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DEFINING ELEMENTS OF BLENDED LEARNING AND TEACHERS' PEDAGOGICAL AND DIGITAL COMPETENCIES

BlendVET – Blended learning in vocational education and training

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https://blendvet.si/

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Introduction

This publication was produced as part of the **BlendVET** (Blended Learning in Vocational Education and Training) project, funded by the EEA Grants and corresponding Slovenian contribution. Publication's aim is to define blended learning, its main elements and the competences teachers need to implement it. The publication describes the starting points for introducing blended learning in vocational education and training (VET), which will also prepare students for the challenges they will face in their professional lives. There are several reasons for the introduction of a blended format in VET. The application of theoretical knowledge to practical exercises or job duties is a fundamental tenet of vocational education, although it is far from the sole one. Along with occupational credentials, employers prefer individuals who are adept at utilising ICT and expanding their knowledge through online learning, which is increasingly used in work-related learning segments.

When properly planned and thoughtfully implemented, blended learning can have many benefits. It allows students to learn at their own pace, plan their learning, develop critical thinking, learn how to learn, work on projects, learn collaboratively, and to develop digital skills (professional and general). The above objectives cannot be achieved simply by introducing technology into existing forms of teaching. Blended learning has a different dynamic that also requires a very different planning (and delivery) of lessons. First and foremost, it is necessary to think about what learning objectives can be achieved with blended learning, how the lessons will be designed and how the activities will be planned, because the dynamics of learning in online learning environments are very different from the dynamics in face-to-face teaching. Next, teachers should think about the technology that will be used to achieve the goals of the programme. It also provides opportunities for cross-curricular integration, collegial learning, innovation, and creativity in their work and professional development.

Thus, blended learning is not only about the use of individual online tools and environments, but also about the development of students' digital competencies and flexible modes of learning, which contribute to their increased awareness of lifelong learning, among other things. Along with suitable occupational qualifications, this might very well be a component of the description of what constitutes a high-quality vocational education and training.

1 Defining blended learning

Although blended learning as a didactic concept and practice has gained popularity in recent years, the idea to take the learning out of the classroom and move it where the learner is, is not new. For blended learning to work, teachers need technology that enables students' engagement, ease of use, and interpersonal contact. Powell et al. (2015) highlight that in recent years, teachers at all levels of education have largely adapted blended learning to the connected world in which they and their students live and learn. In this context, it should be noted that there is a rather large gap between the implementation and research of blended learning in higher education and general secondary education on the one hand, and the implementation of blended learning in VET on the other. Blended learning is fostered by web-based learning technologies that are increasingly used in conjunction with traditional textbooks, teachers are also increasingly using tools that can connect more effectively with students and provide feedback in real time. Digital technologies enable one important characteristic of blended learning, that is collaborative learning. Learning and collaboration can go beyond the walls of the classrooms, labs or workshops and extends to virtual spaces and online courses. From a didactic perspective, Gerbic (2011) sees blended learning's transformative potential linked to pedagogical innovation, including the development of students' reflective practice, and the promotion of (international) collaboration between students.

Powell et al. (2015) define blended learning as a "hybrid learning approach" that includes the following features:

> "[Blended learning] ... combines the best features of traditional schooling with the advantages of online learning to deliver personalised, differentiated instruction across a group of learners. Students in formal blended learning educational programs learn online part of the time yet have the benefit of face-to-face instruction and supervision to maximise their learning and to best fit their own needs" (ibid. 2015, p. 5).

Blended learning therefore exchanges two approaches to teaching and learning: teaching methods conducted in the classroom and distance learning that takes place in online learning environments and where teacher and students are separated in space and time. Alternatively, blended learning can also take place entirely in the classroom (or different classrooms, labs, workshops etc. within the school). In this case, classroom instruction is combined with student-directed activities and content delivered via computers, various learning apps, etc. Self-directed learning and student autonomy are emphasised in this case.
Some experts point out that this gives educators more time to focus on more challenging learning objectives when the class is in school (and when the contact with the students is most authentic). In practice, there are several possibilities for implementations where blended learning takes place: it could start with the learning content and activities delivered in the classroom and followed in an online classroom or vice versa.

Blended learning can be delivered through a variety of online learning environments such as Moodle, Canvas, Google Classroom or Microsoft Teams. Students have access to pre-recorded lessons, published presentations, and other learning materials, as well as worksheets and

assignments for assessment. Students can also interact with teachers, classmates, mentors at the workplace etc. through webinars, online group activities and discussion forums.

One of the most important features of blended learning is that teaching, and learning can be synchronous, i.e., students and teachers working together in real time and/or in the same room, or asynchronous, i.e., students can participate in learning activities according to their available time. Teacher, together with students decide which form of communication is more appropriate at a given time – if immediate feedback on student performance is needed, synchronous communication (e.g., audio or video conferencing) is recommended, but if the aim of the activity is for students to read something first, look it up online, etc., and then respond, then the use of asynchronous tools may be more appropriate (discussion forum, blog, etc.). The role of the teacher is as important in teaching at a distance as it is in classroom teaching and helping students to achieve their learning goals as comprehensively and effectively as possible. However, it should be stressed that the role of the teacher in this process is changing towards more mentoring, facilitating one. Blended and online teaching approaches rely more on active participation and participation of students. So, in many cases the teacher plans and moderates the activities in the online classroom together with students. Of course, the level of their autonomy and active course participation depends on many things, e.g., students' knowledge-level, experience, motivation, self-direction, etc. Nevertheless, we can argue that blended and online approaches are based on mostly student-centred teaching methods.

Introducing blended learning might bring certain benefits for the school, teachers, and students. We must not forget that whether blended learning is useful or not in VET depends on many circumstances (school organisation, teachers' understanding/skills, workplace integration, students' understanding/motivation, etc.).

Benefits for schools:

- **Promoting digital literacy and critical thinking.** Through blended learning, students can develop digital literacy and critical thinking (Garrison & Kanuka, 2004). To achieve this, independent work and research are encouraged, and teamwork skills are developed. Studies also show that a blended learning approach increases student achievement (e.g., Bernard et al., 2014; Means et al., 2013).
- **Adapting to teachers' and students' needs**. Blended learning initially requires a high level of commitment from both school leaders and teachers, but once it is in place, schools can better adapt their working methods to meet teachers' and students' needs. This approach can also be partly associated with better utilisation of classrooms.
- **Better collaboration**. Blended learning offers many opportunities for better collaboration and exchange of knowledge and experience between relevant actors in this process (schools, businesses, industry sectors). It also makes it possible for students to gain more relevant work experience and work knowledge.
- **Professional development of teachers.** Because blended learning and technology-use are very intertwined, there are many opportunities for professional development of teachers' digital competencies. This could consequently provide students with quality teaching and training - and ensure equal access to "quality teachers".

Benefits for teachers and (workplace) mentors:

- **Course delivery**. Teachers can deliver the course in a more vivid and creative way than if it were delivered in the classroom, school workshops etc. The study by Bliuc et al. (2012) showed that teachers can have very different views on what blended learning is, and their approaches vary accordingly.
- **Time organisation**. Blended learning allows the teacher to engage students in deeper and more meaningful learning. It is important to note that the initial steps of planning and implementing this type of work can be stressful and time-consuming for the teacher, but later the teacher can make better use of the face-to-face learning time with students by spending less time on traditional forms (lecturing) of teaching and more time on individual or small group work, supporting those students who need extra explanation and help.
- **Support**. Online teaching cannot replace face-to-face communication, but it can broaden, extend, and deepen communication with students. In school, the teacher's time with students is limited depending on the timetable, but in the online learning environment, and different apps for communication this contact can be further extended using email, discussion forums, chat rooms or video conferencing. These tools can also be used to provide students with additional learning support outside the classroom. In the online classroom, the teacher can with integrated learning analytics check the performance of individual students or the whole class and get better feedback on students' work.

Benefits for students:

- **Autonomy and flexibility**. Students could develop autonomy when they learn at their own pace and when it suits them. They can also become more intrinsically motivated and engaged in their learning, while online work, where they have access to many up-to-date resources, gives them more time, flexibility, and freedom to shape their learning as it suits their individual needs. On the other hand, teachers should be careful about the amount of material made available to students. Online resources can lead to an overwhelming amount of content and challenge students' ability to focus and work effectively.
- **Promoting digital literacy and critical thinking.** Through blended learning, students develop digital literacy and critical thinking. Independent work and research are encouraged, and teamwork skills are developed. Research also shows that this approach increases student achievement and reduces dropout, which is particularly important for VET.
- **Learning to learn**. Active learning, independent use of learning materials and engagement with activities in online classrooms can have an impact on the development of students' self-regulated learning skills. Online classroom activities encourage students to organise their own work and set their own learning goals, thus taking responsibility for their own learning.
- **Digital literacy/skills**. Students can use a variety of digital and online technologies in blended learning to improve their digital skills and, with appropriate support, make better use of these technologies.

- **Student activity and participation**. The quality of learning outcomes can be highly dependent on student activity in the learning process and hands-on work with the material. Different studies and meta-analysis in the past showed that learning outcomes are better and more sustainable when students are not just passive listeners or spectators, but active collaborators in the learning process (e.g., Alfieri et al., 2011; Cornelius-White, 2007; Hattie, 2009). This can be achieved by encouraging individual and group learning activities, allowing students to test their own ideas, synthesise the ideas of others and develop a deeper understanding of what they are learning. Finally, group work and discussions can also foster a sense of community and collaboration among students, which is extremely important for young people at this age.

2 Blended learning models

One of the most popular classifications of blended learning models was created by Christensen et al. (2013). They identify four main models of blended learning (Figure 1), which differ according to the role of the teacher, the combination of physical and virtual learning, and the teaching methods used.

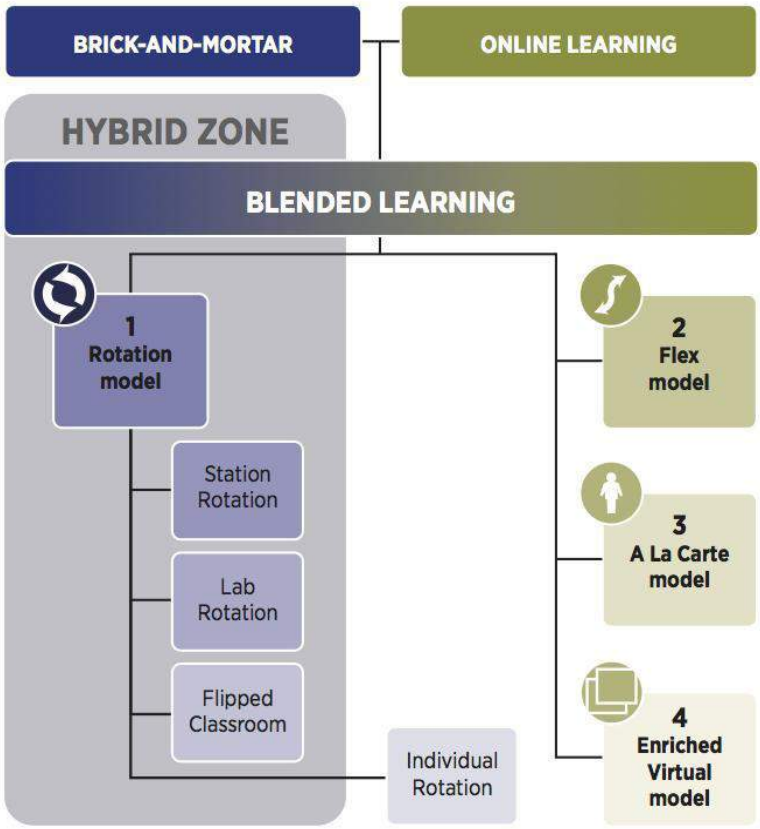

Figure 1: Blended learning models
(Source: Christensen et al., 2013)

In the following sections we briefly introduce each of the four models, which are also described on the website Blended Learning Universe (https://www.blendedlearning.org). The models presented here can be helpful to teachers and school leaders as an idea of how blended learning can be implemented, rather than as step-by-step instructions to follow when introducing blended learning. It is important to note that not all models are suitable for all schools or vocational programmes. Schools decide on one model (or a combination of several) according to their specific circumstances. These may include the specifics of the school's curriculum, premises, equipment, etc. Teachers', mentors' and students' digital skills should also not be neglected.

2.1 Rotation models

2.1.1 Station Rotation model

In this model, students rotate learning modes – partly in school and partly online – either according to a fixed schedule (the schedule set at the beginning of the school year) or according to a schedule set by the teacher. In practice, this rotation can also mean that the student remains physically in the classroom but combines the teacher's explanations with the use of ICT tools (e.g., working on a tablet or laptop). Within the school, the student may rotate between different classrooms (practice, computer, and other classrooms, or even do some of the learning on a home computer), with work guided by a teaching assistant or teacher.

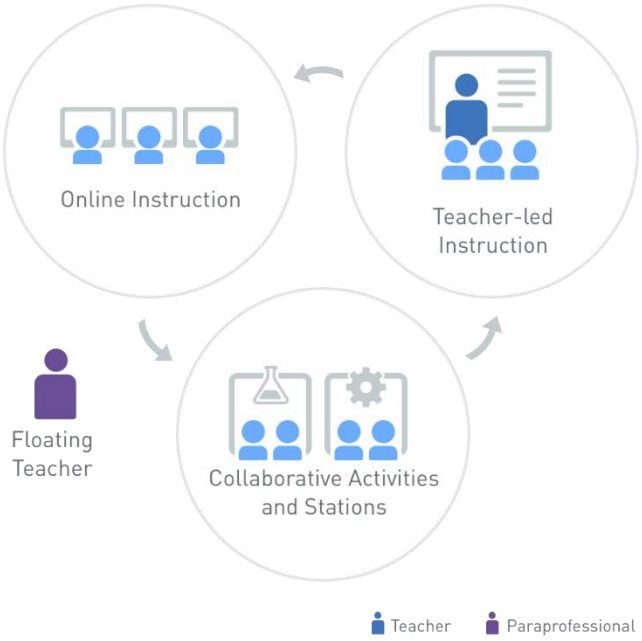

Figure 2: Station Rotation model
(Source: www.blendedlearning.org/models)

2.1.2 Lab Rotation

As with Station Rotation, the Lab Rotation model allows students to rotate through stations on a set timetable. Nevertheless, online education takes place in a designated computer lab in this situation. This concept enables schools to utilise existing computer laboratories and provides for flexible scheduling agreements with teachers and other education personnel.

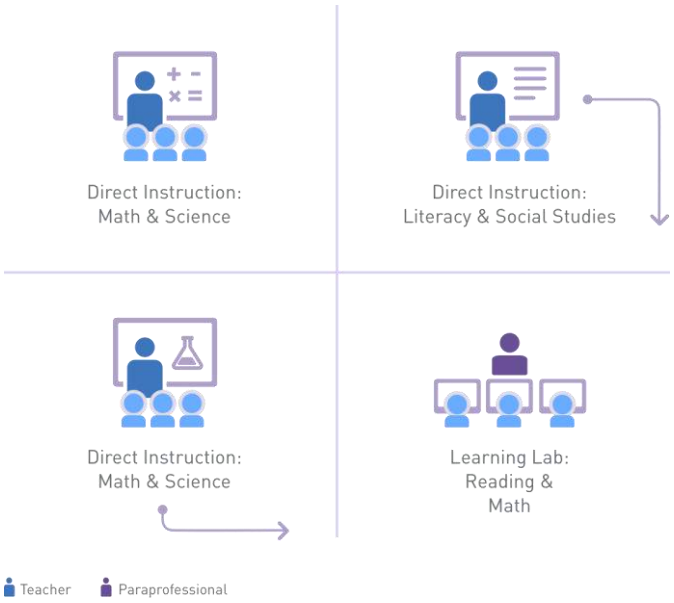

Figure 3: Lab Rotation model
(Source: www.blendedlearning.org/models)

2.1.3 Flipped classroom

One of the more well-known sub-types of the rotational models is the flipped classroom model, where lessons are divided between work at home. Students learn at home via online coursework and lectures, and teachers use class time for teacher-guided practice or projects. This strategy enables instructors to utilise class time for purposes other than typical lecture delivery.

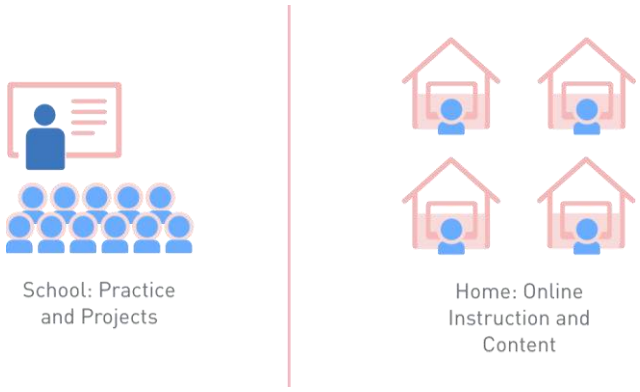

Figure 4: Flipped Classroom model
(Source: www.blendedlearning.org/models)

Of course, it is important to stress that this approach is by no means a “passive” viewing of the learning video, but always comes with comprehension activities (e.g., quiz, discussion forum) or problem-based tasks, which students can complete partly in the online classroom and finish at school. All activities are moderated by the teacher. A very common misunderstanding of the "flipped classroom" is that the teacher just uploads certain instructions and tasks into the online classroom and expects the student to carry out the learning independently, without the teacher monitoring and checking the work done.

2.1.4 Individual Rotation

Individual Rotation allows students to rotate between various stations on their own timetables determined by a teacher or a computer algorithm. In contrast to other rotation models, students do not necessarily cycle to all stations; rather, they rotate to the activities scheduled on their timetable.

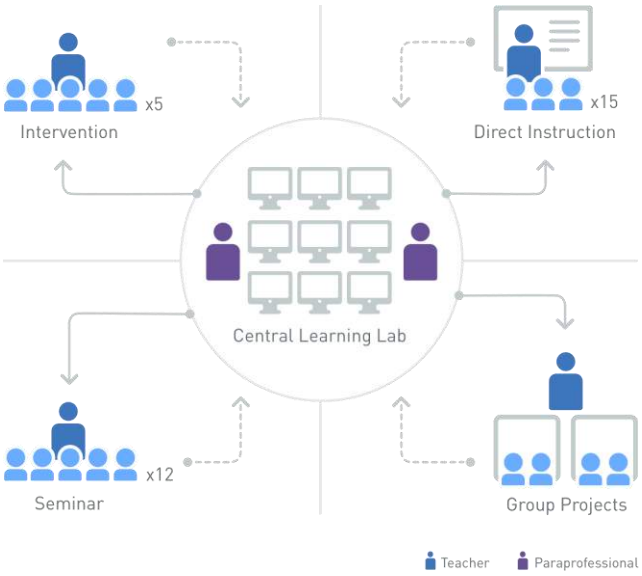

Figure 5: Individual Rotation model
(Source: www.blendedlearning.org/models)

2.2 Flex model

In this model, students follow a personalised curriculum characterised by a rotation of different forms of school-based learning, such as work in specialised classrooms, school workshops, laboratories, collaborative learning, and online learning, which usually takes place at school but can also take place at home. Instead of a fixed schedule of activities, the flexible model allows for changes and adjustments in real time, depending on the needs of the students. The teacher is always available to the students and support is individualised and adapted to the specific needs of the students. This teaching concept also provides for different combinations of teaching positions, classes, workshops, group work, etc.

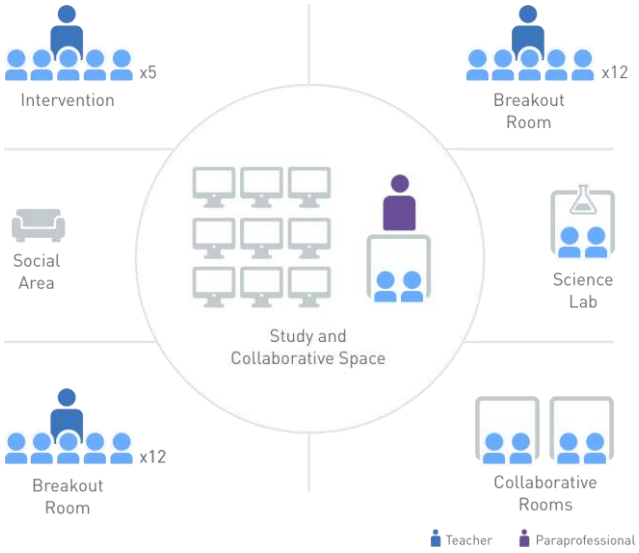

Figure 6: Flex model
(Source: www.blendedlearning.org/models)

2.3 A La Carte model

It is a model that allows students to design their own educational experience by choosing their own subjects or content to be delivered through online classrooms and supplementing it with school-based courses. This approach can be used when schools are unable to deliver certain elective courses or activities face-to-face.

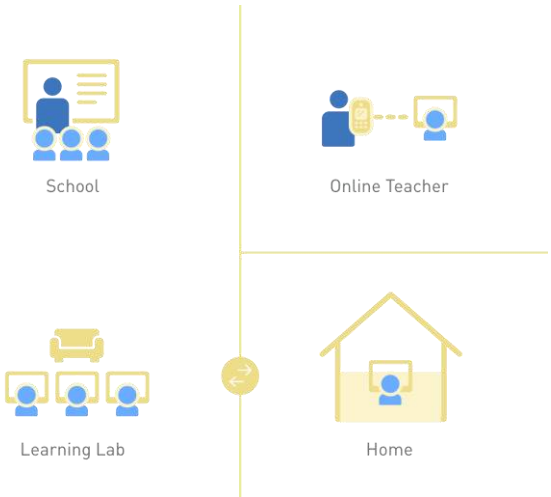

Figure 7: A La Carte model
(Source: www.blendedlearning.org/models)

2.4 Enriched Virtual model

In this model, students attend classes mainly online and occasionally at school. The teacher's work is therefore mainly focused on leading, delivering and facilitating online lessons in an online learning environment. Lessons in school include additional explanations, learning support, etc. Unlike the Flipped Classroom, Enriched Virtual programmes do not require daily attendance at school, but only occasional attendance (e.g., twice a week).

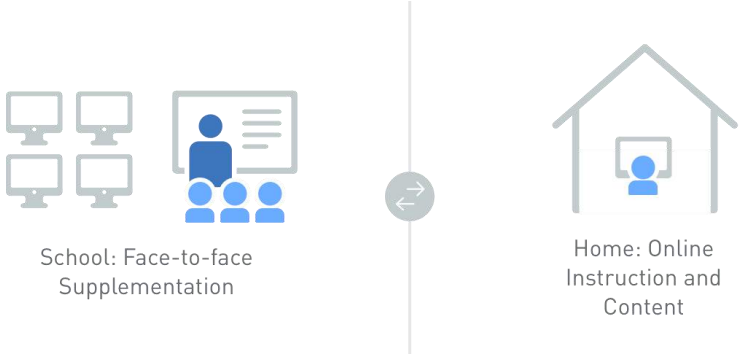

Figure 8: Enriched virtual model
(Source: www.blendedlearning.org/models)

2.5 Building up "the right" model

School leaders and teachers will make different choices about the blended learning model that is right for them. Of course, they must first consider which model will best enable them to achieve the objectives set out in the curriculum or the course. But this is not the only criterion:

- An important factor is certainly the capacity of the school itself. It includes the physical (space) conditions at the school, teachers' competences, ICT support that school can offer to teachers and students etc.
- The second aspect is, of course, the motivation behind the school's decision to implement blended learning in the first place. Whether it is to improve the acquired competences and/or motivation of the students or to change the organisation and delivery of teaching (e.g., due to lack of space, etc.).

For this reason, the implementation of blended learning varies greatly, and practises differ greatly from school to school, even if the implementation is essentially based on the same blended learning model. In practise, it is usually a modified version of a particular model or a combination of several models, depending on the competencies or capacities that a particular school has to implement blended learning. And there is nothing wrong with that, as long as this decision has been made consciously and systematically.

3 Digital Competences

One of the most important prerequisites for the successful introduction of blended learning into the curriculum is the digital competences of teachers, mentors, and students. These include not only the technical skills that teachers or tutors need to use the appropriate technology, but also an understanding of ICT-enhanced teaching and learning and the implications for changing/redesigning the educational process. In 2006, the European Parliament and the European Council published their report on key competencies for lifelong learning, which highlighted digital competence as one of eight competencies every citizen should have developed.

The following definition of digital competence was used:

> "*Digital competence involves the confident and critical use of information Society technology (IST) for work, leisure, learning and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, access, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet."* (Recommendation…, 2006, p. 16)

As a result of the critical importance of digital literacy in the digital age, the European Commission has included a pillar on digital literacy, skills, and inclusion in its 2010 Digital Agenda for Europe (European Commission, 2010). The Digital Agenda aimed to develop EU-wide indicators of digital literacy and media literacy, given the importance of metrics when assessing the level of digital literacy in Europe. These needs are addressed by the various digital competence's frameworks, which provide a structure to enable all people to better understand what it means to be digitally competent and to develop their digital skills: DigComp (Carretero Gomez et al., 2017) and DigCompEdu (Redecker, 2017).

A good starting point for understanding the digital competences a teacher needs in a modern school is also the Professional Digital Competence Framework for Teachers, developed by the Norwegian Centre for ICT in Education (Kelentrić et al., 2017). The framework, which is based on several national regulations and guidelines, consists of seven areas of competence that contain descriptions of teachers' knowledge, skills, and competences, e.g.: Subjects and basic knowledge, School in society, Ethics, Pedagogy and subject didactics, Managing learning processes, etc.

In the following chapter, we briefly introduce the "iNACOL Blended Learning Teacher Competency Framework" (Powell et al., 2014). This model was developed by the *International Association for K-12 Online Learning* to better understand the competencies teachers need for high-quality implementation of blended learning.

3.1 iNACOL Blended Learning Teacher Competency Framework

Among the frameworks relevant to understanding the competencies teachers need to plan and implement blended learning, the framework developed by iNACOL and The Learning Accelerator (TLA) is one of the most suitable. These two organisations convened a committee of practitioners and experts in blended learning to examine important features of successful blended learning teachers. The outcome of this effort was the creation of the "iNACOL Blended Learning Teacher Competency Framework" (Powell et al., 2014), that include the most important competences educators need to successfully implement blended learning in their teaching.

The Framework defines 12 distinct competencies (listed further in the text) that are arranged into four broad domains: 'mindsets', 'qualities', 'adaptive skills', and 'technical skills'. These domains are distinct not just in terms of substance (the type of skill and the way it is conveyed), but also in terms of how individuals develop these competencies.

A brief description of each iNACOL domain:

1. **Mindsets:**
   The term "mindset competencies" refers to the fundamental values or attitudes that influence an individual's thinking, behaviour, and actions and that are consistent with educational transformation goals. Practitioners of blended learning must comprehend, embrace, and commit to attitudes that facilitate the transition to new modes of teaching and learning.

2. **Qualities:**
   Quality competences refer to personal features and behaviours that assist instructors in adapting to new modes of teaching and learning. These characteristics must be refined and developed over time.

3. **Adaptive skills:**
   Adaptive skills are transferable skills that can be applied to a variety of roles and subject areas. These versatile skills (e.g., teamwork or problem-solving) help teachers tackle new tasks or develop solutions in environments that require organisational learning and innovation. They are developed through modelling, mentoring and self-reflection.

4. **Technical skills.**
   Technical skills are domain-specific 'know-how' and expertise that educators apply to specific occupational activities. They are learned and mastered through instruction, practice, and guidance.

Figure 9: Framework for Blended Teaching Competencies
(Source: Powell et al., 2014, p. 8).

The competences relevant to each domain are listed below (Powell et al., 2014, pp. 9-12):

1. **Mindsets**:
   - 1.1. New vision for teaching and learning
   - 1.2. Orientation toward change and improvement
2. **Qualities:**
   - 2.1. Grit
   - 2.2. Transparency
   - 2.3. Collaboration
3. **Adaptive skills:**
   - 3.1. Reflection
   - 3.2. Continuous improvement and innovation
   - 3.3. Communication
4. **Technical skills:**
   - 4.1. Data practises
   - 4.2. Instructional strategies
   - 4.3. Management of blended learning experience
   - 4.4. Instructional tools

For a more detailed description of iNACOL competency framework see Powell et al. (2014)

4 Elements of a blended learning implementation

Blended learning is not just an individual project of one teacher, but always involves teachers of other courses and often, or very preferably, a school-level strategy. There are many factors to consider when organising and delivering blended learning. A review of the various manuals, textbooks and literature in the field shows that the implementation of blended learning involves at least four main elements.

These elements are:

1. organisation,
2. teaching,
3. assessment,
4. technology.

Below we offer a brief description of each of the elements.

4.1 Organisation

Blended learning represents a departure from the existing and established mode of vocational education and training and may initially provoke resistance. For this reason, school leadership is key to introducing a blended learning format. If the school management is in favour of the change and supports it not only in principle but also in a very concrete way, it can be assumed that the teachers are more likely to approve and support this form of education.

When introducing blended learning, the first step at the school management level is to review the current situation and the possibilities for implementing blended learning. In most cases, the following questions arise:

1. **Strategical work.** Discussion of why and how blended learning is an appropriate method at our school and what could blended learning look like at our school (which models would we like to "embrace" first)? What is our vision? And how do we involve teachers in the first steps towards implementing blended learning? Important to establish/ "anchor" a common understanding of vision and goals for both school leaders and teachers/ staff.
2. **Infrastructure.** Reflection on whether the existing infrastructure at the school allows for a combined form of teaching and what are the possibilities of staff support for this form of teaching. This reflection could be done with the SELFIE tool (https://education.ec.europa.eu/selfie), which was developed by the European Commission. This tool aims to help schools integrate digital technologies into teaching, learning and assessment processes for students, and can also help in finding an answer. SELFIE can be used to identify areas where work is going well, areas where improvements are needed and to identify the school's priorities. The blended approach to teaching can be implemented with the existing personnel structure, but the introduction of this approach may change the workload of teachers, which needs to be considered in the organisation.
3. **What experience do teachers have in using ICT tools?** Teachers' didactic competence and skills in using ICT tools for teaching purposes are crucial when planning a blended

learning approach. At school level, it is necessary to ensure that teachers involved in this form of teaching have sufficient knowledge, both in terms of didactic planning of the combined form and in terms of knowledge or skills to use ICT tools for teaching purposes (a more detailed description of competences is in element 4).

4. **Professional development of teachers**: It is the responsibility of the school management to provide continuous professional development for teachers, which is particularly important in the combined form, as the new ways of working also create a need for additional qualifications. School management should be interested in teacher training and encourage teachers to participate.

In addition to seeking answers to the above questions, school leaders should pay attention to the following aspects when introducing blended learning:

1. **Selecting learning management system (LMS), and digital tools for blended learning**: Formally, this is a responsibility of the school management, together with the teaching staff, to choose an appropriate learning environment that will guarantee the achievement of programmes educational objectives. It is useful to agree on the use of one or more online learning environments, technologies, or digital tools (apps), which will then be used by all teachers in the programme.
2. **Forming a team to coordinate the implementation of blended learning**: Due to many commitments, it is difficult for the head teacher or his/her deputy to coordinate all the activities that take place in relation to the planning of blended learning in the programme. It is therefore advisable to appoint a coordinator or form a team of teachers who have an overview of the overall planning and implementation of the blended form of teaching in each programme and whom teachers can also turn to if they need support in relation to this form of work.
3. **Support for teachers**: When introducing blended learning, several issues arise at the school management level in working with teachers, mainly related to the organisation of teachers' work. Teachers' tasks change somewhat when they introduce the blended format, their daily routine to which they are accustomed becomes different (planning is different, delivery is different) and there can be a feeling of a double workload. It is up to the leadership to find solutions to redistribute this (either through adjustments to the existing workload or through new scheduling).
4. **Support for students:** Blended learning is also new for the students. It is important to introduce them to this type of work, along with the commitments and ways of working. At the same time, it is important to ensure that students receive adequate training at the beginning of the school year or during their time at school so that they can learn and work as independently as possible.

4.2 Teaching

The planning of blended learning at the programme unit level starts with a review of the objectives of the course syllabus. The review and distribution of the objectives for each vocational module (course) is done by the teacher of this module or by the group (if more than one teacher is teaching the vocational module). When planning learning situations, if the learning situation includes different modules, all teachers involved in the learning situation

should be involved in the planning and it is useful to involve the mentors in the companies in the planning.
Planning by teachers is key to the implementation and delivery of blended learning. Below is a summary of the key elements of planning for this type of teaching that should not be overlooked. The curriculum unit includes both general and professional courses.

1) Overview of learning goals of the course (module)

The starting point for planning are the objectives defined in the course syllabus for each vocational course (module). If the training is conducted in blended learning, the teacher divides the learning goals from the course syllabus into:

- goals to be achieved in the classroom,
- goals to be achieved in online learning,
- goals to be achieved in a blended way at school.

The review and distribution of objectives is an extremely demanding and complex process for teachers, requiring first and foremost a departure from the established way of planning work to which teachers are accustomed. As part of this planning process, teachers revise and, in some cases, redefine the ways in which objectives are to be achieved, while at the same time reflecting on or defining the standards of knowledge to be achieved. Despite the latter and possible concerns, we advise teachers to reflect on and divide the objectives and knowledge standards at the subject module level, either according to the proposed criteria or according to criteria they define themselves. This is one of the fundamental steps that enables the delivery of a blended learning programme and ensures that students achieve the objectives of the programme in a high-quality manner, regardless of the delivery method.

2) Support for students' active learning

In carefully planning the learning objectives, the teacher must also be aware that in blended learning, the way in which the students are to achieve these objectives must be adapted accordingly. Various studies (Alfieri et al., 2011; Cornelius-White, 2007; Hattie, 2009) and experience show that students are most successful in this form of teaching when they are actively involved in their learning. This means that, as far as possible, the teacher should use didactic approaches based on the active participation, autonomy, and self-direction of the students in achieving the learning objectives. These approaches also include different "formative assessment" or "assessment for learning" strategies (more in the "Assessment" chapter). Indeed, various online tools and applications are already very supportive of these didactic approaches.

3) Considering the characteristics of the students

For blended learning to work well, the characteristics of the students participating in the course or module must be considered in the planning. It is important that blended learning is tailored to all students. The characteristics of the students can influence both the teaching method and the ICT tools that the teacher uses for delivery. Questions such as:

- **What kind of learning environment can students set up at home?** Part of the learning in a blended approach very often takes place in the home environment. In this context, the school must ensure that all students have the same opportunities to participate in learning. Without being too intrusive, the teacher should check whether students have a room at home where they can set up their learning environment, whether they have their own computer that they can use at any time, whether they share it with other members of the household or whether they have no computer at all.
- **Are there differences between students in terms of their knowledge and skills in using ICT tools?** If there are differences between students, or if the teacher decides to use a tool that the students do not know or know how to use, the students should be trained in the use of the tool. It is recommended that training in the use of ICT tools takes place at the beginning of the school year, at the beginning of the introduction of blended learning and during school hours so that if students do not understand something, they can ask the teacher or ask for a further demonstration or explanation.
- **Are there students with disabilities who find it more difficult to use computers or other ICT tools?** If there are students who have difficulties (or are unable) to use a computer or the tools of their choice because of their special needs, the teacher should take these particularities into account both when planning the work and when selecting the tools. Special attention should also be paid to students who need extra support (students in lower vocational programmes). Blended learning is also suitable for them, but adjustments are needed, especially in planning the independent activities and the complexity of the tools chosen.

Only when the teacher is familiar with the implementation options can he or she begin to plan and design the various components of blended learning. In doing so, the teacher needs to plan in such a way that the classroom (face-to-face) teaching is clearly linked to the content and learning objectives that students will achieve in the online part of the course or subject module. The online activities should be purposeful (i.e., linked to clearly defined objectives in the course syllabus) and, where appropriate, link to planned activities in school where students can demonstrate their competences in a more authentic environment.

4) Student and teacher workload

When planning, the teacher must also make sure that the workload of the students in blended learning does not exceed that of the traditional course, because an excessive workload can affect the quality of schoolwork and lead to absenteeism or lower student performance. The teacher's perspective should also be considered. The teacher should therefore consider, on the one hand, the time and resources invested in the development of specific online learning materials and activities, and, on the other hand, the time required from the student for specific tasks and activities.

As a possible tool, the teacher can use the Workload Estimator tool (https://cat.wfu.edu/resources/tools/estimator2) developed at Wake Forest University to calculate student workload. It is particularly useful for use with student text assignments, where it can help the teacher plan student workload for various activities in the online or offline classroom (e.g., reading materials, preparing various assignments, discussions, watching videos, etc.).

4.3 Assessment

In blended VET programmes, students can get grades on oral, written, practical tasks both at school and at a distance. However, it is essential that the school rules provide for the assessment methods to be introduced in blended learning, in addition to the existing ones. The expected learning outcomes and knowledge standards, as well as the assessment methods and criteria, should also be communicated to students at the start of the course or module, with particular emphasis on the assessment of work such as seminar, project or other assignments, or products that students complete independently. Here, the assessment criteria should be presented to the students at the same time as the instructions for the preparation of the assignment or product. It should also be noted at this point that, regardless of the form in which the training is delivered, the assessment must be obtained in the manner provided for in the training programme or in the assessment plan. From a didactic point of view, the learning objectives can be achieved in a blended format in school-based or work-based, in distance learning or in a combination of school- or work-based and distance learning. Once teachers or mentors have distributed the objectives through different ways of delivery, they can also determine which learning goals they will assess face-to-face and which they will assess at a distance.

In addition to assessment itself, we would also like to emphasise the importance of individual learning progress. In this sense, the teacher must not only pay attention to assessment OF learning, but also to assessment FOR learning. Assessment for Learning (AFL) is an approach to teaching and learning related to formative assessment as it emphasises the need to provide (constant) feedback to students as they learn to improve their performance (William, 2011). Using this approach, students become more involved in the learning process and more actively engaged with their learning progress.

4.4 Technology

We cannot discuss blended learning in the present day without mentioning the critical role of technology and technical infrastructure. Access to digital equipment and tools, as well as a reliable technical infrastructure are essential ingredients for the successful introduction of blended learning. This includes a solid network, software, and hardware devices that students and teachers can access and use. In addition to technological infrastructure, teachers and students need good technological support to navigate digital teaching and learning.

Bersin (2004) defines **learning technology infrastructure** as having seven components:

1. Learning management system
2. Content delivery system
3. Hosted third-party content
4. LCMS content development system
5. Development tools
6. Network
7. Learning portal

While Bersin (2004) bases his classification mainly on the use of technologies required for developing and sharing content via “traditional” LMS platforms, modern blended learning can also use other technologies and learning platforms. With AR/VR technologies, for example, teachers can create interactive and engaging learning materials. Libraries of immersive content are needed for successful implementation, and experiences need to be developed for specific topics or learning objectives. Mobile devices are also increasingly used as interactive and engaging learning tools. With them, students can learn anywhere. With mobile phones, tablets or other devices, teachers and students can stay connected outside the classroom.

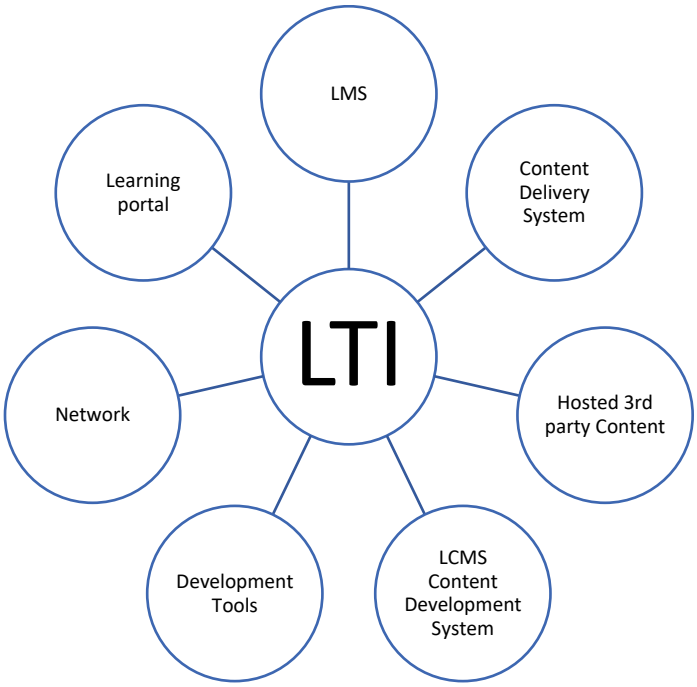

Figure 10: Learning Technology Infrastructure – LTI
(Adapted from: Bersin, 2004, p. 208)

1. Learning Management System (LMS)

According to Bersin (2004), the learning management system (LMS) serves as the central administration point for blended learning. The role of the LMS is to create a learning environment by enabling enrolment and participation in the environment and tracking the progress of participants.

2. Content Delivery System

Online learning materials provided in one course can have many authors who create a large amount of content. To ensure that the content is available to all authors and is well organised, the function of the content delivery system is to divide the content into chapters and subsections or to create it as literature. So, the function of the content delivery system is to select, provide and manage this content. The second function of the content delivery system is to keep track of the participant's actions).

3. Hosted Third-Party content

It is not uncommon for teachers to host content developed by third parties in their LMS. Such content is hosted on third-party servers, which means that it is neither owned by the teacher nor stored on institutional servers. Often the learning materials are stored on another provider's LMS or web portal. We should stress that, according to European legislation, schools must also adhere to the standards of the General Data Protection Regulation (GDPR, https://gdpr.eu/). GDPR requires schools to take more responsibility for the data they collect. As a result, any activity that deviates from the school's standard processes requires explicit authorisation, especially if the data is processed by a third party. In addition, schools must ensure that their third-party providers comply with the GDPR and that all transactions are governed by legally enforceable contracts.

4 and 5. LCMS Content Development System and Development Tools

Bersin (2004) divides the content infrastructure into two components. The first part deals with the tools that developers and content-creators use. The second part is the institution's content management system. This system is usually referred to as the "Learning Content Management System" (LCMS). It is responsible for the production and effective management of a very large number of courses and learning resources. LMCS is a platform for creating, managing, hosting, and tracking digital learning content. It enables the trainer to manage the entire educational process, from the beginning (development of teaching materials) to the end (application of the educational programme and assessment).

6. Network

The network is the sixth component of the learning and technology infrastructure (Bersin, 2004). All electronic content requires a certain amount of bandwidth to function. Therefore, it is critical to check and validate system performance to ensure that there is uninterrupted transmission of content. Of course, it is also necessary to consider the connection capabilities of the students. It is also advisable to investigate the devices that will be used to implement blended learning.

7. Learning Portal

The last component is a learning portal that serves as an interface through which students complete their coursework. The role of the learning portal is to facilitate the learning process by making it easy to register and find appropriate information. The learning portal must inform students when, why, how, and how to register for the course, as well as provide information on the required software and standards.

Bersin's (2004) classification distinguishes the individual functions of the technical side of learning platforms and highlights their importance and functions. It is important to note that modern learning management systems (LMS) combine all these functions and many more in a single experience. This makes it easier for the teacher to create learning materials, moderate online learning and assess learning.

5 Final thoughts

In this document we have looked at the aspects of blended learning that are considered universal and should not be ignored when introducing blended learning. In this document we have presented the main features of blended learning, the different ways of introducing it on VET and the main elements that make it up. Of course, adaptations need to be made when introducing it, depending on the level of education and the specificities of each vocational field or programme, but the school infrastructure also needs to be considered. We highlight the digital competences of teachers and students as a particular prerequisite for the successful introduction of blended learning in the school environment. It is not only important that a teacher is familiar with modern technology and its use, but also that they can integrate it into the curriculum of their course. When planning teachers' work, the guidelines focus on the online parts of blended learning. When planning the work when the teaching takes place in the school, we have drawn attention only to those aspects that are easily changed by the blended learning format and therefore require special attention from the teacher. Such a document cannot, of course, offer definitive solutions, as that is not its intention. However, we hope that we have offered some reflections and first steps for a more confident start in introducing the blended format in VET.

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