varied needs to maximize learning opportunities for each student in the classroom. It requires teachers to be flexible in their approach and adjust the curriculum and presentation of information to learners of different abilities.

[UNESCO-IBE](#)

Twenty-first century skills

An overarching concept for the knowledge, skills and attitudes citizens need to be able to fully participate in and contribute to the knowledge society. This need is mostly attributed to the changes in society, and more particularly, to the rapid development of technology and its impact on the way people live, work and learn. While in the industrial society the focus of education was to contribute to the development of factual and procedural knowledge, in the information or knowledge society the development of conceptual and metacognitive knowledge is increasingly considered important.

[Lai and Viering 2012](#)

Learning management system (LMS)

An integrated electronic system or platform that provides a set of interactive services for managing and creating courses, teaching and assessment tools, tracking learners throughout their educational journey, and submitting reports to all relevant parties.

[National E-Learning Center Terminology n.d.b](#)

Formative assessments

Assessment conducted throughout the educational process with a view to enhancing student learning. It implies: eliciting evidence about learning to close the gap between current and desired performance (so that action can be taken to close the gap); providing feedback to students; and involving students in the assessment and learning process.

[Heritage, n.d.](#)

Self-assessment

Assessment by which the learner gathers information about and reflects on his or her own learning, judges the degree to which it reflects explicitly stated goals or criteria, identifies strengths and weaknesses, and revises accordingly. It is the learner's own assessment of personal progress in knowledge, skills, processes, and attitudes

[UNESCO-IBE](#)

Appendix B. Comparing ICTs and their impact on learning

The table below presents various ICTs commonly used in the classroom and compares their learning effectiveness drawn from multiple (meta)studies that analyzed a total of 250+ articles on the use of ICTs for learning. The table also reflects the PISA 2018 results where it intended to identify the relationship between the devices and the learning outcomes of 15-year-olds in 51 countries. Echoing what has been reiterated throughout the report, the high-level summary of the below table confirms that (1) technology alone does not yield positive learning outcome, (2) effective implementation and teacher training are critical, (3) the access to technology is associated with improving computer and digital skills, and (4) efforts to generate more evidence on the advanced ICTs must be placed as many tend to be introduced in the classroom without much empirical evidence on their effectiveness.

TYPES OF ICTS	EFFECTS ON LEARNING OUTCOMES
Tablet	According to PISA 2018, students who use tablets in the classroom performed a half-grade level in reading below those who did not, and this finding was consistent across the MENA region (assuming approximately 40 PISA points to every grade level), (Bryant, Child, Dorn, et al. 2020). However, tablets have potential with evidence on mathematics learning when complemented with in-person support from teachers (Pitchford 2015; Rodriguez-Segura 2021).
E-Reader	E-Readers displayed similar results as tablets. When the exposure to e-readers was combined with a routine group meeting, there was a positive impact on reading (Mensch and Haberland 2018; Rodriguez-Segura 2021). In Nigeria, the findings showed that six to eight months of exposure to e-readers led to modest positive impacts on learning, but only if the devices had curriculum material. If only with recreational content, learning outcomes were reduced. Note in this experiment there was no in-person support (Habyarimana and Sabarwal 2018).

TYPES OF ICTS	EFFECTS ON LEARNING OUTCOMES
Laptop	<p>The overarching findings on laptops are that their effects on learning outcomes are often mixed, and there is little evidence that they improve learning. For example, according to PISA 2018, students who used laptops in the classroom performed lower in reading than those who did not, and similar results were found in Romania and the Netherlands when computers were subsidized for students. Both found negative impacts on achievement outcomes, possibly due to students spending more time playing games (Escueta et al., 2020).</p> <p>However, the finding was different in the US where students with access to laptops scored 17 PISA points higher than those who did not (vs. -12 points for the other countries). One way to explain this difference is related to learning curves that develop as teachers and students learn how to get the most out of devices. A proxy to assess this learning curve could be penetration — 71 percent of US students claim to be using laptops in the classroom, compared with an average of 37 percent globally (Bryant, Child, Dorn, et al. 2020).</p>
Desktop computer	<p>The findings regarding desktop computers in PISA 2018 showed that, at the global level, desktops alone did not have any statistically significant impact on learning, yet when connected to the internet, there was nearly a grade-level learning impact on all subjects (i.e., reading, mathematics, and science). The prospects of the internet-connected desktops are promising, particularly for the MENA region, as students with access to desktops alone performed +25 points compared to those who did not (Bryant, Child, Dorn, et al. 2020).</p>
Computer-assisted learning (CAL)	<p>CAL programs utilize specific software designed to develop skills such as mathematics computation, reading comprehension, etc. They are often powered by artificial intelligence and machine-learning technology to offer personalized learning by modeling students' cognitive processes and suggesting content accordingly. The overall findings on CAL have been that there is slightly stronger evidence on improved learning in mathematics than literacy (Lewin, Smith, Morris, et al. 2019; Escueta et al. 2020).</p> <p>For example, a mathematics intervention in Maine, where all students and teachers had access to laptops or tablets (i.e., the first state in the US to grant 1 to 1 technology), yielded a positive learning outcome in 7th grade mathematics, and students who are at or below the median tended to benefit more (Roschelle et al. 2016). In contexts where teacher capacity is a great challenge, CAL can greatly support student learning, too: students assigned to CAL fared better than those in a traditional teaching environment during a weekly, 90-minute intervention in El Salvador (Rodriguez-Segura 2021).</p>
Game-based learning	<p>According to the meta-analysis carried out by Wouters and colleagues (2013), games with educational aims and objectives (as opposed to those for entertainment) have more impact on learning language than mathematics or science, and learners benefit more when games are played in groups, across multiple sessions, and integrated with other instructional approaches.</p>
Projector	<p>According to PISA 2018, the use of data projectors in the classroom is correlated with nearly a grade-level-better performance on the PISA assessment (i.e., +42 points in reading, +32 points in mathematics, and +34 points in science)</p>
Interactive whiteboard	<p>Unlike projectors, there is no statistically significant difference in learning at the global level between students who use interactive whiteboards in the classroom and those who do not. However, when broken down by regions, students in MENA with access to interactive whiteboards performed below those who did not (-18 points in reading) (Bryant, Child, Dorn, et al. 2020).</p>

Appendix C. Checklist for developing blended learning lesson plans

There is no standard, one-size-fits-all template for blended learning lesson plans. After reviewing various types and examples of blended learning models (e.g., [rotation](#), [flipped classroom](#), [playlist or flex](#)), the table below distills the key components or a checklist of items to include in a robust blended learning lesson plan. The table is largely organized in the order that teachers would need to follow or consider. The checklist is somewhat linear in that the decisions made in the earlier steps inform the later ones.

✓	ITEM	NOTES
	Age Consideration	Different grades have different needs for in-person learning. Evidence indicates that younger students need social learning and supervision and have the lowest effectiveness in remote learning (Dorn, Panier, Probst, et al. 2020). For example, in the state of Illinois (2020) , it was recommended for early graders to come to school every day for two hours to have consistent daily routines compared to going in for two full days. Regardless of age, loading more in-person classes at the beginning of the semester is beneficial, as more visible teacher presence could ease students' adjustment to the online environment (Cleveland-Innes and Wilton 2018).
	Learning Objectives	Start drafting the lesson plan by first clearly defining the student-centered learning objectives. They inform the environment of the content delivery and learning activities and how these are connected together and assessed online or in-person. Also, draft the learning objectives in student-friendly language so they can be shared and communicated with students (Cleveland-Innes and Wilton 2018).
	Technology	When it comes to technology, opt for resources that not only align with the learning objectives but fit the level of technical expertise of students. At the most basic level, chosen technologies and tools must allow for equitable access to learning. Be aware of the resources that students have and do not have, as well as consider how to offer access to alternative instruction in cases where insufficient resources exist (The Learning Accelerator 2020).
	Rules and Expectations	Self-directed learning is key to success in blended learning; therefore, clearly stating and communicating the rules and expectations is critical. Work with students to establish these as they will guide the decision-making during students' independent online learning session from setting up learning-activity arrangements to deciding how to undertake learning activities in terms of media type, pace, depth, and coverage of the content, and time (University of Texas, n.d. ; The Learning Accelerator 2020).

✓	ITEM	NOTES
	Blended Learning Models	Age also has implications on the choices of blended models. Among those introduced in this report (see box 1), rotation models are common at the elementary level as students transition from face-to-face instruction to online learning in school (classroom or computer lab) or at home (see this website for ideas to design rotation models in mathematics, language, history, and science). Flex models, on the other hand, are common in secondary schools as they require a high level of self-directed learning skills as students work independently and at their own pace (Bailey, Duty, Ellis, et al. 2013).
	Remote vs. In-Person Activity	All subjects can be delivered online, but depending on the nature of the activity, one modality could be preferred over another. Direct instruction, for example, online learning is considered more effective. For triggering thoughts, integrating knowledge, and affective expression, in-person learning is considered more suitable. There are also other areas to factor in when making that distinction, such as different student needs, subject matter, striking the right balance between the two modalities, which ultimately require teachers to adapt and customize to each class. There is no one right modality for learning (Cleveland-Innes and Wilton 2018).
	Student Engagement and Collaboration	It is important to embed strategies and tools that will enhance student engagement, particularly during online learning (e.g., random questioning strategies, participation prompts, etc.). In terms of multimedia, videos should be short and engaging (reported student median engagement time is 6 mins), presentations should be personal and conversational (vs. third-person monologue), and students' attention should be directed to key ideas, avoiding distraction by removing unnecessary pictures, colors, music, etc. In addition, provide students with opportunities to work collaboratively using web tools to annotate together to engage in social reading, group sense-making, knowledge construction, and community building (The Learning Accelerator 2020).
	Personalization	Personalization strategies help students stay motivated and make meaningful connections to their own interests, needs, and goals. Teachers can support learners to set goals, give them meaningful choices regarding content, pathway, time, and build in flexibility to tailor to individual needs through data-informed differentiation (e.g., tutoring, small group instruction, tailored content), plus ask students to reflect and monitor their own progress (The Learning Accelerator 2020).
	Formative Assessment and Reflection	Build mechanisms into the lessons to collect formative assessment data so students' progress can be tracked effectively. The more formative assessment data teachers collect, the more effective they will be in differentiating learning experiences to meet a diverse group of students' needs. See this page with concrete examples of how teachers can embed formative assessment strategies prior to, during, and after class. Also vital to blended learning is to engage students in the process of reflecting on their own learning (Tucker 2021).

Appendix D. Categorizing KSA's criteria for excellence in K-12 online learning by criteria developed in framework

Table A1. Categorizing the components of NELC's Criteria for Excellence in K-12 Online Learning that relate to a Shared National Vision

STAGE 1	STAGE 2	STAGE 3
The school administration completes a site readiness assessment of the blended learning initiative before implementation that includes stakeholders (e.g., students, parents, teachers, staff, and administrators)	The school administration has a governance structure to enable systematic and continuous improvement for the whole process of design, development, and delivery of blended learning experiences	<i>The institution has established a clear vision and mission (purpose) that reflects clear beliefs and philosophy, explains the value of online learning, and includes clear expectations for learners.</i>
The school administration has defined blended learning (e.g., flipped, rotation, self-paced, etc.) and its strategic value (i.e., activity level, course level, and school level) for its stakeholders (e.g., students, parents, teachers, staff, and administrators) to ensure its alignment with the school's overarching mission, vision, and strategic direction	Schools provided with effective leadership, support, and continuity, including succession planning to ensure stability of the school's leadership	The institution's leadership provides a productive collaborative environment for learning and work for all school stakeholders
The program has clearly defined and communicated the strategic value of blended learning to all stakeholders (students, teachers, staff, community, etc.)	The program's leadership establishes annual program goals, implements action plans designed to meet or exceed those goals, and monitors and communicates progress on goals to stakeholders	The institution's leadership establishes annual goals, directly connected to the vision and mission, and monitors and communicates progress on goals to all school stakeholders

STAGE 1	STAGE 2	STAGE 3
The institution's leadership implements operational processes and procedures consistently and in a manner that ensures organizational effectiveness in support of teaching and learning	The course delivery technology systems for blended learning experiences are considered mission-critical enterprise systems. Thus, they are supported with appropriate contingency plans and administered in compliance with established data management practices and security measures	The effectiveness of blended learning is regularly evaluated using a variety of academic and administrative data
The program has a governance structure that enables clear and effective decision making regarding online education	The school administration has a planning process to ensure adequate resources for the continuous monitoring of recent developments in education and technology to inform blended learning strategic planning, resource allocation, and decision-making	The institution's leadership engages in a continuous improvement process in which policies and procedures are regularly reviewed and updated
The program governance articulates the organizations to which it belongs and reports to, the roles and responsibilities of its leaders, and its compliance with applicable governing regulations and accreditation requirements	The school administration has maintained and regularly updated appropriate technology infrastructure to deliver high-quality blended learning experiences based on reliable and secure data management systems	The institution's leadership engages stakeholders to support the achievement of the institution's purpose and direction
The program clearly organizes course offerings in a way that stakeholders can easily navigate	The blended learning program's strategic plan is reviewed for its continuing relevance and compliance with licensing objectives. It is periodically improved and updated	
The teachers' roles and responsibilities in blended learning are clearly defined in school policies	The school administration conducts regular needs assessments for blended learning initiatives	
Teacher respects and protects student privacy and adheres to all applicable privacy laws and guidelines	The institution's leadership maintains knowledge of current trends in the educational and business environments in order to inform budget projections and resource allocation requests	

STAGE 1	STAGE 2	STAGE 3
Copyright guidelines are followed by the class teacher, media specialist, online learning coordinator, and/or instructional designer (if applicable)	The school has a plan ensuring the requisite expertise and experience are developed (e.g., by teachers, instructional designers, videographers, technologists, and editors) to envision, design, and deliver high-quality blended learning experiences that achieve sustained results and include parental support and guidance	
A process is followed that ensures appropriate permissions (Creative Commons, Copyright, Fair Use, Public Domain, etc.) are in place for online course materials. Teachers have access to program policy about intellectual property concerning online materials	The leadership team promotes equitable access to the blended learning program by ensuring all students have the resources required to participate	
Students' rights, roles, and responsibilities in blended programs are clearly defined in school policies and communicated with parents	Course orientation materials clearly state the relationship and/or complementary connection between the in-person and online blended course design components, making it an integrated learning experience	
The institution ensures all content and material adhere to the principles of intellectual property rights and copyrights	A communication strategy has been developed and implemented to update all stakeholders on changes to the online learning program	
Institutions have access to training, online resources and support related to Fair Use, plagiarism, and other relevant legal and ethical concepts		
Leaders utilize ethical marketing and communication practices including adherence to appropriate guidelines concerning confidentiality in communications		

Table A2. Categorizing the components of NELC’s Criteria for Excellence in K–12 Online Learning that relate to ICT and Digital Resources

STAGE 1	STAGE 2	STAGE 3
The institution plans for and expends financial and technological resources using sound business practices which ensure effective resource allocation while ensuring accomplishment of the organization’s mission and vision	The governing authority and the school leadership execute responsible resource planning for the future	The program’s leadership ensures the program is adequately resourced and secures and/or approves new resource allocations in a timely manner that aligns with the program mission, vision, and strategic goals
The institution provides access to information resources and technological materials as well as necessary support staff to deploy and support the curriculum, programs, and needs of students, staff, and the institution	The institution demonstrates strategic resource management that includes long-range planning and use of technological resources in support of the institution’s purpose and direction	The technology delivery systems are highly reliable and operable with measurable standards. Technology systems are administered in compliance with established data management practices such as the Information Technology Service Management (ITSM) standards, which include appropriate power protection, backup solutions, disaster recovery plans, etc.
Students receive information concerning the technology requirements (hardware and software) to succeed in a blended course before the course start	The institution has established a contingency plan for the continuance program administration (data centers and support services backups) which address the potential of prolonged service disruption	
Parents of students receive information concerning the technology requirements (hardware and software) to succeed in a blended course before the course start	On-going training and support are provided to the faculty and staff to carry out the institution’s mission, vision, and goals. This includes the development and use of new technologies and skills related to online learning	
Technology training is available for teachers, staff, and students	A centralized technology system provides support for building and maintaining the online program’s education infrastructure. Course delivery technology is considered a mission-critical enterprise system	
The online class materials are tested for good readability for use with screen readers, different browsers, and mobile technologies	The institution provides an effective Learning Management System (LMS). Search functionality is included and adopted tools ensure equity of materials access across systems (personal computers, tablets, and phones)	

STAGE 1	STAGE 2	STAGE 3
The institution provides stakeholders access to orientation programs to equip them with the necessary knowledge and skills to access course content, as well as continued support to trouble-shoot throughout the school year	Program and course technologies and tools are current, facilitate instructional objectives, and promote engagement in student learning	
The institution demonstrates a student-centered focus that also addresses online student needs rather than trying to fit on-campus institutional services to a program for online students	A documented program technology plan is present and suggests resource allocation considerations, continuous improvement initiatives, and compliance with affiliated accreditation or regulatory requirements	
The institution provides the necessary technical infrastructure to implement its online learning program(s). This includes single-sign on functionality, identity verification for online system users, and system interoperability.	Technology support is provided and offered at times that best support the needs of online students, teachers, and staff	
The institution plans for and expends financial resources to ensure adequate security measures are in place within the online learning program to prevent unauthorized access or interference.	The necessary tools for pre-production, production, and post-production of video assets are provided	
Program and course technologies protect student privacy and maintain confidentiality of student information (e.g., password protection, encryption, multi-factor authentication).		
Links or explanations of technical support are available in the course (i.e., each course provides suggested solutions to potential technical issues and/or links for technical assistance)		

Table A3. Categorizing the components of NELC’s Criteria for Excellence in K–12 Online Learning that relate to Teacher Training

STAGE 1	STAGE 2	STAGE 3
Training for teachers is provided for teaching in blended learning	On-going training and support are provided to the teachers and staff to carry out the program’s mission, vision, and goals. This includes the development and use of new technologies and skills related to online learning	Teacher demonstrates comfort with the technology used to support learning objectives
The school provides training for teachers to develop, adapt, or use blended course materials, including those ensuring that students remain on task in a blended environment	Online curriculum development is a core responsibility for teachers, though technical assistance is provided for teachers completing course development responsibilities (e.g., instructional designers or technologists)	The blended learning program establishes a virtual professional learning community where teachers may engage in meaningful collaboration and knowledge sharing with their peers
The school provides training for teachers focusing on the similarities and differences between online and in-person pedagogy and building community in a blended classroom environment. These efforts ensure that the teacher can help students understand the differences between online and offline etiquette	Teachers have access to training, online resources and support related to Fair Use, plagiarism, and other relevant legal and ethical concepts	The blended learning program conducts regular and consistent teacher evaluations and provides rich feedback for their professional growth
Training is made available for on-camera presentation focused on the effective use of presentation and voice; while camera technology is readily available, quality considerations remain for optimal educational use	The blended learning program affords the teachers access to on-demand resources that promote current research and reflect best practices in teaching with technology	Teachers support services are regularly evaluated for continued improvement
Training about the effective filming, editing, and sound recording of the video output is made available for anyone engaged in production; educational media requires polished quality for optimal use	Teachers are provided adequate time and resources for blended course development and preparation	
Teachers responsible for delivering the blended curricula are appropriately qualified and empowered to monitor and evaluate student success in achieving course or program learning outcomes	The institution’s leadership implements staff supervision and evaluation processes to improve professional practice and organizational effectiveness	

STAGE 1	STAGE 2	STAGE 3
Institution-wide, qualified professional, administrative, and support staff are provided to achieve the organization's mission and annual goals	The leadership team engages in annual professional development to enhance their knowledge of blended learning	
Qualified professional, administrative, and support staff are provided to achieve the institution's mission and annual goals and tend to varying aspects of online program administration	Teacher demonstrates subject matter expertise and shares relevant experience related to the subject matter	

Table A4. Categorizing the components of NELC’s Criteria for Excellence in K–12 Online Learning that relate to Teaching and Learning

STAGE 1	STAGE 2	STAGE 3
Teacher enhances the teaching/ learning experience using technology	Student-centered instruction is considered during the course development process and monitored in implementation programmatically	Instruction is student-centered, and the learning approach is cooperative, collaborative, and community-oriented unless the learning is independent
The institution verifies that measures are in place to ensure the quality, integrity, and validity of instructional resources and content	The blended learning program systematically reviews all instructional materials, curriculum, digital technologies, and tools (both online and in-class) to ensure alignment with student learning outcomes, relevance, and reflectiveness of research	A comprehensive course blueprint is developed to support alignment of course goals, learning activities, resources/materials, assessments, and learning objectives to ensure students develop the necessary knowledge and skills to meet learning outcomes
Course development guidelines are in place and followed to ensure courses are designed so that students develop necessary knowledge and skills to meet measurable course and program learning outcomes	Teacher aligns all course elements: goal, content, activities, and assessments	Instructional materials (both online and in-class) and course assignments and activities are systematically reviewed to ensure alignment with the student learning outcomes
Each program course includes a syllabus outlining course objectives, learning outcomes, evaluation methods, books and supplies, technical and other related course information, making course requirements transparent.	There is consistency in the design of course navigation and utilization of course components to support online quality and student retention	Teachers provide colleagues and other providers with feedback on blended learning course resources. Data about blended learning technology, student support services, and infrastructure is collected to ensure systematic improvements
The institution adheres to all relevant national law and procedural policies governing curriculum, instruction, and program administration	Each course module is structured into meaningful grade-level/age-appropriate chunks that maximize each student’s potential, offering differentiated tasks so that each student can benefit fully from the added value of multiple modalities	Blended course design promotes teacher and student engagement, focusing on building community online and in-person (unless it is self-paced)
Teachers use effective strategies to create presence in their courses. For example, student-to-student and teacher-to-student interaction are essential program characteristics and are facilitated by school staff	Instructional materials and course syllabi are reviewed periodically to ensure they are aligned to course and program learning outcomes	The institution ensures the appropriate level of technical assistance and technical support staff to programs, teachers, students, and parents

STAGE 1	STAGE 2	STAGE 3
Teacher designs the course material to encourage student engagement/ interaction	Support personnel and administrators are available to address student questions, problems, and resolve complaints about the online experience	
Teacher provides clear guidelines for participation and roles within the activity when group work or peer-to-peer assignment is used	Teacher provides students with opportunities for reflection and closure on the lesson to consolidate their understanding	
Teacher facilitates class discussions (asynchronous and synchronous)	Frequent opportunities exist for the students to work together through interactive and collaborative techniques deployed by the teacher	
Class materials are appropriate to the course subject matter and are offered in various forms (e.g., text, audio, and visual materials) when possible	Easy access to curated and curriculum-aligned extended learning resources is provided through assets like online library resources (e.g., collections, databases, and interlibrary loan)	
Teacher connects course activities to the relevant applications	Teacher uses and integrates technology and learning resources in multi-educational contexts to meet the students' needs	
Teacher shows motivation for course topics	Video productions meet the appropriate standards applicable to each grade/level of the curriculum and align with the target audience, considering their prior knowledge	
Teacher appropriately shares engaging experiences related to the subject matter		
Copyright guidelines are followed by the course instructor and instructional designer		

Table A5. Categorizing the components of NELC’s Criteria for Excellence in K–12 Online Learning that relate to Student Learning Support

STAGE 1	STAGE 2	STAGE 3
Students are sufficiently advised regarding the blended course format and provided strategies for success	The school provides effective technical, academic, and administrative services to support students enrolled in a blended program	The school provides the necessary support resources (e.g., academic, technical, administrative) to ensure student success in blended programs
All students are provided with training modules on new and emerging technologies	Throughout the duration of the course/program, students have access to online tutoring support as a learning resource	Throughout the duration of the course/program, students have access to personal and academic counseling resources
The school provides training and resources for students who are new to blended learning	The school provides training and resources (e.g., onboarding resources and technology training) for parents of students who are new to blended learning	Students and parents are offered opportunities to provide feedback on blended course design and delivery of both in-person and remote components
The institution ensures the appropriate level of resources are in place to support students with disabilities	The rights, roles, and responsibilities of the parents of students in blended learning classes are clearly defined and communicated in school policies	A formal monitoring system allows student and parent complaints and concerns over blended learning and support for continuous improvements to be understood and addressed
Teacher focuses on equity and inclusion	Program demonstrates compliance and review of accessibility standards	A process is in place and followed for the assessment of institutional student retention initiatives for online courses and programs
Teacher maintains a safe and positive learning environment that encourages student participation and reaches out to students who stop participating	The institution integrates digital resources into teaching, learning, and operations to improve professional practice, student performance, and organizational effectiveness while also ensuring equitable access for students with disabilities.	Student and parent support services are regularly evaluated for continued improvement
Teacher attempts to motivate student learning with positive encouragement and shows empathy for students	Instructional materials are easily accessed by students with disabilities via alternative instructional strategies and/or accommodations. Usability tests are conducted and applied, and recommendations based upon Web Content Accessibility Guidelines (WCAGs) are incorporated	The online teacher promotes student-student interaction in online groups to foster collaboration and promote higher-order thinking skills such as analysis, synthesis, and/or evaluation

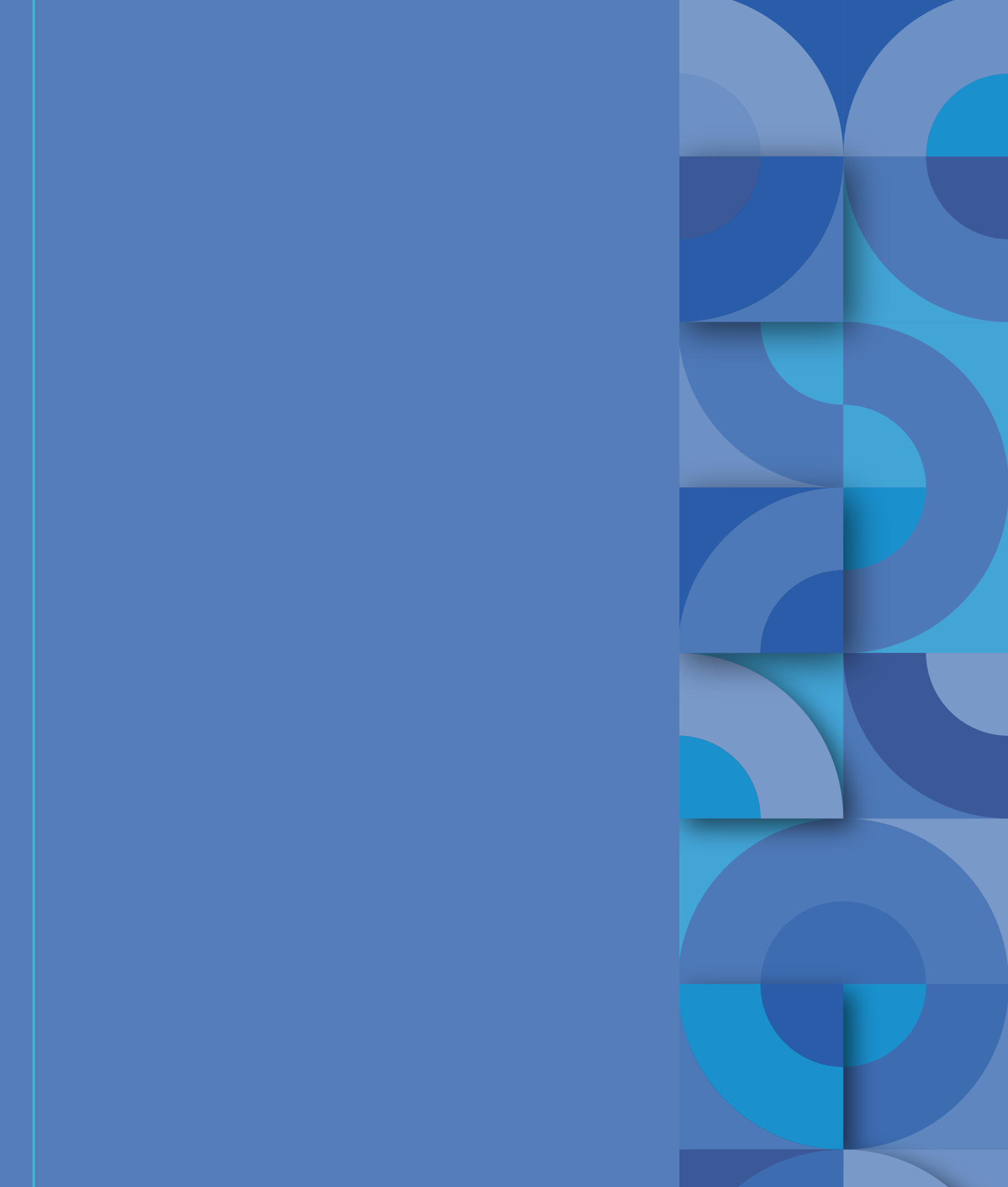
STAGE 1	STAGE 2	STAGE 3
Opportunities are provided to engage students within the program in order to minimize feelings of isolation	Teacher differentiates communication using all possible strategies to ensure the equitable engagement of students with disabilities	
Teacher works to alleviate students' feelings of isolation and demonstrates commitment and concern regarding student success	Learning activities and other opportunities are developed to foster student-student communication and/or collaboration	
Institutional communications (website, email, letters, etc.) provide clear and timely information to students on where to enlist assistance (academic and career counseling, technology, library, etc.)	The online course provides regular opportunities for student-student interaction	
Easy access to technical support is provided	The school administration carefully monitors at-risk students who may need additional resources for success	
Appropriate student support services are in place	The institution ensures student online tutoring support as a learning resource	
Class orientation materials that explain how the course is organized are provided to students and parents	Throughout the duration of the course/program, students have access to appropriate technical assistance and technical support staff	
Teacher acknowledges and recognizes excellence in student efforts	Teacher motivates students with positive encouragement and provides a place for students to form a community and discuss non-course-related topics	
The school administration ensures all course materials and activities conform to universal design principles and the Web Content Accessibility Guidelines (WCAG) standards. This ensures all students have access to the same information and can engage in the same interactions and within the same time frame	Teacher encourages students' awareness of other perceptions or perspectives	

STAGE 1	STAGE 2	STAGE 3
<p>Institutional communications (website, email, letters, etc.) provide clear and timely information to students on where to enlist academic supports and programmatic resources (counseling, technology, library, etc.)</p>	<p>Teacher's communications with students reflect a positive tone, cultural competency, and inclusivity</p>	
<p>The online class protects student privacy and adheres to all applicable privacy laws</p>		
<p>The course content strives to reflect a culturally diverse perspective that is free from bias</p>		

Table A6. Categorizing the components of NELC’s Criteria for Excellence in K–12 Online Learning that relate to Monitoring and Assessment

STAGE 1	STAGE 2	STAGE 3
The student learning outcomes are clearly stated and measurable for each course module or lesson unit	Intended learning outcomes at the program level are reviewed regularly to ensure alignment, clarity, utility, appropriateness and effectiveness	Teachers assess the effectiveness of blended learning offerings, including the extent to which goals and student outcomes are achieved, and compares results to other modalities (in-person and remotely). These results are used to inform and update subsequent instructional practices
Teacher explains how course activities connect to student learning outcomes	Authentic assessment activities derived from course outcomes and/ or aligned to professional practice and industry standards are evident in the overall blended course design	Using learning analytics to identify the students’ needs
Teacher actively assesses student learning outcomes throughout the course	Teacher feedback on student work, assessments, and questions is constructive and provided in a timely manner	The school and teachers analyze and use data, including student grades, course completion, persistence rate, and graduation rate for the effective management of blended learning courses and programs
Teacher provides prompt, clear, and relevant feedback on student work	Blended course design includes rubrics for grading and feedback with checklists to keep students on task	
Grading rubrics are used for student assessment to provide feedback and are included with the assignment overview information	Each class module includes an overview of learning module activities and which learning outcomes are addressed. Learning modules clearly state how student work should be completed (e.g., self-paced, individually, with parental assistance, group work)	
An online grade book is used to promptly record grades, communicate feedback, and offer parental access to students’ graded work	The course learning outcomes are clearly stated and measurable for each course module or unit, whether delivered in-person or remotely	
Clear guidelines and instructions are provided for each assignment that is an assessment, including how the submission of an assignment is completed	An appropriate mix of blended learning assessments is included in the course design, measuring student success relative to course outcomes regardless of the course modality	

STAGE 1	STAGE 2	STAGE 3
Track the online learning knowledge and skills continuously	A process has been implemented to ensure students get timely and substantive feedback on all course assignments or activities	
Multiple types of assessment activities are used (portfolio assessment)		
Evaluation results are timely and communicated to program stakeholders		
A process is in place and followed for the assessment of institutional support services for teachers and students		
Create an improvement plan based on students' grades and course completion rate if unsatisfactory to stakeholders and program leaders		
Teacher carefully monitors student attendance and reaches out to students and parents who stop participating or are frequently late on assignments		



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