BLENDI

Blended Learning for Inclusion (BLENDI)

BLENDI approach – Guidelines

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BLENDED LEARNING
FOR INCLUSION

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Introduction

This publication seeks to present teachers and other interested stakeholders with a theoretical and practical framework for blended learning and inclusive education as this is implemented through the BLENDI approach in the context of the BLENDI project. The framework covers a variety of aspects of the learning process such as student participation, evaluation, and teaching methodology.

BLENDI – Blended Learning for Inclusion aims to promote students' social inclusion in the digital era by developing teachers' and students' digital competence through blended learning. It is led by the Diaconia University of Applied Sciences (Finland) and involves other funded partners from Ireland (I & F), Cyprus (European University Cyprus), Greece (Athens Lifelong Learning Institute), and Spain (Universitat Pompeu Fabra). Moreover, the project aims to foster the digital skills of teachers based on the European Framework for the Digital Competence of Educators, and to promote the inclusion and participation of all students in digital environments through applying the methodology of co-design among students and teachers.

These guidelines have been developed to assist interested teachers to understand the BLENDI approach, terms related to it such as digital divide, social and educational inclusion, digital inclusion, digital competence, and co-design, and the frameworks that comprise the BLENDI approach, which focus on children's participation in education. In addition, the guidelines offer information to teachers about the BLENDI platform and toolkit. Finally, these guidelines contribute in helping teachers to implement the BLENDI approach by pinpointing specific aspects that schools and teachers should consider during the implementation of the BLENDI approach, its impact on students' digital competence, and the evaluation of its results concerning students' digital competence.

Contents

1. Social and Educational Inclusion

1.1. Digital skills and social inclusion

In today's society, digital skills are recognised as important for the social inclusion and professional development of individuals (Castaño-Muñoz, Colucci, & Smidt, 2018; Hatlevik & Christophersen, 2013; Mossberger et al., 2003; DiMaggio et al., 2004). The Declaration on Promoting citizenship and the common values of freedom, tolerance and non-discrimination through education (European Commission 2015a, p. 2), signed by the European Union education ministers in 2015, makes the commitment of combating educational and other inequalities by 'providing all children and young people with the necessary knowledge, skills and competences to build their own professional futures and pathways to success in society, and by encouraging measures to reduce early school leaving and to improve the social and professional integration of all young people'.

The European Commission underlines that 'inequality is at its highest level in 30 years in most European and OECD countries', and that this has a 'negative impact on educational outcomes, since education systems tend to reproduce existing patterns of socioeconomic status' (European Commission, 2015b, p. 28). Recent findings indicate that among other actions, such as collaboration between governments and technologists, investing in in-service teachers and initial training in digital technology can contribute to creating digitally literate, informed, and engaged children online, which can in turn help in children's social inclusion (UNICEF, 2017). The training of teachers in digital technologies also necessitates training teachers to utilise digital technologies via pedagogical frameworks based on the principles of inclusive education.

1.2. Understanding inclusive education

To gain an understanding of the principles of inclusive education, it is important to explain the different approaches to the education of special educational needs and disabilities (SEND) students, and the development of the field of inclusive education. It is emphasised that these approaches should not be seen as temporally distinct or linear in development, because they may still exist or coexist with other practices or approaches in the education of SEND students.

1.2.1. Segregation and categorisation

Traditionally, the education of SEND students has been conceived under *charitable segregation and categorisation* (Jones & Symeonidou, 2017), based on the premise that some children's needs can be met in the mainstream school, and that other children, who are still able to learn, can receive their education in a segregated class or school. This requirement for separate provision for certain groups has undoubtedly given the authorities the power to make decisions regarding the ability of certain groups of children and to have them categorised as 'more capable' than others.

According to this approach, the 'deficit' is clearly located within the child, leading to what has been characterised as the medical model of disability, in which any possible failure or difficulty of the students at school is perceived as the medical problem of a certain individual which requires treatment, cure, or at the very least amelioration (Jones & Symeonidou, 2017). As Barton (2000, p. 53) argues, special education 'makes sure the system continues as smoothly as possible by removing those difficult, objectionable and unwanted people to other spheres. It is, however, often justified on the basis of being in their interests, of meeting their needs.'

1.2.2. Integration

Integration has been the first outcome of parents' and disability activists' struggles for the right of SEND children to be educated in mainstream classrooms. It has emphasised the amending of existing practices or the building of more accessible schools for SEND students (Abbott, 2007) to accommodate their needs. This attempt highlights the effort to shift the focus from the categories of disabilities and the segregation of groups in education to the adaptation to students' particular needs. In essence, integration places more emphasis on socialisation and adaptations, and less on equal educational opportunities (Squires, 2012). However, it was only during the late 1980s and 1990s that the aspect of integration began to be regarded as a matter of social and political values, leading to succes-

sive changes in educational settings (Jones & Symeonidou, 2017).

1.2.3. Inclusive education

In the 1990s the Salamanca Statement (UNESCO, 1994) was regarded as a landmark for inclusive education. It called for a restructured school system that would advocate for the full inclusion of children described as having 'special educational needs' and disability (SEND). Since the Salamanca Statement (UNESCO, 1994), there has been a clear rationale for providing education ***for all children in mainstream schools***. This is an attempt to abandon the term 'integration' and adopt the more recent term 'inclusion' (Jones & Symeonidou, 2017), because the focus of the two approaches differs in both philosophy and practice (Vislie, 2003). The field of inclusive education remains complicated, with no clear consensus on its implications and how the term 'inclusive education' is understood and defined (Ainscow, 2007; Avissar, Licht, & Voge, 2016). According to Ainscow (2007), there are many typologies of inclusive education. In particular, there is a shift in the terminology of 'inclusion' and 'inclusive education' in many countries from being mainly focused on disability and students having 'special educational needs' (the broad meaning of SEND) and the challenging aspects of their educational placement, to an approach which meets the needs of a wide range of learners who may be vulnerable to exclusion, irrespective of their needs, abilities, gender, race, and socioeconomic background (Kozleski, Artiles, & Waittoler, 2013).

Inclusive education is at the heart of education policy in many parts of the world (Florian & Spratt, 2013; Savolainen, Engelbrecht, Nel, & Malinen, 2012). This global spread (Howie, 2010) indicates that there is a policy response not only throughout Europe but worldwide to work towards more inclusive education systems (European Agency for Special Needs and Inclusive Education, 2016). Both the Salamanca Statement (UNESCO, 1994) and the UNESCO Policy Guidelines (UNESCO, 2009) refer to the ongoing and somewhat complicated process of inclusive education as one of the biggest challenges education systems must face today. More importantly, as Ainscow (2007) points out, developing inclusive practices which approach learners who are failing at school or are at risk of school failure due to existing arrangements should be at the core of the design of each educational approach.

It should therefore be noted that different approaches need to consider the diverse populations of students in schools and the need to remove any kind of barrier that prevents every learner from participating more fully in accessible learning environments (European Agency for Special Needs and Inclusive Education, 2016). Inclusive education's principles are based on a human rights discourse for the equal participation of all individuals in school and society, and for tackling issues of social and educational justice. Defining social justice is a somewhat complex task due to the plethora of different perspectives on it (Artiles, Harris-Murri, & Rostenberg, 2006). From a social and educational justice perspective, differences in the classroom should be regarded as opportunities rather than barriers to learning. The current literature (European Agency for Special Needs and Inclusive Education, 2018) provides evidence of the links between inclusive education and social justice, indicating the common dimensions and the need for informed education policymakers and practitioners. Practices which exclude students should constitute a violation of human rights (Liasidou, 2012).

As Messiou (2015) points out in her research into diverse student populations, students can express their views about social justice through their experience of it in classroom and social contexts. At the same time, they are capable of identifying both segregating practices that enhance marginalisation and factors that inhibit inclusion in their schools (Messiou, 2015). Having said this, research in the field of

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inclusion and student voices has found that children's perspectives with respect to interculturalism and inclusive education were vital in efforts to promote equal education opportunities for culturally (and/or ethnically) diverse student populations (Hajisoteriou, Karousiou, & Angelides, 2017).

Considering children's voices is at the core of the BLENDI project, because their input informs crucial aspects of the project such as the current situation in their schools concerning digital technologies, the BLENDI platform and toolkit, and most importantly, aspects related to their education, as they become co-creators of blended lessons plans.

Following the principles of *Index for Inclusion* (Booth & Ainscow, 2002), an approach which has greatly emphasised the building of supportive communities and the fostering of high achievement for all staff and students, the definition of inclusion involves:

Valuing all students and staff equally, increasing the participation of students in, and reducing their exclusion from, the cultures, curricula and communities of local schools; restructuring the cultures, policies and practices in schools so that they respond to the diversity of students in the locality and reducing barriers to learning and participation for all students, not only those with impairments or those who are categorised as having special educational needs (Centre for Studies on Inclusive Education, 2020).

In these terms, the Index for Inclusion can be perceived as a significant resource for the systemic improvement of schools based on the principles of inclusive education. In particular, the Index has been developed to assist school communities to adopt a different learning perspective. Students are actively involved in the learning process, and their own experiences are integrated with lessons (Booth & Ainscow, 2002). Within the Index, the term 'barriers to learning and participation' (Booth & Ainscow, 2002, p. 1) is used instead of SEND, with a focus on removing barriers to learning and transforming the classroom into an accessible learning environment for all students. The BLENDI project embraces this view, especially in supporting teachers and students to develop their digital skills.

Inclusive education thus concerns all children, irrespective of their abilities or cultural, ethnic, socioeconomic, or language backgrounds. Inclusive classrooms are seen as places which support learning for a number of diverse learners, in which deficit views of difference and ability are rejected, and participation in the learning process enhances the experience of every individual in the classroom community (Florian, 2009; Kozleski, Artiles, & Waitoller, 2014). Viewing classrooms through an inclusive lens while utilising blended learning is a fundamental element of the BLENDI project to foster blended inclusive school communities in which all students can participate to the fullest and have an enjoyable learning experience.

2. Blended learning

2.1. What is blended learning?

Blended learning (BL) is a broad concept. It is interpreted in different ways, depending on the educational context. In what follows, we provide some of the existing views and provide the definition which is used for the BLENDI project's context and needs.

According to Heinze & Procter (2004, p. 11), '[b]lended Learning is learning that is facilitated by the effective combination of different modes of delivery, models of teaching and styles of learning, and founded on transparent communication amongst all parties involved with a course'. In terms of effectiveness, Hoic-Bozic, Mornar, & Boticki (2009) state that BL is based on different combinations of face-to-face (f2f) classrooms, Internet learning, and learning supported by other technologies to create a

learning environment that is as effective as possible. Despite the large number of definitions, Siemens and colleagues (2015, p. 62) affirm that there is still no authoritative definition of BL, noting that in all definitions, 'BL is considered a combination of traditional f2f modes of instruction with online modes of learning, drawing on technology-mediated instruction, where all participants in the learning process are separated by distance some of the time'.

For reasons of practicality, in the context of the BLENDI project, we shall adopt the most common definition of blended learning (in a broad sense), which is the combination of traditional f2f teaching methods with online learning (Figure 1).

Staker and Horn (2012) distinguish between two types of brick-and-mortar modalities, traditional instruction and *technology-rich instruction*. The latter differs from the former by using digital enhancements such as electronic devices, digital resources, and Internet tools (e.g. digital textbooks, electronic whiteboards, and online lesson plans). However, contrary to BL courses, in instruction enriched by technology, 'the Internet does not deliver the content and instruction; or, if it does, the student still lacks control of time, place, path, and/or pace' (Staker & Horn, 2012, p. 6).

Staker and Horn (2012) also note that *informal online learning* and *full-time online learning* can sometimes be wrongly considered BL, because the Internet is used to provide students with the possibility to control their time, place, path, and/or pace. However, *informal online learning* does not facilitate a structured education programme compared with BL, and *full-time online learning* programmes lack supervised brick-and-mortar sessions except in a few cases (e.g. proctored exams or experimental labs) (Staker & Horn, 2012).

As can be deduced from the figure above (Figure 1), if learning is to be considered blended, the course needs to include f2f sessions with a teacher in the classroom and cannot be delivered fully online. Most importantly, as several authors indicate (Kaspar, 2018; Means et al., 2013; O'Byrne & Pytas, 2015; Tucker & Umphrey, 2013; Staker & Horn, 2012), students need to have some control over what, at what pace, where, and when they learn:

This shift in control is critical in terms of student engagement; when students feel as if they have a say in both what and how they learn, many feel their voice is being honored. Therefore, in a blended learning classroom, the role of the teacher transforms from delivering the instruction in favor of acting as a curricu-

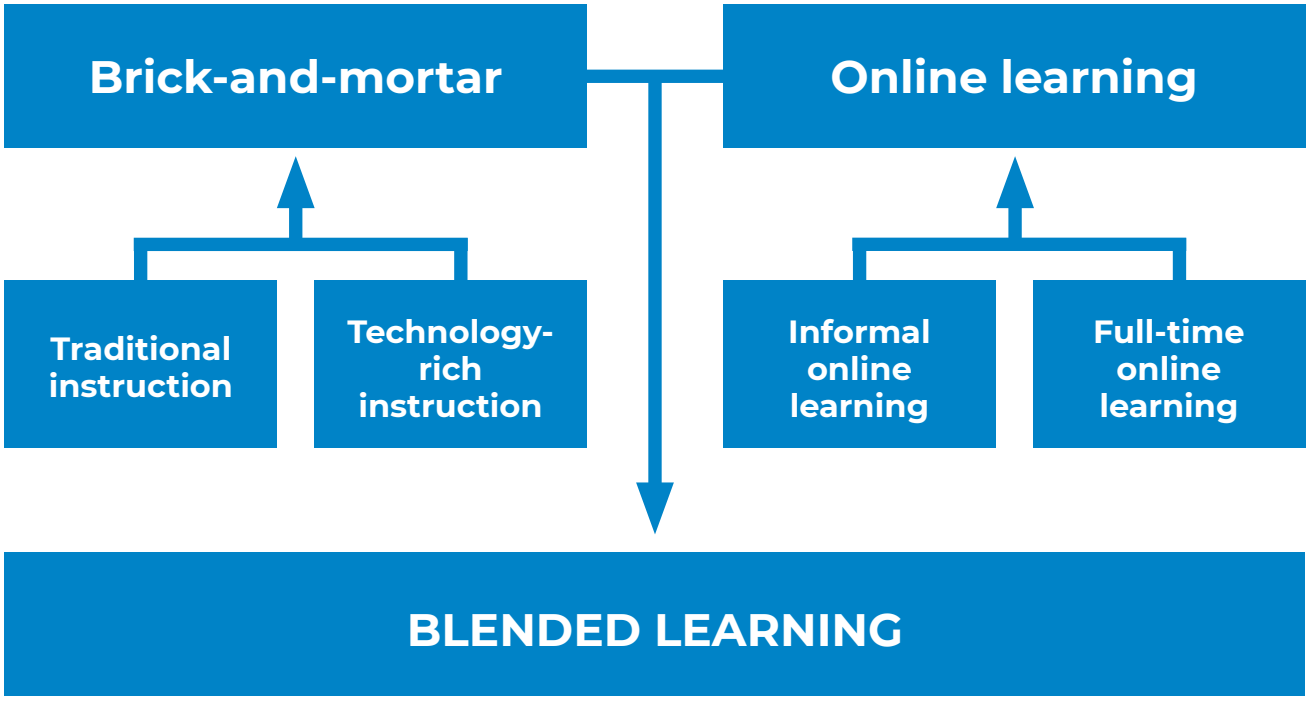

FIGURE 1. Blended learning in relation to other education practices. Adapted from Staker and Horn (2012, p. 5)

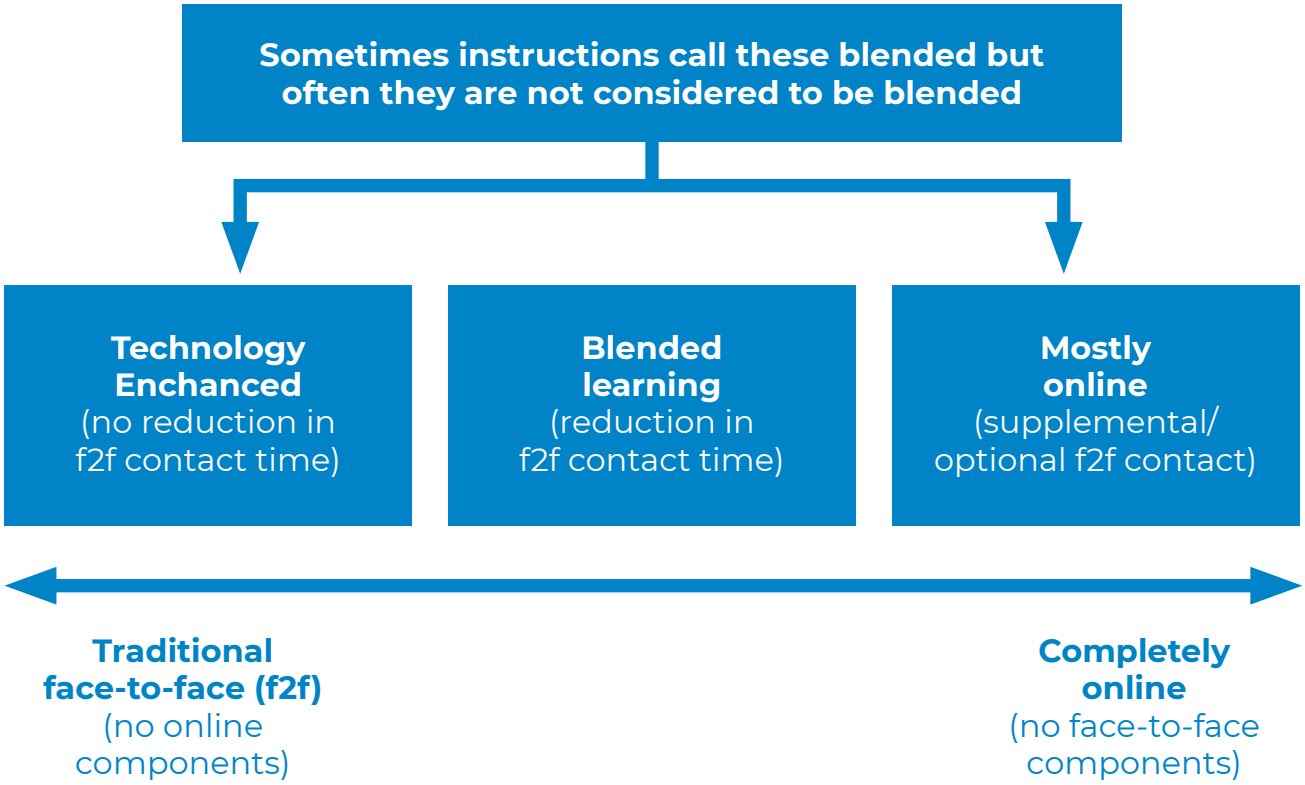

FIGURE 2. Spectrum of course delivery modalities. Adapted from Graham, Woodfield, and Harrison (2013, p. 5)

lum facilitator or mentor (Kaspar, 2018, p. 57).

Finally, it is noteworthy, as Cleveland-Innes and Wilton (2018, p. 6) state, that BL is not 'merely the addition of some technological element to an existing course but rather is an integrated plan utilising the best of what both f2f and online learning have to offer'.

2.2. Models of blended learning

At schools, BL can be understood and applied in hundreds of ways; one size does not fit all. Teachers often explore several combinations of f2f instruction and online elements through trial and error to determine what works best for them (offering BL activities that provide a good balance between content quality, learners' needs, and the requirements of the curriculum). However, as Graham, Woodfield, and Harrison (2013, p. 4) state, 'when institutions have not clearly defined and strategically adopted BL, they are not likely to really know the extent to which BL has been adopted institution wide'. For many institutions, categorising what lies between online and traditional courses is a huge challenge, because the spectrum of BL possibilities is very broad (Figure 2).

However, despite the variety of existing blended learning designs, Horn and Staker (2014) find that most cases can fit somehow in the broad parameters of four models: Rotation, Flex, A la Carte, and Enriched Virtual (Figure 3). The authors highlight that many schools do not adopt a single model but a combination to create a customised programme.

Below, we provide a short description for each of the models extracted from the BLU project (www.blendedlearning.org), which offers a database tool that organises and presents examples of the above blended programmes, which can be searched by model and other characteristics:

1. The Rotation model is a course or subject in which students rotate between learning modalities, at least one of which is online learning. Students learn mostly at the school, except for any homework assignments.

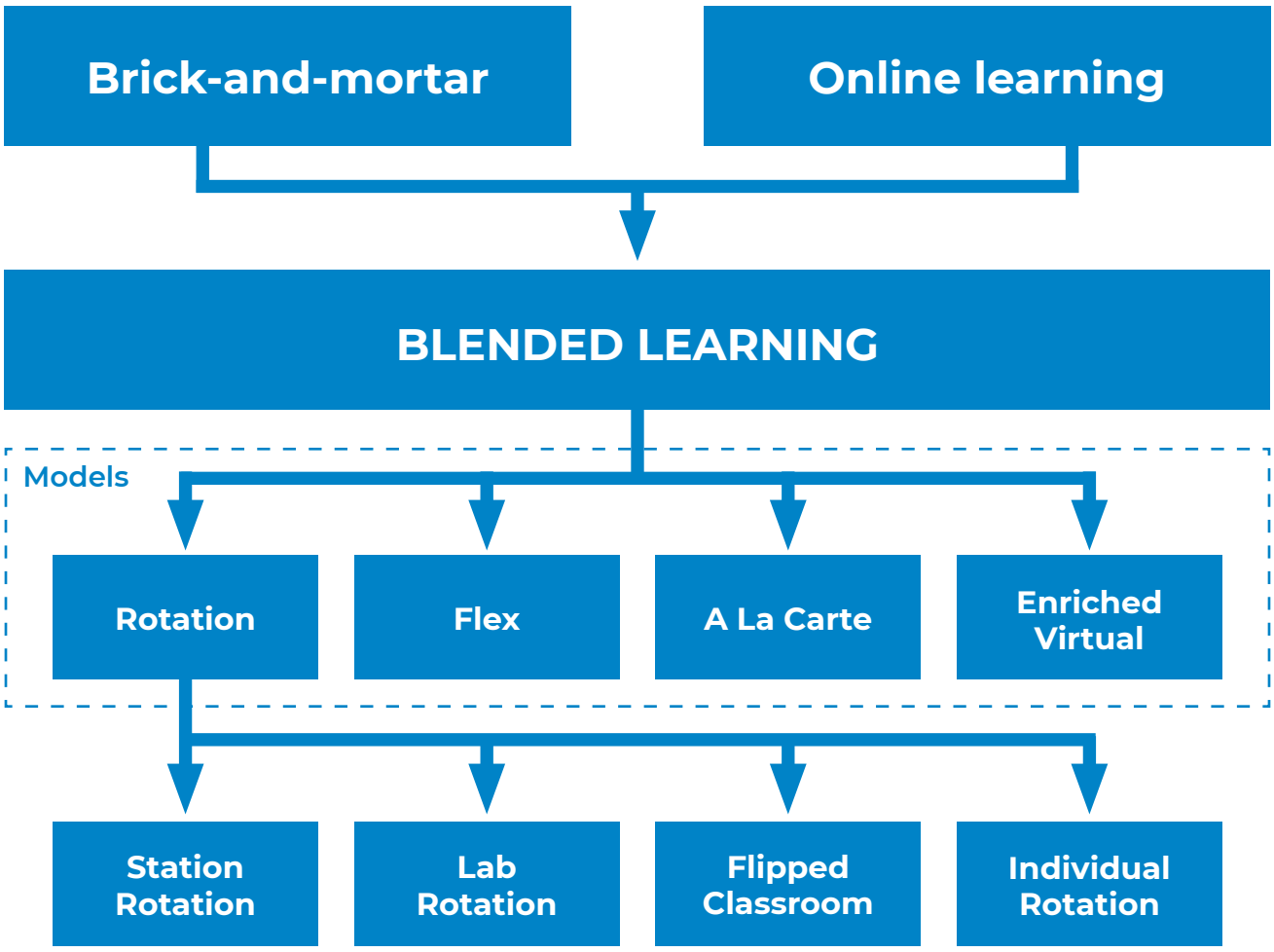

FIGURE 3. K-12 Blended learning models. Adapted from Horn and Staker, 2014 (p. 38)

a. Station Rotation allows students to rotate through stations on a fixed schedule, in which at least one of the stations is an online learning station. This model is most common in elementary schools, because teachers are already familiar with rotating in stations.

b. Lab Rotation, like a Station Rotation, allows students to rotate through stations on a fixed schedule. However, in this case, online learning occurs in a dedicated computer lab. This model allows for flexible scheduling arrangements with teachers and other paraprofessionals, and enables schools to make use of existing computer labs.

c. The Flipped Classroom is a course or subject in which students participate in online learning off-site in place of traditional homework and then attend the brick-and-mortar school for f2f, teacher-guided practice, or projects. The primary delivery of content and instruction is online, which differentiates a Flipped Classroom from situations where students merely do homework practice online at night.

d. Individual Rotation allows students to rotate through stations, but on individual schedules set by a teacher or software algorithm. Unlike other rotation models, students do not necessarily rotate to every station; they rotate only to the activities scheduled on their playlists.

2. The Flex model allows students to move fluidly between learning activities in accordance with their needs. In this model, online learning is the backbone of student learning. Teachers provide support and instruction on a flexible basis as required, while students work through the course's curriculum and content. This model can give students a high degree of control over their learning.

3. The A la Carte model enables students to take an online course in addition to other f2f courses, which often provides students with more flexibility over their schedules. A la Carte courses can be a great option when schools cannot provide particular learning opportunities, such as an advanced placement or elective course, making it one of the more popular models in blended high schools.

4. The Enriched Virtual model is an alternative to full-time online school that allows students to complete most coursework online at home or outside school, but to attend school for required f2f learning sessions with a teacher. Unlike the Flipped Classroom, Enriched Virtual programmes do not usually require daily school attendance (e.g. some programmes may only require twice-weekly attendance).

2.3. Role of blended learning in developing digital competences for students

Recent research in the education field has proved that blended learning can provide advantages to both students and teachers. Cleveland-Innes and Wilton (2018, p. 5) summarise the key benefits of blended learning for students as follows:

1. An opportunity for collaboration at a distance (individual students can work together virtually)

2. Increased flexibility (opportunity to learn anytime and anywhere, no time/location barriers, with the possibility of in-person support)

3. Increased interaction (between students, but also between students and teachers)

4. Enhanced learning (additional types of learning activities promoting students' engagement and more meaningful learning)

5. Learning to be virtual citizens (the opportunity to practise the ability to project themselves socially and academically in an online community of inquiry)

The authors point out that the last benefit is especially relevant, because digital skills are becoming essential to being a lifelong learner today. (Online) media literacy is critical for the virtual citizen, because it allows the significant changes that have happened in the last decade with regard to the digital environment (Smahel et al., 2020, p. 9) to be faced. It also connects with virtual mobility opportunities, because blended learning often enhances students' language skills and abilities to act as members of a generation of Europeans (Banditvilai, 2020).

As the European Commission (2018) emphasises, digital skills constitute one of the top priorities for transversal and basic skills development in Europe. Blended courses thus have the potential to support learners in acquiring the skills for a variety of technologies (Cleveland-Innes & Wilton, 2018). Blended learning in formal (Loizou-Raouna & Lee, 2018) and non-formal learning settings (Stylianidou, 2018) has shown that it can help students in developing their digital skills.

At the same time, socioeconomic factors contribute to creating complex discourses of digital exclusion; in turn, digital exclusion creates and strengthens current socioeconomic disadvantages (Centeno et al., 2010). In this context, blended learning can also play an important role in reducing the digital exclusion of socioeconomically disadvantaged students, because it is broadening access to and participation in education and social inclusion by developing the knowledge and skills needed by every twenty-first century student.

3. Digital Means, Blended Learning, and Inclusion

3.1. Students' exclusion in the blend of online-offline environments

It is now widely acknowledged that information and communication technologies (ICTs) can empower people by promoting participation through technology or contribute to widening the inequalities between different groups (Min, 2010). The latter has given rise to the term 'digital divide' (Gunkel, 2003; Van Dijk, 2006). The term digital divide, as adopted by the ENTELIS network glossary[1], refers to financial, educational, and social inequalities, expressing the difference between different people or groups (e.g. people with disabilities, older adults, people in different geographical regions) in accessing and utilising the possibil-

[1] https://www.entelis.net/en/taxonomy/term/153

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THE FIRST LEVEL OF THE DIGITAL DIVIDE IS **UNEQUAL ACCESS** TO THE INTERNET.

ities and benefits of technology (Hilbert, 2015; Mossberger et al., 2003).

Students from disadvantaged backgrounds lack equal opportunities to access digital technologies (Rodrigues & Biagi, 2017). This is the first level of the digital divide (Van Dijk, 2006). However, a second digital divide exists in how students from different socioeconomic backgrounds use technology (Van Deursen & Van Dijk, 2011, 2014). The first level of the digital divide is unequal access to the Internet. The Internet is important because of the constant emergence and development of new systems and applications (Lutz, 2019). According to Van Dijk (2006), the term digital divide is defined 'as the gap between those who do and those who do not have access to new forms of information technology' (pp. 221–222). In richer countries, there are certain population groups – such as those with qualifications lower than a high school certificate, those aged over 65, and those living in rural areas – that face difficulties in accessing the Internet (Pew, 2018), pointing to the importance of examining this level of divide along socioeconomic lines (Lutz, 2019).

The term 'second-level digital divide' was introduced by Hargittai (2002) in an attempt to distinguish inequalities of Internet access (first-level) from inequalities in online participation, and technology skills and usage (second-level). In the context of education and our project, the second-level notion refers to how students use digital technologies (see OECD, 2016a). In particular, PISA results have demonstrated that despite the fact that the majority of students can now access new media with relative ease, inequalities remain evident in how students use these tools. For example, a number of factors, including student motivation, students' own skill level, and support from their family, friends, and teachers, can differ across diverse socioeconomic groups (OECD, 2016a).

Similarly, van Dijk (2012, p. 61) argues that the digital divide can be perceived as inequalities in four successive types of access: motivation; physical access; digital skills; and different usage. In essence, physical and material access is not automatically linked to the use of technology, because one has to cultivate multiple skills to be able to use technological methods (Min, 2010; Van Dijk, 2012). Isomaki and Kuronen (2013) refer to elements of digital inequalities, including 'equipment, autonomy of use, skills, social support, motivation, engagement and attitudes' (cited in Rodrigues & Biagi, 2017, p. 9).

3.2. The development of teachers' digital competences

Students need help from digitally competent teachers in using digital technologies (DT). Research shows there is a lack of digitally competent educators in the EU (Vaikutytė-Paškauskė et al., 2018). Policy documents in the area of digital technology note that digital skills are those understood as **the key competences** in the area (often also called transversal, soft, or basic skills). In the EU policy context, the term digital competence refers to 'the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society' (European Commission, 2020a). It includes information and data literacy, communication and collaboration, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), and problem solving.

On international, European, national, and regional levels, the interest focuses on equipping teachers with the necessary competences to become digitally competent and exploit the potential of digital technologies in the enhancement of teaching and learning, and the preparation of the students for life and work in a digital society. In this effort, a number of European member states have developed or are currently engaging in the development and revision of frameworks, self-assessment tools, and training programmes to be utilised for educators' training and continuous professional development in this field (Redecker, 2017).

Educators are seen as 'the role models for the next generation and thus, it is vitally important for them to be equipped with the digital competence in order to actively participate in a digital society' (Redecker, 2017, p. 15). At the same time, it is required that professionals devoted to teaching develop these competences

for teaching (ibid.). At a European level, the aim of the European Framework for the Digital Competence of Educators[2] (DigCompEdu framework) is to capture and describe these educator-specific digital competences to allow educators at all levels of education to comprehensively assess and develop their pedagogical digital competence.

In particular, the DigCompEdu Framework proposes 22 elementary competences, organised in six areas, in an attempt to capture and describe the educator-specific digital competences in the areas of Professional Engagement, Digital Resources, Teaching and Learning, Assessment, Empowering Learners, and Facilitating Learners' Digital Competence. These key areas of the DigCompEdu framework form the basis of the BLENDI project's approach.

4. The BLENDI approach

4.1. Basic theoretical concepts and principles of blended learning and development of digital competences for inclusive education

Having digitally competent educators means that teachers are required to develop their digital skills but revise their pedagogy at the same time (OECD, 2016b). Using different approaches and frameworks can contribute to realising this aim. The BLENDI approach builds on three main axes:

1. *learning for all*, by taking into account the principles of Universal Design for Learning (UDL);

2. teachers' training for technology integration, adopting, and adapting the framework of *Technological Pedagogical Content Knowledge (TPACK)* according to BLENDI requirements;

3. the importance of *students' voice for pedagogy and learning design*.

As will be explained, TPACK constitutes a framework for teachers' training that combines three broad aspects: content; pedagogical; and technology knowledge. Combining this with UDL principles places the development of teachers' digital skills in a pedagogical context that emphasises the use of technology to promote 'a student-centred, peer-learning approach, in which knowledge is created rather than transmitted' (Kolikant, 2012. p. 908).

4.1.1. Technological Pedagogical Content Knowledge (TPACK)

TPACK (technological pedagogical content knowledge) constitutes a framework which considers the complexity of interactions between a teacher's knowledge of content (CK), pedagogy (PK), and technology (TK). TPACK is useful when educators must consider the kind of knowledge they need to utilise technology in their teaching practice and ways of developing this knowledge. TPACK includes seven components (Baran, Chuang, & Thompson, 2011, p. 371).

1. Technology knowledge (TK): Knowledge about various technologies, ranging from low-tech technologies, such as pencil and paper, to digital technologies, such as the Internet, digital video, interactive whiteboards, and software programmes.

2. Content knowledge (CK): Knowledge about the actual subject matter teachers must know about for teaching.

3. Pedagogical knowledge (PK): Knowledge about the methods and processes of teaching, such as classroom management, assessment, lesson plan development, and student learning.

4. Pedagogical content knowledge (PCK): Knowledge that deals with the teaching process. Pedagogical content knowledge differs according to various content areas, because it blends both content and pedagogy with the goal of developing better teaching practices in content areas.

5. Technological content knowledge (TCK): Knowledge about how technology can create new representations for specific content.

6. Technological pedagogical knowledge (TPK): Knowledge about how various technologies can be used in teaching.

7. Technological pedagogical content knowledge (TPACK): Knowledge required by teachers for integrating technology into their teaching in any content area. Teachers who

[2] https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/european-framework-digital-competence-educators-digcompedu

have TPACK use an intuitive understanding of the complex interplay between the three basic components of knowledge (CK, PK, TK).

We adopt an activity-type approach to TPACK that can contribute to helping teachers with the effective integration of technology in their specific content area (Harris & Hoffer, 2009). The activity-type approach urges teachers to set their learning goals 'for instruction and then moving to activity types that will support these goals' (Baran et al., 2011, p. 375). These activities can involve 'group discussions, role playing, taking a fieldtrip' (Harris & Hoffer, 2009, p. 100), and '[o]nly after these decisions are made does technology enter the picture' (Baran et al., 2011, p. 375).

However, when technology enters the picture, important questions arise – for example, regarding the accessibility of content and activities for all students, the issue of equal student participation in these activities, the issue of necessary modification to ensure student voices are heard, and the issue of student inclusion in the classroom community in which technology is used. The UDL framework can help teachers reflect on the answers to these questions regarding their teaching practice.

4.1.2. Learning for all – adopting the UDL principles

Universal Design for Learning (UDL) has its roots in the broader concept of Universal Design (UD) or Design for All, which is based on an architecture and engineering framework introduced by Mace (Mace, Hardie & Place, 1990) for the design and development of physical environments, and then the design of products (Michael & Trezek, 2006).

By considering every person instead of adapting to particular needs after the fact, the UDL's focus is mainly on responding to students' diverse needs and how all students can participate during the learning process, designing an accessible content delivery system for all learners.

As Meyer and colleagues (2014, p. 50) point out, 'if you step back and consider UDL as a way to shift your understanding of how all people learn, then UDL becomes a systematic means by which we move to the practical'. Concerning the role of new technologies, Meyer and colleagues (2014) underline that technology provides the possibilities for flexibility in applying all the principles of UDL in the new digital learning environment.

UDL is based on three basic principles (CAST, 2017):

- *Provision of multiple means of engagement* (the 'why' of learning), which refers to providing options for motivating and maintaining learners' interest and effort in the learning process;
- *Provision of multiple means of representation* (the 'what' of learning), which refers to providing options of different means of presenting content and information;
- *Provision of multiple means of action and expression* (the 'how' of learning), which refers to providing options for various means of participation and learners' interaction in the learning process.

The technological affordances of online and blended environments, such as interactive webpages, social media, and multimodal means, can help teachers implement UDL, making these environments great platforms for utilising UDL (Evmenova, 2018). Evmenova (2018) provides an interesting and useful resource of elements teachers can use to respond to the principles of UDL when designing and delivering online courses (see Appendix I).

In BLENDI's approach framework, UDL and TPACK are connected to not only help teachers build and develop knowledge to utilise technology in their teaching practice, but to ensure that technology-enhanced activities provide access and accessibility, and respond to the needs of all students. Nevertheless, being in a position to respond to the needs of all students is strongly linked to knowing **from the students themselves** what works and what does not in online and blended environments for them. It is to this that the following section turns.

4.1.3. Students' voice for pedagogy and learning design

Considering students' voices in issues that concern them is of utmost significance, aligning with the United Nations Convention on the Rights of the Child (1989). As Mitra (2004, p. 651) argues, 'When placed into practice, "student voice" can consist on the most basic level of youth sharing their opinions of problems and potential solutions', stating also that the active participation of students is beneficial for them in many ways.

At the classroom level, listening to students' voices is synonymous with increasing students' participation in learning and tackling exclusionary practices (Taylor & Robinson, 2009). Therefore, given that the BLENDI approach emphasises students' voices, it is important to remember Becroft's argument (2018, p. vii) that 'Children and young people are the experts on their own experiences. Hearing and incorporating their views delivers better and more robust decisions.' Furthermore, as other authors have underlined concerning students' perceptions in technology-rich classrooms, students' input constitutes a valuable source of information which often remains 'under-utilised' (Levin & Wadmany, 2006, p. 307). The same authors also point out that students' perspectives may differ from their teachers, impacting education practices in innovative ways.

In line with the above, Sargeant and Gillett-Swan (2015) speak of a pedagogical framework called Voice Inclusive Pedagogy (VIP). VIP urges teachers to consider how they will act to incorporate children's voices within their teaching practice (ibid.). Digital VIP is most relevant for our project. Engaging with the philosophy of VIP in a digital – and we would add blended – context creates opportunities to understand, identify, incorporate, and implement children's preferences in their learning (Sargeant and Gillett-Swan (2018) in ways that relate to education practice. Five main elements are important to characterise a classroom as a VIP digital classroom (Gillett-Swan & Sargeant, 2018, pp. 44–46):

Being accessible: Involving children in activities that include the creation of video projects and realising the kind of means and access that are important to achieve this. In our project, this is also related to learning for all (see Section 5.1.2).

Shared media selection: The presentation of a learning task from a teacher while children select the method(s) or application(s) for completing the specific task.

Shared digital safety: Promoting a commitment from all interested parties to keep safe when accessing material from online spaces; recognising that a balanced approached is required to decrease children's exposure to harm without reducing their opportunities for full participation, enjoyment, and self-expression.

Shared digital literacy: All members of the learning community commit to engage in piloting and analysing technological means before deciding if they are going to accept or dismiss their educational application.

Reciprocal knowledge and skills transmission: This element is strongly interlinked with shared knowledge. The relationship between teacher and student is collaborative. Teachers and students collaborate in decision making concerning the 'hows' of education practice. Students' decisions in collaboration with their teachers about how they will learn, and how they will complete a specific learning activity, constitute a significant aspect of the shared practice encouraged by digital Voice Inclusive Pedagogy.

Concerning the BLENDI project, the philosophy and education practices related to students' voices are interlinked with the design of dialectical-synergic blended lesson plans (DSBLP). In a classroom where students' feedback about their learning is taken into account, a dialogical space is created, in which learning synergies can occur between teachers and students. These synergies contribute to realising blended inclusive environments.

5. Dialectical-Synergic Blended Lesson Plans

5.1. Defining dialectical-synergic blended lesson plans (DSBLP), and the role of students and teachers in their creation

One of the most important and innovative aspects of the BLENDI project is the provision of a framework for the creation and development of dialectical-synergic blended lesson plans. These plans, jointly created by teachers and students, offer the basis of a fruitful and positive cooperation and engagement, leading to a more inclusive education environment.

Before describing the purpose behind the development and use of these synergic-dialectical blended lesson plans (DSBLP), and the steps to be taken to achieve this goal, a brief definition of these plans is necessary. First, the different components are presented, concluding with their synthesis.

Lesson plan
A lesson plan is a teacher's detailed description of the evolution of instruction, or 'learning trajectory', for a lesson, including details on its structure and format (Watkin & Ahrenfelt, 2006). A lesson plan is developed by a teacher to guide students' education process. It is the teacher's guide for implementing a specific lesson, and it includes the goals and objectives, how they are achieved, and how the extent to which the goal was achieved is assessed.

More especially, the three basic components of any lesson plan are:

a. Identification of learning objectives: A learning objective refers to what the learner knows or can do after the learning process, rather than what the learner is exposed to during the instruction. These objectives should be clear, achievable, measurable, fair, and equitable for all students and linked to the course's broader goals.

b. Planning of specific learning activities: The teacher (or in the case of a synergic environment, the teacher and students) considers the kinds of activity in which students need to engage to develop the skills and knowledge required to demonstrate effective learning. Learning activities should offer experiences that provide students with the skills and abilities to be activated, engage in, practise, and gain feedback concerning their specific progress towards the objectives.

c. Assessment of learning achievement: Assessments provide opportunities for students to demonstrate and practise the knowledge and skills described in the learning objectives, and for instructors to provide targeted feedback that can stimulate further learning. In planning assessments, teachers need to decide on the number of assessments and their type, the criteria to be used for the assessment, students' involvement (e.g. self-assessment or peer assessment), and the provision of feedback (Means et al., 2013; Staker & Horn, 2012).

Lesson plans in a blended learning environment
Blended learning is a combination of e-learning with classroom instruction. Both environments are partly or fully supervised, depending on the blended learning model. It does not concern the use of more technology in the classroom or assigning homework that requires using the Internet or other technologies (Bonk & Graham, 2005).

In creating a lesson plan in a blended learning environment, the same steps as creating a typical lesson plan for face-to-face instruction are involved, with certain additional tasks that require consideration. The basic tasks are as follows:

- The type of blended learning to be used – for example, the rotation, flex, or self-blended model. One or two models can be used to make classroom content more engaging.

- A mixture of activities which are either online or take place in person (or a combination of both). It is of vital importance that the time and procedure of the online and offline learning experience are laid out.

- The available tools to include in the different steps and activities of the lesson plan. Such tools include educational games, interactive posters, digital badges, webinars, blogs, simulations, social media pages, and platforms (such as Kahoot). Software changes rapidly, so it is important to identify the tools that are suitable for the class and that are capable of contributing to the achievement of learning goals.

Generally, teachers need to be well prepared to introduce blended learning and blended learning lesson plans to their students. The development of a classroom culture which embraces blended learning is of utmost importance.

Dialectical-synergic blended lesson plans
These lesson plans involve the participation and collaboration of the two groups participating in the education process, teachers and students, in the mutual design of the lesson. Generally, co-design, or collaborative design, is rooted in the tradition of participatory design (Kvan, 2000). It is therefore an activity in which potential users are encouraged to provide their ideas for the design of new solutions.

The notion of co-design is also conceived as a cooperative sharing of knowledge and creation, in which the skills and experiences of participants are brought together to achieve innovative solutions. In co-designing, two fundamental needs remain: enhancing participants' creative thinking and supporting dialogue between participants. Thus, one of

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BLENDED LEARNING **IS A COMBINATION** OF E-LEARNING WITH CLASSROOM INSTRUCTION.

the cornerstones of co-design is facilitating creative, generative collaboration (Simoff & Maher, 2000).

To create the BLENDI dialectical-synergic blended lesson plans (DSBLP), the two groups take all the necessary steps (see section further below) together by exchanging ideas, opinions, and feedback to achieve a final lesson plan, which has already considered:

- the students' needs and specificities;
- the general programme or course curriculum;
- the teachers' abilities and skills;
- the available means and tools (online and offline);
- the practical aspects of the learning experience (time, computers, interaction methods, etc.).

Therefore, the roles of the teacher and the student to a great extent coincide. They both need to create, design, provide feedback and amend accordingly, express their views openly and equally, think critically about different aspects of the lesson plan (such as the sequence of activities), test different approaches for the same issue, democratically decide and finalise items, justify proposals and suggestions, respect others' opinions and views, and monitor the design process mutually.

The aspect which differentiates the teacher's role is that he/she is responsible for setting the lesson's overarching learning goal based on the overall curriculum and verifying that the produced DSBLP is in accordance with it, while leaving space for creativity and personal expression on the part of the students, as well as taking into account their personal preferences and situations. The teacher needs to inform students about the learning objectives and then provide the necessary guidelines ('the rules') according to which the co-design takes place. Finally, the teacher is responsible for moderating discussions and gathering the final activities and materials to construct a detailed final blended lesson plan.

5.2. Why use dialectical-synergic blended lesson plans?

The creation and use of the dialectical-synergic blended lesson plans, a task which is co-designed and co-implemented by teachers and students, have multiple benefits for both groups, as described below.

Benefits for students

The collaboration between students and teachers produces social, psychological, educational, and assessment benefits for both the students and teachers (Laal & Ghodsi, 2012). More especially, the involvement of students in the development and use of these DSBLPs is expected to benefit them in different ways:

- Student collaboration facilitates the twenty-first-century goals of education. These goals refer to the development of a specific set of skills that are critically important to success in today's world, particularly in education programmes, and careers and workplaces. These skills include critical thinking, problem solving, analysis, interpretation, perseverance, self-direction, planning, self-discipline, adaptability, collaboration, initiative, and creativity.
- Student collaboration is democratic schooling. Teachers who deliberately collaborate with their students in sharing responsibility for instruction, decision making, and advocacy offer their students a democratic voice for making choices, solving problems among themselves, and dealing with conflicts of ideas. Teachers who collaborate with their students to give them choice, power, and control prevent problematic behaviour and promote higher levels of learning or mastery (Apple & Beane, 1995; Glasser, 1998; Lenzi et al., 2014; Wallin, 2003).
- Student collaboration increases self-determination. By co-designing the DSBLP, students have the freedom, power, responsibility, and support to manage their learning, and therefore their lives, in the long

run. Some essential skills associated with self-determination include decision making, goal setting, self-knowledge, and self-regulation (Villa, Thousand, & Nevin, 2010).

- Students develop a more positive attitude towards education and the school environment. They have the opportunity to alleviate any negative feelings or indifferent attitudes towards their education, because they are given the power to change what they consider impractical, boring, or difficult in line with their own beliefs and priorities. This can lead to a better performance at school, deeper understanding (Stone-Wiske, 2002), and a more positive stance towards education and training. Moreover, the advantage of a blended learning approach is that it creates more meaningful interaction for students. A blended learning environment provides better results, because the quality of learning interaction has greatly increased. Students learn better because they have more opportunities to learn (Francis & Shannon, 2013; Güzer & Kaner, 2013).

Benefits for teachers
Teachers' participation in the development of DSBLP creates significant opportunities, in which teachers can develop as professionals across multiple domains while participating in the growth of these domains. More especially, some crucial benefits for teachers from this co-designing process are expected:

- When students and teachers collaborate, teachers often experience a new appreciation of what their students can actually do. This shifts teachers' attention from the typical focus on deficits and deficiencies to a strengths-based perspective, which creates new roles and responsibilities. They have the opportunity to develop more positive attitudes towards their students and consider them as co-workers instead of a group of beneficiaries.

- Teachers further develop certain professional and personal skills, and therefore become more prepared to undertake new roles and commitments as professionals and active citizens. They have the chance to develop decision-making skills, acceptance of diversity and true equality, management and creativity, and multicultural literacy and innovation. Moreover, the blended approach to the lesson plans provides them with specific digital competences, such as ICT skills, media and Internet literacy, and data interpretation and analysis.

- Teachers' participation positively affects their work. They have more resources to use when delivering a specific education unit. These resources enrich their work and their role as instructors because they become knowle UJHdge facilitators. Other positive effects include teaching in a welcoming environment, keeping better track of their students' work, and developing an inclusive ethos in their classrooms.

5.3. How to create a dialectical-synergic lesson plan

One of the basic ingredients needed before starting the creation and co-design of the DS-BLP is the existing school infrastructure (on-line materials, stable Internet access, student mobile devices, and a comprehensive Learn-ing Management System (LMS)) to support blended learning. Teachers should think about the school's technological infrastructure and capacity to integrate information systems into instruction to ensure the appropriate decisions are taken and the co-creation process is adapt-ed accordingly.

Apart from this, other requirements that need to be considered for the successful im-plementation of blended learning lesson plans include considering the integration of infor-mation systems and access to technological support, teachers' own abilities to integrate ICT tools in the education process, and the general programme or course curriculum. Finally, stu-dents' learning needs and specificities, as well as their cognitive, educational, and psychoso-cial level should also be considered, because it affects the level and length of their prepara-tion for the co-design of the DSBLP.

After these considerations have been taken into account, the basic steps to be taken for the creation of the DSBLP are as follows:

1. **Defining and knowing the learning objective:** Usually, when discussing education processes for children participating in formal education, learning objectives are fixed in accordance with the age of students, their skills and competences, and the desired outcome. When creating a DSBLP, the teacher guides students in realizing and understanding the objective through questions and discussions. Students can display what they understand about the learning objective, and the teacher can move forward with the process.

2. Researching: The teacher at this point provides students with all the available options and tools to create a DSBLP. Having researched the means and tools which could be used for this, he/she lets students know about the possibilities at their disposal in deciding the best and most meaningful options. Teachers can guide students in the direction of reliable and valuable resources and tools to support the learning objective, and help students develop the skills to assess and choose the most suitable tools for their task in hand.

3. Planning: Once everyone is aware of both the process to follow and the available tools, the planning stage can commence. The teacher should create an open, creative, and democratic environment to allow everyone to freely express their views and opinions on suggestions and proposed solutions. The teacher oversees and monitors the discussion to ensure that everyone focuses on the subject under consideration, participates equally, and exercises the right and obligation to contribute to the plan. Flexibility is crucial at this stage. If students do not feel very comfortable with the process at first, the teacher can propose certain tools, methods, and courses of action to receive students' feedback and acquaint them with the co-designing process. Gradually, he/she then empowers students to act similarly and propose their ideas. Once everyone agrees on each tool and activity, the teacher compiles them in a common format.

4. Implementing the DSBLP: When the co-design of the lesson plan has finished, its implementation follows. The teacher must ensure that the decisions taken are applied, whether this involves the actual time spent inside the classroom or later at home, in a form of distant, self-paced, and self-guided learning. This is an important step for the process, because it indicates what worked and what did not for the students, the teacher, and the learning. It is crucial to gather any feedback from students (during and after the implementation) to verify that the methods, tools, and activities used have achieved their aim.

5. Reflecting and assessing: Teachers and students reflect together on the learning journey during and after the cycle of co-design, with the following questions in mind:

- What is/was learned?
- What evidence has been shared with regards to hitting our learning goal?
- Were the directions given to students sufficiently clear?
- What went well? What can be improved next time? Which tools served us well?
- How does this affect our next steps in the co-design cycle?

These indicative questions and answers serve as a compass for the improvement of the produced DSBLP through amendments and changes if necessary. The reflection and assessment of the DSBLP can take different forms, which can also be decided by the teacher and students. The teacher gathers this information and uses it to improve the DSBLP to enhance its sustainability and use by other teachers and groups of students.

5.4. What to consider after the creation of dialectical-synergic lesson plans

After the dialectical-synergic lesson plans have been created, the teacher needs to consider specific aspects to ensure that they have achieved their target and learning objectives, the students have gained the desired knowledge and developed the relevant skills, and everyone is happy with the planning and implementation process. This teacher checklist needs to include the following issues and answer the following questions:

1. Has the co-designing process been clear for everyone?
2. What was the level of students' participation?
3. What is the balance between online and offline activities?
4. How well has the learning objective been achieved?
5. Did everyone participate in the co-designing process? If not, why not?
6. How did the students react to the co-creation of the lesson plan?
7. Was the working environment open and democratic for all?

8. Did the majority accept and agree on the lesson plan?

9. Were the directions given to students sufficiently clear?

10. What was the initial spontaneous feedback and reaction from the students?

11. Were there any points that did not work and that need to be avoided next time?

12. Which blended tool/resource worked well?

13. Which blended tool/resource did not work well?

14. Was I an adequate moderator and facilitator?

15. Which part of the creation of the DSBLP did I enjoy/appreciate most?

16. Is the final DSBLP sufficiently clear and ready to be used by other teachers and students? Does anything need to be modified?

6. The BLENDI platform and toolkit

Although there are many resources for blended learning, pressure of time acts as a barrier to teachers becoming more engaged with them (Skaalvik & Skaalvik, 2017). Providing teachers with a roadmap is invaluable. Hence, the BLENDI platform and toolkit are Open Educational Resources (OER), focusing on providing specific strategies for the use of blended learning in schools for inclusive education.

The BLENDI platform and toolkit target teachers and students across Europe. To reach a wider audience and adapt to teachers' and students' needs, both (platform and toolkit) are available in multiple languages (English, Greek, Spanish, and Finnish).

6.1. BLENDI platform

The BLENDI platform has been conceived as a place teachers and students can visit to learn and enhance their digital, creative-thinking, and collaboration skills. The aim is to provide teachers and students with activities and tools that can be used in a blended learning environment that is accessible to every student and simultaneously ensures the participation of all.

The platform hosts the BLENDI toolkit – a series of OER (downloadable guides, videos, links to tools) to help students and teachers use blended learning – and the blended training course for teachers. It also provides a space for teachers and students to collaborate in creating the Dialectical-Synergic Blended Lesson Plans (DSBLP). The platform also hosts the blended training course for teachers and two social communities: the community of 'BLENDI Teachers' and the community of 'BLENDI students' across Europe.

The BLENDI platform comprises the following sections (see Figure 4):

1. **A teachers' section**, which includes:

   a. training resources (blended training course for teachers);

   b. methodological guidelines for implementing the BLENDI approach by using the BLENDI toolkit;

   c. initial lesson plans prepared by the project's team.

2. **A students' section**, which includes:

   a. methodological guidelines (in a user-friendly student format)
      i. f*or using the platform and the toolkit,*
      ii. *for participating in decision making regarding their learning in digital educational contexts;*

   b. a space where students can provide reviews and feedback concerning activities, tools, etc.

3. **A collaborative forum** for teachers, students, and teachers and students.

4. **Dialectical Synergic Blended Lesson Plans (DSBLP).** Examples of these plans include:

   a. Students' input
      i. concerning the tools used (accessible/engaging/motivating)
      ii. concerning the activities used (accessible/engaging/motivating);

   b. The availability through the platform of these dialectical-synergic lesson plans to other teachers and students to use and revise. The final product (i.e. the lesson plan) is incorporated into the BLENDI toolkit. To this end, the BLENDI community uses social media tools to interact with each other, allowing them to comment, share,

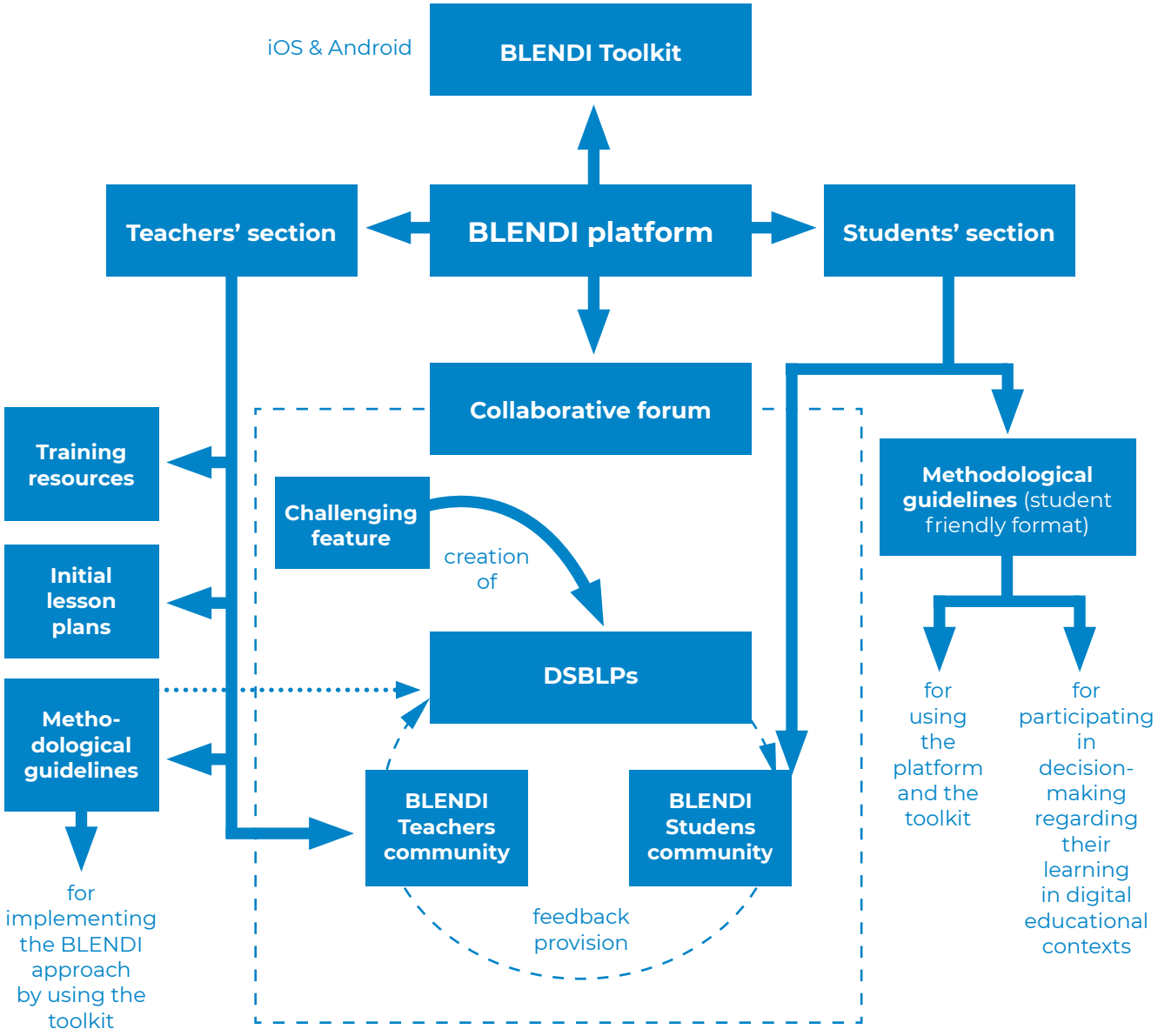

FIGURE 4. BLENDI platform scheme

provide feedback, etc. The social aspect of the community facilitates the co-creation of the DSBLPs.

5. A 'challenging feature': the BLENDI platform has a 'challenging feature', meaning that content creators are challenged to create more inclusive, impactful, and higher-quality content, with a rating system adding a gamified layer to the co-creation of DSBLPs.

A combination of manual and automated translation of the BLENDI platform's menus and instructions is available.

6.2. BLENDI toolkit

The BLENDI toolkit has been conceived as a user-friendly application with various resources for teachers and students. On the one hand, it provides teachers with practical tips about the use of blended learning to include all students, helping them decide on the various tools used in inclusive blended learning environments. The toolkit has been designed with four functions, providing teachers with:

1. practical tips for using blended learning in schools;

2. practical tips for using blended learning to respond to students' diverse needs;

3. collaborative lesson plans for teachers and students in blended learning environments;

4. ways of **encouraging students to express themselves** in decision making about their learning.

On the other hand, the toolkit provides students with the opportunity to express their opinions about issues with which they are concerned regarding their learning process in the digital educational context, supporting them in making decisions regarding their learning in blended learning environments. Through the toolkit, students can communicate with their teachers.

The toolkit is a practical user-friendly web-based application (usable on iOS and Android mobile devices) that is available on the BLENDI platform for use by teachers and students. Toolkit guides are provided in the partner languages.

The BLENDI toolkit is divided into the following sections (see Figure 5):

1. Tools that can be used in blended learning environments.

2. Examples of DSBLPs. This section is divided into certain educational and learning subjects.

The digital content of the DSBLPs can be added in any language, and participants are encouraged to add content in several languages for each DSBLP.

3. A **feature** students can use to provide **feedback** to teachers regarding lessons. This includes a short survey consisting of ten questions and a rating system regarding different aspects of the lesson (e.g. tools, methods, engagement) students answer to provide feedback to the teacher.

The toolkit is developed based on the reports elaborated by the consortium about the implementation of the SELFIE tool in the partner countries. Reports include quantitative data from the SELFIE questionnaire, as well as qualitative data from the focus groups that add more in-depth understanding to the quantitative results.

7. Implementation

What matters when a school is adopting a BLENDI approach?

The successful integration of digital technology in schools has many characteristics. Some characteristics are fairly easy to include in implementing a BLENDI approach, but some are probably at a level individual schools may find difficult to control.

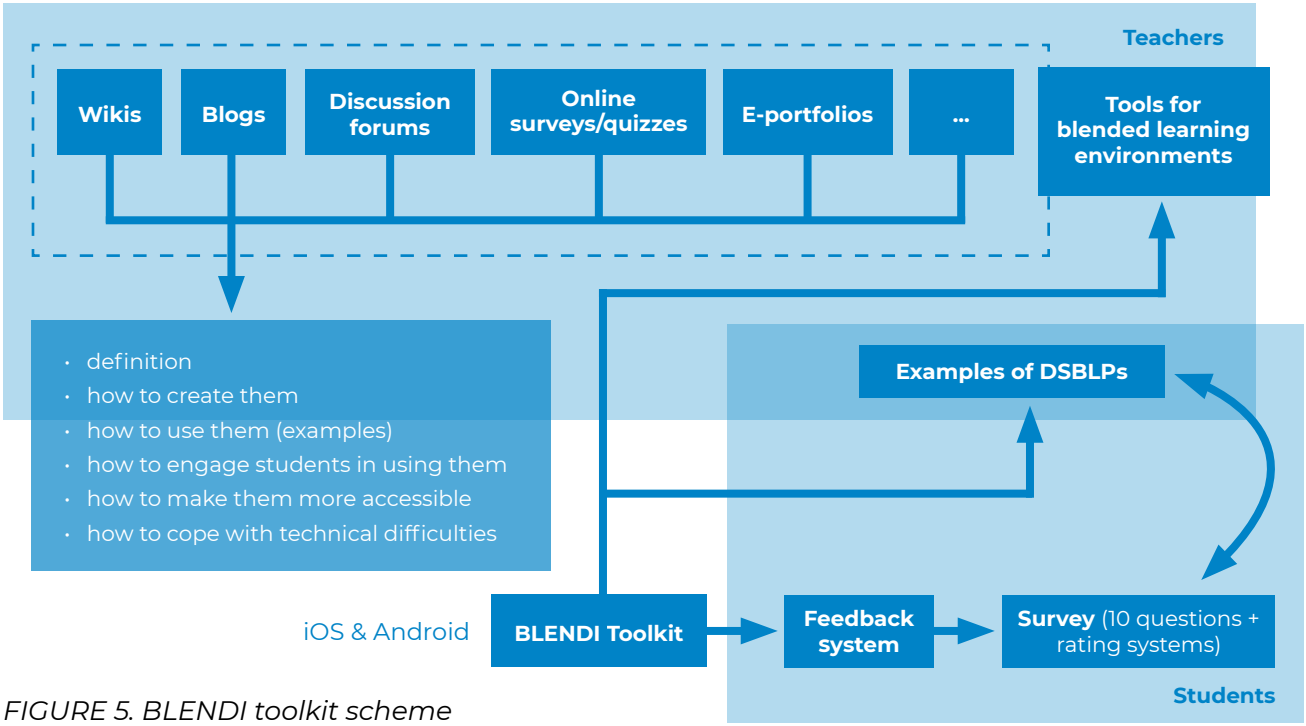

FIGURE 5. BLENDI toolkit scheme

In observations and discussions with principals and teachers and research data from 20 Finnish schools, Niemi, Kynäslahti, and Vahtivuori-Hänninen (2013) identified six elements that could be seen as conditions for good practice:

1. Including digital technology in strategic planning as part of school culture
2. Teaching and learning methods facilitating participation and leading to empowerment
3. A flexible curriculum
4. Investment in communication
5. Optimal leadership and management
6. Teaching staff's capacity and commitment (Niemi, Kynäslahti, & Vahtivuori-Hänninen, 2013; Attaran, Alias, & Siraj, 2012).

It also seems that an open school culture is important. This allows teachers to apply new technology, create learning environments, and empower learners without fear of failure (Niemi, Kynäslahti, & Vahtivuori-Hänninen, 2013).

7.1. Making the change

Making digital technology part of school culture means it is included in strategic planning (Niemi, Kynäslahti, & Vahtivuori-Hänninen, 2013). Schools throughout Europe find similar challenges regarding the digital skills of students and teachers, and the pedagogical development towards twenty-first-century learning and society. When a school recognises the challenges related to these questions, the BLENDI approach offers ways of making the change, because it focuses on enabling every student to develop their digital and other transversal skills (collaborative skills, critical thinking). With these focuses, the BLENDI approach strives for students' educational and social inclusion throughout Europe, for which digitally competent teachers are required. Hence, the BLENDI approach assembles a platform, toolkit, and resources that foster the use of blended learning in schools.

7.2. The pedagogical use of digital technology

Empowerment needs a flexible curriculum, and teaching and learning methods that facilitate participation (Niemi, Kynäslahti, & Vahtivuori-Hänninen, 2013). Blended learning is a form of pedagogical use of digital technology. In considering the pedagogical use of digital technology, the teacher can think of the added value that digital technology brings to schoolwork. Frequently, the writing of a text may not differ whether one uses pen and paper, or computer and printer, and students in this case basically just become more familiar with digital environments. No added value is gained too much. The writing process differs significantly when a text editor on a computer is used for process writing. You can simply begin to produce as much text as desired and then edit the paper more accurately, change the order of the paragraphs, and correct the grammar.

Even more added value is gained when the activities of students are impossible without digital technology. The use of hypertext instead of a linear text alone completely changes how we think. Digital technology uses hyperlinks and different structures of knowledge to produce a different type of text, as well as a different kind of writing process and reading experience.

7.3. Commitment of school leaders and impact on teachers

The commitment of school leaders entails investment in communication, as well as optimal leadership and management. It also results in teachers' capacity and commitment (Niemi, Kynäslahti, & Vahtivuori-Hänninen, 2013). Change does not happen in a school if teachers feel there is insufficient support from the higher administrative level. School leaders play a leading role in change, and are therefore the key partners in making a schoolwide improvement in pedagogical and digital practices through the BLENDI approach.

One teacher acting as a local contact person is needed in each participating school. They assist colleagues who need more help and communicate questions to the BLENDI project team.

Pedagogical views should not be separated from the social, cultural, and institutional aspects of schools (Simola, 1998, pp. 740–741). In other words, schools should elaborate more when technology is constituted by basic tools like pen and paper, when it is the learning content, and when it defines in part how we conceive the things we otherwise aim to learn in different school subjects. Teachers should understand something of the effects it may have on conceptualisation and meaning in relation to the content mediated through the device (Vesterinen, 2011, p. 28).

7.4. Things that matter in implementing the BLENDI approach

There are several issues to consider in implementing the BLENDI approach in a school. Here is a checklist for improving the integration of blended learning, based on a model by Niemi, Kynäslahti, and Vahtivuori-Hänninen 2013 (p. 69):

- Digital technology has been integrated in the schools' empowering working culture, learning methods, and environments. It is not a separate tool or environment.
- The school has invested in students from various backgrounds and has produced learning material that includes everyone. The school has worked to activate learner-centred knowledge creation methods and practices.
- The curriculum is flexible and renewal-oriented. Changes are considered according to students' needs. The school has its own curriculum for digital technology learning. The principle is that digital technology is seen as part of everyday schooling.
- Internal and external communication with parents and other stakeholders – for example, companies – is undertaken.
- Principals and other administrators support teachers' education practices and their use of digital technology.
- Teachers have adopted a collaborative and sharing working culture, and receive grassroots-level training, as well as research-based knowledge about blended learning practices.

The BLENDI approach includes the following concrete implementation steps for schools:

- the selection and preparation of schools participating in the BLENDI project;
- the preparation of teachers and students;
- the use of dialectic-synergic blended lesson plans;
- the use of the platform and toolkit;
- evaluation.

Country-specific issues in the implementation of the BLENDI approach are not considered here. The general aspects of implementation help to identify what schools should consider concerning new technologies and approaches. However, the precise implementation steps of the BLENDI approach follow in other project outputs (e.g. on the project website: www.blendedinclusion.eu).

8. Evaluation

The BLENDI approach uses self-evaluation, student feedback for BLENDI teachers, and the measurement of students' and teachers' competences. In addition, there must be a focus on learning itself. It is obvious that technological interventions can increase learning, but they can only do so if they enhance the teacher-learner relationship (World Bank, 2018, p. 145).

Several issues should be remembered in implementing the BLENDI approach. Are we merely assimilating new technologies in existing instructional practices? It is not our wish to trivialise the possibilities offered by new technology (see Salomon, 2002). The horse-race paradigm focuses evaluation on who learns more quickly in terms of traditional achievements. Traditional education has sought to serve the same goals for centuries, yet technology is not merely another means to attain the same goals, because '[d]ifferent means, if they are powerful, serve different rather than the same ends' (Salomon, 2002, p. 74).

In the last decade, learning analytics has become a popular term. It entails an improved way of following, supporting, and controlling student learning. It measures, collects, analyses, and reports data about learners and their contexts, aiming to understand and optimise learning and environments (Long & Siemens, 2011). In principle, a key question in evaluation is alignment, meaning that learning outcomes, teaching and learning activities, and assessment are aligned (Biggs 2003).

This part of the publication addresses issues of student evaluation in general, the evaluation of students from a variety of backgrounds, and the evaluation of students' and teachers' digital competences.

8.1. Basics of evaluation and student assessment

Whereas summative assessment deals with the measurement of achievement, formative assessment offers information about students' learning. Usually, the purpose of formative as-

sessment is: (1) to identify students' strengths; (2) to support teachers in the planning of instruction; (3) to aid students in guiding their own learning, revising their work, and gaining self-assessment skills; and/or (4) to foster autonomy and responsibility for learning on the part of students. In all, the nature of formative assessment is directive, not evaluative (Andrade & Cizek, 2009, vii.).

To gain an inclusive evaluation, summative assessment approaches such as testing accommodations, item and test modification principles, and repeated measurements are utilised (Elliott, Kettler, Beddow, & Kurz, 2009). For example, accommodations are commonly grouped in four categories, based on the type of testing that is altered: (1) timing; (2) the assessment environment; (3) the presentation format; and (4) the recording or response format (Elliott, Kratochwill, & Gilbertson-Schulte, 1999).

Inclusive methods include increasing accessibility and improving the technical soundness of evaluation (Elliott, Braden, & White, 2001; Elliott, Kettler, Beddow, & Kurz, 2009). Inclusive assessment methods make evaluation accessible. Concerning the use of technology in schools for formative assessment, the teacher needs to see that the student's progress is monitored to inform instructional decisions, ensure possible misconceptions that may interfere with student learning are identified, and ensure the teacher receives the information about student learning needs during instruction (Russell, 2009, p. 126).

8.2. Measuring teachers' digital competences

As already mentioned, the BLENDI approach acknowledges the need to measure changes in teachers' digital skills and competences. Teachers' self-evaluation is used to measure the effects of the BLENDI approach on teachers' digital skills and competences.

SELFIE (Self-reflection on Effective Learning by Fostering the use of Innovative Educational Technologies) is a tool designed to help schools embed digital technologies in teaching, learning, and student assessment (European Commission, 2020b). Improvement needs can be assessed, and priorities can be detected. The tool is available in several languages. SELFIE essentially gathers the views of students, teachers, and school leaders on the use of technology in their school. This is achieved using short statements and questions, and a simple 1–5 agreement scale. The statements cover areas such as leadership, infrastructure, teacher training, and students' digital competence (European Commission, 2020b).

8.3. Measuring students' digital competences

The BLENDI approach brings together a platform, a toolkit, and various resources that foster the use of blended learning in schools. For students, the assessment of digital competences (e.g. described as twenty-first-century skills) is challenging (Voogt & Roblin, 2012), but it can be done.

In their in-depth research setting, Siddiq, Gochyyev, and Wilson (2017) found positive relationships between students' twenty-first-century skills and the background variables of self-efficacy, socioeconomic background, and academic aspiration. In their framework the four strands were skills related to aspects of (1) consumer, (2) producer, (3) social, and (4) intellectual capital (Siddiq, Gochyyev, & Wilson, 2017, p. 14).

The BLENDI approach therefore focuses on evaluating students' digital skills, so that BLENDI schools may have a clear view of how the student's background correlates with the level of digital competences.

Conclusion

The BLENDI guidelines have been developed to help teachers understand the BLENDI approach, as well as the terms related to the BLENDI approach, such as digital divide, social and educational inclusion, digital inclusion, digital competence, and co-design. These guidelines offer information about the BLENDI platform and toolkit that are key to the successful implementation of the BLENDI approach.

The impact of the BLENDI approach is seen in students' improved digital competence. Even more importantly, the BLENDI approach facilitates teachers in evaluating this improvement, thereby helping students in twenty-first-century European society.

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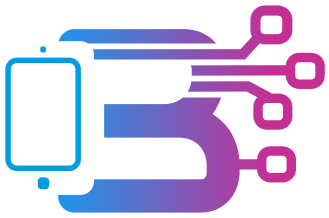
Appendices

Appendix I

UDL Strategies incorporated in online course design (Evmenova, 2018, p. 154)

UDL principles	Online course elements
Multiple means of engagement	Consistent course organisation; ongoing written and video feedback for students; timely responses to students' emails; FAQ blog; virtual office hours; the choice to complete activities individually or in small groups; weekly 'are you on track?' self-monitoring checklists; using the real classroom for the final project; learning objectives for each module clearly identified; project exemplars; intermittent reflective blog entries
Multiple means of representation	Content in text, audio, video formats (each lecture in four formats: video presentation, regular PowerPoint for note taking, MP3, & text transcript); readings in digital format; captioned videos; additional simulations; interactive websites; optional and recorded synchronous sessions; weekly video messages highlighting previous and upcoming content
Multiple means of action and expression	Flexibility in how weekly activities and major assignments are completed (allowing for various formats: written; multimedia presentations; video; creating a graphic organiser, etc.); choice of participating in discussions using text, video, etc.; flexible deadlines for some assignments; gradual release of learning modules; final project outline and rubrics; multiple opportunities to receive feedback on the final project throughout the semester; peer feedback



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