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A FRAMEWORK FOR PEDAGOGICAL AND TRAINING CONSIDERATIONS

Technical Innovation in Blended Learning (TIBL), a KA202 - Strategic Partnerships for vocational education and training, 2017-1-ES01-KA202-038256.

Technical Innovation in Blended Learning

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Innehållsförteckning

Introduction

This conceptual report aims to provide pedagogical and training considerations for blended learning in the Continuous Vocational and Education Training (C-VET) sector, in particular for small and medium enterprises (SME) within the project Technical Innovation in Blended Learning (TIBL), a KA202 - Strategic Partnerships for vocational education and training, 2017-1-ES01-KA202-038256.

This report provides first an overview of the European framework for open education, by the European Commission, Joint Research Center (JRC, 2016). Then, and since the blended C-VET courses within the TIBL project will use multiple devices, a short section on mobile learning follows. Both are rising emerging paradigms in the educational sector, deeply related to blended learning, and not only for continuous professional development (CPD). An overview of digital competences in society and in learning contexts are then presented. In addition, a maturity framework for digital and blended learning is provided. Finally, the developed framework is presented with a figure to serve as guidelines, which embrace all the frameworks which have been presented. For blended learning per se a special report is provided within the TIBL project (Ossiannilsson, 2018a), likewise is the case for quality considerations (Ossiannilsson, 2018b). Accordingly, this is not specifically mentioned in this report.

"No framework provides definitive answers. The answers come from the insights generated by the process of interacting with the framework". (Eades et al, 2010)

Open education framework

A European open education framework has been developed to guide the educational sector and institutions by the JRC (Inamorato, Punie, and Castaño Muñoz, 2016). The framework aims to embrace and enhance the work carried out so far towards on a holistic approach to opening up education and training which is a goal of the European Commission (EC, 2013). Inamorato, et al., (2016, n.p) stated that:

> Openness in pedagogy refers to the use of technologies to broaden pedagogical approaches and make the range of teaching and learning practices more transparent, sharable and visible.

The authors argued that opening up pedagogical practices is about developing the design for learning so that it widens participation and collaboration between all involved. Pedagogical approaches with an emphasis on the learner are very suitable for open education. The goal is to open up the range of pedagogical practices via information and communication technology (ICT) in order to enhance the effectiveness of learning design and increase students' involvement and collaboration. Furthermore, it is about making pedagogical practices visible, transparent and accessible, by making available the rationale for learning design, the assessments and learning outcomes. It also enables learners to design their own learning path by offering them a wide choice of learning resources.

In this present report the view on pedagogy are aligned with the approach of JRC. Their framework consists of ten dimensions of different courses of actions, focusing on a given area, which interact and together shape the practices of open education. The core dimensions of open education are found in the practices around open education. They provide the 'what' of opening up education: i.e. access, content, pedagogy, recognition, collaboration and research. These six core dimensions, though they are not always treated as such, appear as domains of open education in different institutional contexts where open education is being practiced, for example, Inamorata et al., refers to work of Mulder and Janssen (2013), Murphy (2013), Ros et al (2014), Uvalić-Trumbić and Daniels, 2014), Weller (2014), and Wiley & Hilton (2009). These dimensions embody the most common practices and perceptions associated with open education in higher education settings. Then, the transversal dimensions of open education provide the backbone for the realization of the core dimensions - the 'how' of opening up educational practices. They constantly interact with the core dimensions and with one another. These dimensions are leadership, strategy, quality and technology. Together, they enable open education practices to be shaped in different ways in higher education institutions, Figure 1.

Fig.1. The 10 Dimensions of Open Education

For this report the core dimensions pedagogy (3) and content (2) are further elaborated, as this report aim to focus on pedagogical consideration, but also on open educational resources (OER), which are part of the content dimension. In this framework it is also elaborated how each dimension relates both to the other core dimensions and to the four transversal dimensions. For each dimension a definition and rationales are given. All definitions are contextual to opening up education. Moreover, for each dimension components are described. For pedagogy the components are (i) supported open learning, (ii) personalized teaching, (iii) collaborative and networked learning, (iv) use of authentic resources, and (v) sharing educational resources and pedagogical practices. Then descriptors are given related to the four transversal dimensions. The content dimension will be discussed under the heading Open Educational resources (OER). In Appendix 1 the pedagogy dimension is presented, alongside with its components and descriptors of the full framework.

Downes (2017) emphasized that when technologies have enabled the development of open and distributed learning, with access enabled for all, and with materials licensed and shared freely has led to new ways of looking at pedagogy, as typified by trends in social learning, personal learning, OER, and the massive open online course (MOOC).

Mobile seamless learning for the 21st century

Mobile learning is part of a new learning landscape created by the availability of technologies supporting flexible, accessible, personalized education. Learners everyday use of mobile phones and other devices such as games consoles, can, and should be used in an appropriate way even for and through learning. Kukulska-Humle (2010), argued in a report for UNESCO,

that those devices are major drivers for the rapid uptake of mobile learning throughout the world. Hence, using mobile devices for learning is a logical extension of our life in this tech-centric world. Undoubtedly, technologies affect learning in various ways. ICT grant access to information, and communication to all people regardless of where or who they are. Today learning take place anywhere, at any time and whenever learning need arises. Learning is no longer limited to one location, nor does it follow a strict path (Alhajri, 2016). Learning with mobile device will thus undoubtedly shape the frontiers of learning technologies in every global context. Looking back over the past 10 years of mobile learning, increasing evidence and experience of mobiles can be seen driving the agenda for other established learning technologies. Mobile devices are also taking learning to people and communities who were previously too distant, or education was too expensive to reach or enhancing, hence, mobile learning enriching and challenging the conceptions of learning itself (Traxler, 2013). The idea is that learning in contexts builds upon the fact that learning does not happen in a vacuum but is closely linked to objects and experiences in the real world so that knowledge becomes meaningful to learners. Mobile learning is seamless, and provides "Just in time, Just enough, and Just for me" experiences. Therefore, learners have choices, and are able to decide what and how to learn depending on the contexts. In this respect, mobile learning is different from being simply e-learning on a mobile device.

Pedagogical considerations, frameworks and theories

In the next section, the most relevant theories for blended learning are briefly described in alphabetic order; Activity theory, Andragogy, Challenge based learning, Constructivism (including social constructivism), and Heutagogy.

Activity theory, authentic learning, challenged-based learning, and learning by doing

Activity theory is a theoretical framework for the study of blended learning (Karasavvidis, n.d.) and serves as an umbrella term for a line of eclectic social sciences theories and research with its roots in the Soviet psychological activity theory pioneered by Lev Vygotsky, Alexei Leont'ev and Sergei Rubinstein. These scholars sought to understand human activities as systemic and socially situated phenomena Authentic learning, another related theory to active learning, is a new term that describes learning through applying knowledge in real-life contexts and situations. Rule (2006). Four components are repeatedly found in authentic learning; (i) an activity that involves real-world problems and that mimics the work of professionals; the activity involves presentation of findings to audiences beyond the classroom, (ii) use of open-

ended inquiry, thinking skills and metacognition, (iii) learners engage in discourse and social learning in a community of learners, and (iv) learners direct their own learning in project work (Rule, 2006).

Challenge-based learning (CBL) is related to active authentic learning, and worth to consider in the context of blended learning and SMEs. CBL has been highlighted since 2011 by the New Media Consortium Horizon reports (Adams et al., 2017; Adams et al.2018). CBL is a framework for learning while solving real-world challenges. CBL builds on the foundation of experiential learning, leans heavily on the wisdom of a long history of progressive education, shares the many of the goals of service learning, and the activism of critical pedagogy. The framework is informed by innovative ideas from education, media, technology, entertainment, recreation, the workplace, and society (Johnson & Adams, 2011). The framework is collaborative and hands-on, asking participants (students, teachers, families, and community members) to identify big ideas, ask good questions, discover and solve challenges, gain in-depth subject area knowledge, develop 21st-century skills, and share their thoughts with the world.

Learning-by-doing is considered the most effective way to learn (Dewey (1938). Lombard (2007) argued that increased digitization, and the Internet and a variety of emerging communication, visualization, and simulation technologies now make it possible to offer students authentic learning experiences ranging from experimentation to real-world problem solving.

Andragogy

According to Malcolm Knowles, andragogy is the art and science of adult learning, thus andragogy refers to any form of adult learning (in Kearsley, 2010). Knowles identified five characteristics for andragogy (Pappas, 2013), (i) self-concept, (ii) adult learner experience, (iii) readiness to learn, (iv) orientation to learning, and (v) motivation to learn, see even Figure 2, and Appendix 1 and 2.

Fig. 2. Characteristics of adult learners (andragogy).

Knowles' defined 4 Principles of Andragogy that are applied to adult learning (Pappas 2013); (i) adults need to be involved in the planning and evaluation of their instruction, (ii) experience (including mistakes) provides the basis for the learning activities, (iii) adults are most interested in learning subjects that have immediate relevance and impact to their job or personal life, and (iv) adult learning is problem-centered rather than content-oriented (Kearsley, 2010), see Appendix 1. Knowles' four principles and assumptions can be applied to any e-learning/blended learning deliverable in order to offer adult learners a wide range of benefits, including improved comprehension of key concepts and a boost in knowledge retention, as examples below:

Principle of Andragogy#1

Adults must have a hand in the design and development of their learning experience.

While, both adult and younger online learners must feel as though they are playing an active role in their own e-learning/blended learning experience, for adult learners this is particularly important. They must truly be an integral part of the development and implementation of the curriculum, as well as of the evaluation process. Getting feedback from adult learners allows to achieve this, as it offers the opportunity to design learning materials, exams, and activities based upon the needs and wants of the adult learners.

Principle of Andragogy#2

Experience should be at the root of all e-learning/blended learning tasks and activities.

What matters most in regard to adult education isn't the end result, but the e-learning/blended learning experience that is gathered through instruction and activities. Rather than offering memorization tasks, create projects and exercises that encourage adult learners to go out and explore the subject matter, thereby gaining experience. By doing this, adult learners can learn from their errors and master their skills sets through first-hand experience. Adult learners can take on their own approach when solving problems, which will give them the chance to use their knowledge in a practical way. There will be trial-and-error involved, which is what makes the overall eLearning/blended learning experience more meaningful and effective.

Principle of Andragogy #3

Real life applications and benefits must be tied to the eLearning course.

Adult learners need to be able to tie the subject matter to real world benefits and applications. If they cannot see how a module or activity will give them an advantage in real life, or how a particular e-learning/blended learning course is going to apply to real world situations, then they won't be excited about the e-learning/blended learning process. E-learning/blended learning professionals can increase engagement by integrating scenarios into adult e-learning/blended learning courses. This way, adult learners have the opportunity to directly see how what they are learning can be used in the real world.

Principle of Andragogy #4

Give adult learners the opportunity to absorb information, rather than memorizing it.

The content being offered in adult e-learning/blended learning courses should be problem-centered, as adult learners' will want to immediately see how the instructions will help them to solve an issue they might encounter outside of the e-learning/blended learning environment. This often means that the subject matter should offer them the chance to fine tune skill sets and acquire (and retain) practical knowledge by doing, rather than just memorizing. Create activities that allow adult learners to delve into specific tasks, such as simulations, that enable them to store the information in their long-term memory through repetition and experience.

Constructivism

Constructivism is a philosophical viewpoint about the nature of knowledge, and represents an ontological stance. The theory is based on observations and scientific study about how humans learn, and posits that learning is an active, constructive process. Humans actively construct or

create their own subjective representations of objective reality. New information is linked to prior knowledge, thus mental representations are subjective. The main foundation is that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. New information or experiences has to be reconciled with previous ideas and experiences, and humans are active creators of their own knowledge. Questions need to be asked, and explored, and knowledge must be assessed. In the most general sense, constructivism usually means encouraging learners´ to use active techniques (experiments, real-world problem solving) to create knowledge and then to reflect on and talk about what they are doing and how their understanding is changing. Teachers have to be sure that they understand the learners' pre-existing conceptions, and guides activities to address them and then build on them.

There are many flavors of constructivism, but one prominent theorist is Jean Piaget, who focused on how humans make meaning in relation to the interaction between their experiences and their ideas. Views focused on human development in the context of the social world which include the sociocultural or socio-historical perspective of Lev Vygotsky and the situated cognition perspectives of Jean Lave and Etienne Wenger (Wikipedia n.d.). Social constructivism, a sociological theory of knowledge is a special branch of constructivism which emphasized that human development is socially situated and knowledge is constructed through interactions with others.

Heutagogy

Education has traditionally been seen as a pedagogic relationship between the teacher and the learner (Hase and Kenyon, 2000, 2001, 2009, 2011). By tradition, the teacher decided what the learner needed to know, and indeed, how the knowledge and skills should be taught. However, in the past thirty years there has been a revolution in education influenced by research how people learn, resulting in further work on how teaching could and should be provided. While andragogy accepted universally, provide useful approaches for improving educational methodology, it still has connotations of a teacher-learner relationship. It is argued that rapid changes in society, not at least through the digitization explosion, demand other educational approaches where the learners themselves determines what, where, and how learning should take place. Heutagogy, or self-determined learning, as argued by Hase and Kenyon since around year 2000, may be viewed as a natural progression from earlier educational methodologies, in

particular from capability development, and may well provide the optimal approach to learning in the twenty-first century (Blaschke, 2012; Hase & Kenyon 2000, 2001, 2009, 2011).

Heutagogy is based on theories and ideas about learning like socio-constructivism; motivation, reflexivity or capability building (Hase, 2011) with the learner at the center of the teaching and learning process. This approach recognizes the need to promote flexible learning where the learner designs the actual course he or she might take by negotiating the learning objectives, critical issues or questions and determine what is of interest and relevance to them and negotiate learning tasks to achieve them, including assessments. A challenge is to encourage learners to access their tacit learning, to recognize their errors, facilitating them questioning and improving in new ways that make sense to them, in their day-to-day work (Hase, 2011). In addition, this approach demands that assessment becomes more of a learning strategy rather than a means for accountability, as it will be explained in the section about assessment as learning.

The heutagogy approach are autonomous and self-determined and emphasis is focused on development of learners´ capacity and capability aiming promoting lifelong learning that prepare for complexities of today's workplaces. This approach is considered as an active and proactive learning process, where learners are "the major agent in their own learning, which occurs as a result of personal experiences" (Hase & Kenyon, 2007, p. 112). In this respect heutagogy is future orientated, in which knowing how to learn is a fundamental skill given the pace of innovation and the changing structure of communities and workplaces (Hase & Kenyon 2002).

The renewed interest in heutagogy is partially due to the iniquitousness of Web 2.0, and the affordances provided by the technology (Ossiannilsson, 2018). With its learner-centered design, Web 2.0 offers an environment that supports a heutagogy approach, most importantly by supporting development of learner-generated content and learner self-directedness in information discovery and in defining the learning path (Blaschke, 2012). Hase & Kenyon (2000, 2007), Blaschke (2012) posit that self-determined learning encompass the acquisition of both competencies and capabilities. Competency is acknowledged as the ability to solve a set of problems, acquiring knowledge and skills, while capability is related with the confidence learners´ have in his or her competency and, as a result, the ability "to take appropriate and effective action to formulate and solve problems in both familiar and unfamiliar and changing settings" (Cairns, 2000, p. 1, as cited in Gardner, Hase, Gardner, Dunn, & Carryer, 2007, p.

252). Capable people exhibit the following traits; (i) self-efficacy, in knowing how to learn and continuously reflect on the learning process, (ii) communication and teamwork skills, working well with others and being openly communicative, (iii) creativity, particularly in applying competencies to new and unfamiliar situations and by being adaptable and flexible in approach, and (iv) positive values (Hase & Kenyon, 2000; Kenyon & Hase, 2010; Gardner et al., 2007). Competencies and capabilities in this respect, relates to 21st century competencies.

Blaschke (2012) argued that pedagogy, andragogy and heutagogy, related to learners and instructors can be seen as different levels. Level one is on pedagogy in general, and about engagement. Level two is on andragogy, and cultivation, while heutagogy is level 3 and relates to realization, Figure 3. The model relates also to the learner's maturity and autonomy required, as well as instructor control and course structure required due to the different levels.

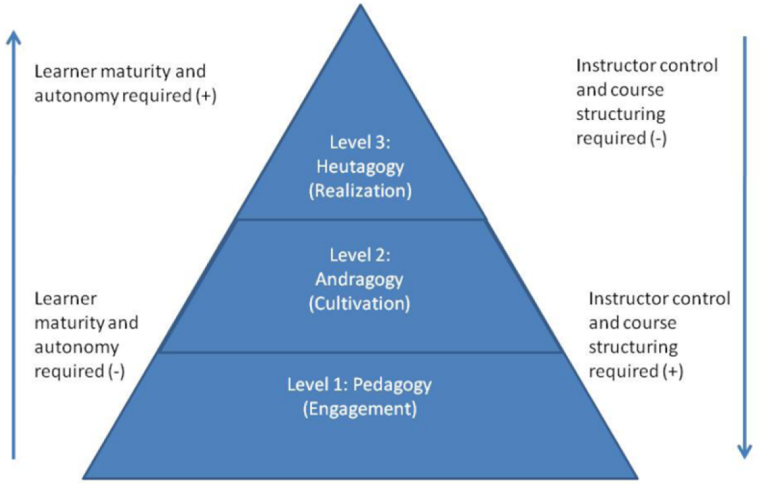

Fig. 3. Pedagogy, andragogy and heutagogy, related to learners and instructors (Blaschke, 2012).

Moreover, Blaschke (2012) described heutagogy as a continuum of andragogy, Figure 4.

Heutagogy as a Continuum of Andragogy

Andragogy (Self-directed)	▶	**Heutagogy (Self-determined)**
Single-loop learning	▶	Double-loop learning
Competency development	▶	Capability development
Linear design and learning approach	▶	Non-linear design and learning approach
Instructor-learner directed	▶	Learner-directed
Getting students to learn (content)	▶	Getting students to understand how they learn (process)

Fig. 4. Heutagogy as a continuum of andragogy (Blaschke, 2012).

Motivation theory

One of the most cited motivation theories is Maslow´ need hierarchy. They use to be distinguished in content and process theories as illustrated in Figure 5. For this report the motivation theories will not be further elaborated, as they are well-known. The aim is instead to to emphasize the need to consider motivation for any pedagogical framework in blended learning with an heutagogy approach.

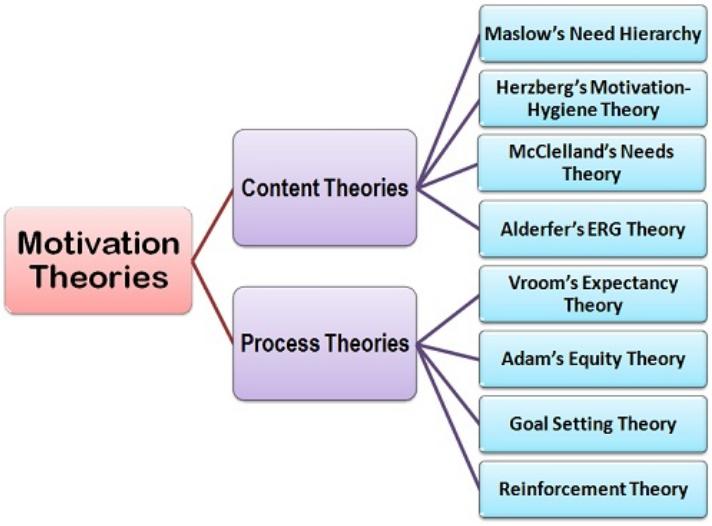

Fig. 5. Motivation theories.

Reflective Practice

Reflective practice is the ability to reflect on one's actions so as to engage in a process of continuous learning (Schön, 1983). It involves paying critical attention to the practical values and theories which inform everyday actions, by examining practice reflectively and reflexively. This leads to developmental insights (Wikipedia, n.d.). Rationales for reflective practice is that experience alone does not necessarily lead to learning, as deliberate reflection on experience is essential.

Reflective practice is an important tool in practice-based professional learning settings where people learn from their own professional experiences, rather than from formal learning or knowledge transfer. It may thus be the most important source of personal professional development and improvement. Reflective practice brings together theory and practice; through reflection a person is able to see and label forms of thought and theory within the context of his or her work. A person who reflects throughout his or her practice is not just looking back on past actions and events, but is taking a conscious look at emotions, experiences, actions, and responses, and using that information to add to his or her existing knowledge base and reach a higher level of understanding (Wikipedia, n.d.).

SAMR (Substitution, Augmentation, Modification, Redefinition) Framework

The Substitution, Augmentation, Modification and Redefinition (SAMR) model developed by Puentedura (2012) is a framework to integrate technology into the curriculum. As instructors integrate technology tools into instruction, the model can be used to determine whether the technology application is enhancing or transforming the learning. The model has four levels that explain the increasing impact of the integration from substituting another traditional learning method (such as writing with pen and paper) to creating a completely new learning style (such as students complete and present a team project using global videoconferencing and a virtual classroom.

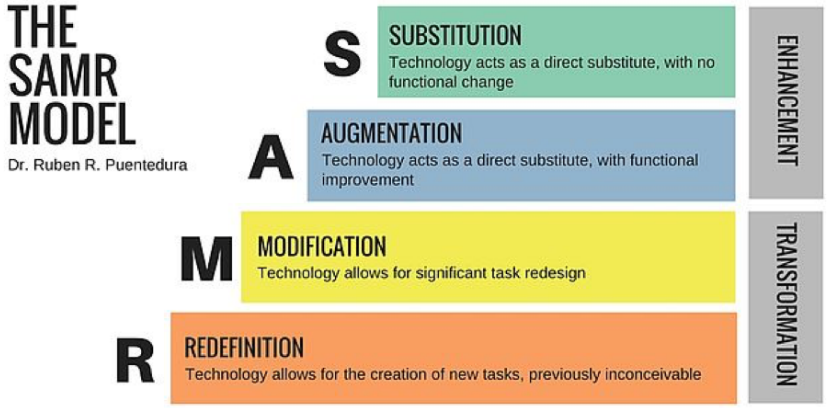

Fig. 6. The SAMR model by Ruben Puentedura (2012).

The SAMR framework could be used to understand the transformation from education 1.0 to education 3.0, which also is the case with the Padagogy Wheel framework by Allan Carrington Carrington, 2017), Figure 7, which has its foundation both in the SAMR framework by Puentedura, and work from Bloom (Blooms taxonomy), and Matt Harris. The Padagogy Wheel aim to empower teachers and learners to use technology and tie apps to specific learning outcomes directly connected to modern pedagogies and theories. The Padagogy Wheel support to find tools that will best aid learners to extend or deepen learning towards 21st century skills or content area. This connection of theory, practice, and application is unique, and thus an invaluable resource.

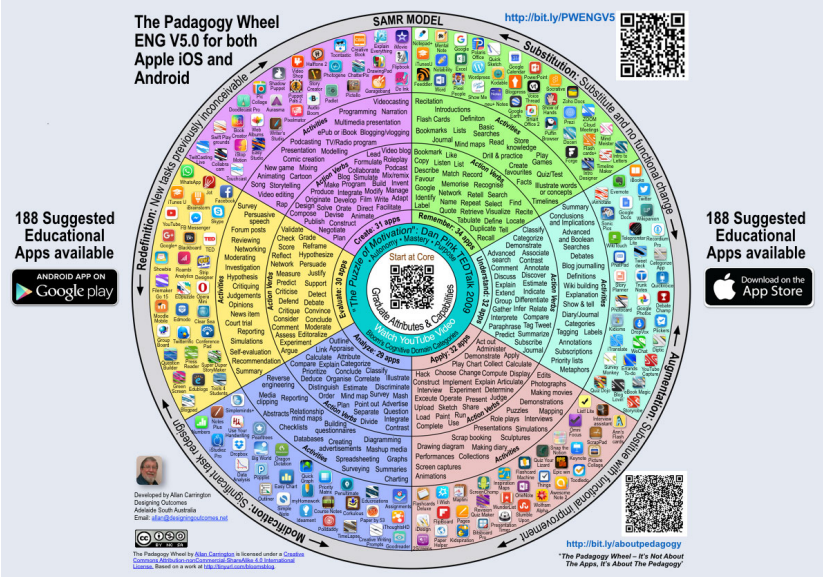

Figure 7. The Padagogy wheel by Carrington (2017).

Related to user generated education, Gerstein make the connections and give practical hints concerning Education 3.0 and mobile learning.[1] One of the sources that could be useful is the video about Education 3.0 and mobile learning. In the next section, the European framework for digital competences and digital competence educational framework is presented. Then the OECD framework 2030, for digital competences, and 21st century skills is presented.

DigComp Framework

The Digital Competence Framework for Citizens (DigComp 2.1) (Carretero, Vuorikari & Punie, 2017) is a further development of the first Digital Competence Framework for Citizens, DigComp 2.0. DigComp 2.1 is presented by 8 proficiency levels and examples of use applied to the learning and employment field. This DigComp Framework 2.1 has 5 dimensions, (i) competence areas identified to be part of digital competence and 21 competences, (ii) competence descriptors and titles that are pertinent to each area, (iii) proficiency levels for each competence, (iv) knowledge, skills and attitudes applicable to each competence, and (v) examples of use, on the applicability of the competence to different purposes, see Figure 8:

[1] https://usergeneratededucation.wordpress.com/2013/05/13/education-3-0-and-the-pedagogy-andragogy-heutagogy-of-mobile-learning/

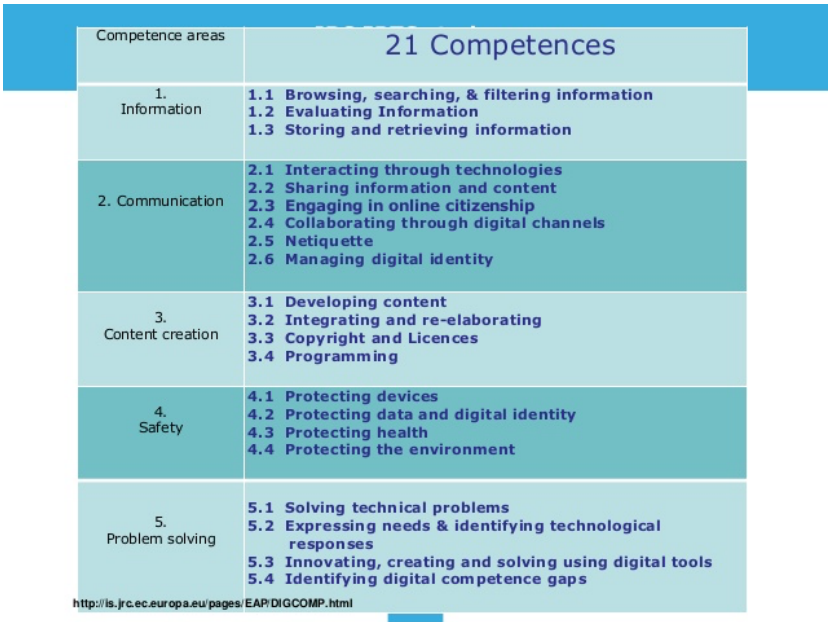

Fig. 8. DigComp 2.1, the Digital Competence Framework for Citizens (Carretero, Vuorikari & Punie, 2017).

DigCompEdu

The European Framework for the Digital Competence of Educators (DigCompEdu), build on DigComp 2.1 is a scientific framework describing what it means for educators, and learners to be digitally competent (Redecker & Punie, 2017). The framework provides a general reference to support the development of educator-specific digital competences in Europe. DigCompEdu is directed towards educators at all levels of education, from early childhood to higher and adult education, including general and vocational education and training, special needs education, and non-formal learning contexts. DigCompEdu details 22 competences organized in six areas, Figure 9, and Figure 10. The focus is not on technical skills, rather, the framework aims to detail how digital technologies can be used to enhance and innovate education and training.

- Area 1 focuses on the professional environment
- Area 2 on sourcing, creating and sharing digital resources
- Area 3 on managing and orchestrating the use of digital tools in teaching and learning
- Area 4 on digital tools and strategies to enhance assessment
- Area 5 on the use of digital tools to empower learners; Area 6 on facilitating learners' digital competence

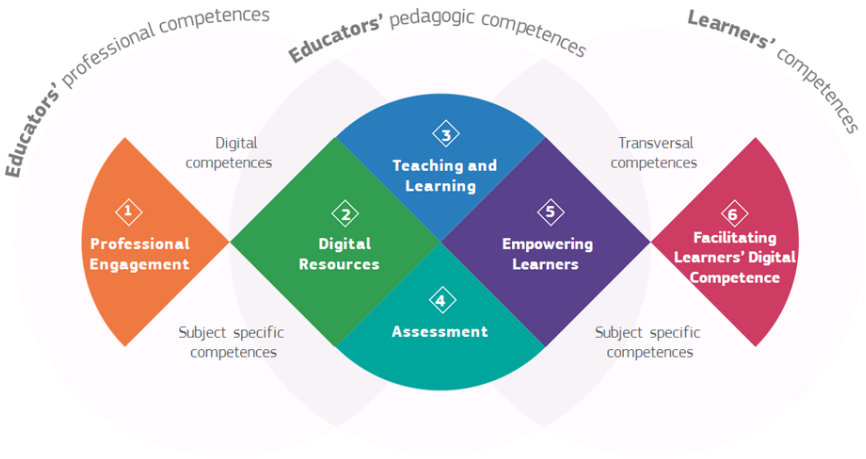

Fig. 9. The DigCompEdu by JRC.

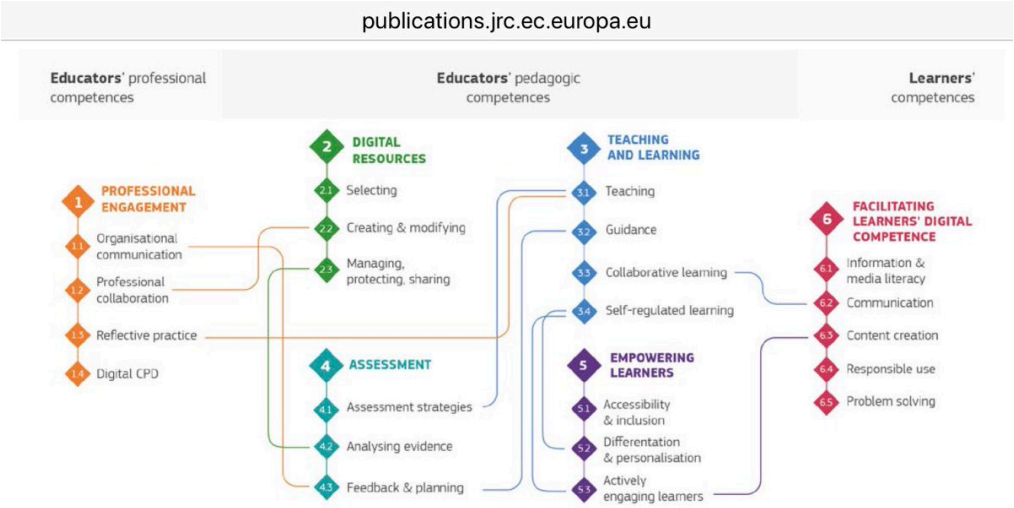

Fig. 10. The DigCompEdu by JRC.

The OECD learning framework 2030, digital competences, and 21st century skills

The OECD Education 2030 stakeholders have co-developed a learning compass, the OECD Learning Framework 2030, that shows how young people can navigate their lives and their world illustrated in OECD Education 2030 project (OECD, 2018) Appendix 6 Two domains, in particular, are crucial. The first one is personalized learning environment that supports and motivates each student to nurture his or her passions, make connections between different learning experiences and opportunities, and design their own learning projects and processes in collaboration with others. The second one is on building a solid foundation, where literacy and numeracy remain crucial. In the era of digital transformation and with the advent of big data, digital literacy and data literacy are increasingly becoming essential, as are physical health and mental well-being. With the OCDE Learning Framework, the concept of competency implies more than just the acquisition of knowledge and skills; it involves the mobilization of

knowledge, skills, attitudes and values to meet complex demands. This requires development of:

- cognitive and meta-cognitive skills (e.g. critical thinking, creative thinking, learning to learn and self-regulation)
- social and emotional skills (e.g. empathy, self-efficacy and collaboration)
- practical and physical skills (e.g. using new information and communication technology devices)

This broader range of knowledge and skills is mediated by attitudes and values like motivation, trust, respect for diversity and virtue, at personal, local, societal and global levels. While human life is enriched by the diversity of values and attitudes arising from different cultural perspectives and personality traits, there are some human values (e.g. respect for life and human dignity, and respect for the environment, to name two) that cannot be compromised. The OECD Education 2030 project extend those competencies and has identified three further categories of competencies, the "Transformative Competencies", that together address the growing need for young people to be innovative, responsible and aware i.e. creating new value, reconciling tensions and dilemmas, and taking responsibility.[2]

Assessment as learning

Heutogogy has been outlined above as a useful approach for learning in the 21 centuries where the learners are taking control and orchestras their own learning. Thus, there are also urgent demands to even rethink assessments,[3] and value assessment as learning, instead of just control of learning, and check remembering of facts and figures. Assessment *as* learning is the use of ongoing self-assessment by students in order to monitor their own learning, which is "characterized by students reflecting on their own learning and making adjustments so that they achieve deeper understanding." (Western and Northern Canadian Protocol for Collaboration in Education [WNCP], 2006, p.41).

Assessment is by tradition an essential component of the teaching and learning cycle. Assessment for, assessment as and assessment of learning are approaches that enable teachers to gather evidence and make judgements about student achievement. However, it has to be

[2] For further information consult the DeSeCo web page - http://deseco.ch/bfs/deseco/en/index/02.html, in particular the Definition and Selection of Key Competencies - Executive Summary (OCDE, 2005).

[3] https://syllabus.nesa.nsw.edu.au/support-materials/assessment-for-as-and-of-learning/

mentioned that the common way to describe assessment is done by categorizing it purposes. According to the Western and Northern Canadian Protocol (WNCP, 2006) there are three assessment purposes, i.e. assessment *of* learning; assessment *for* learning and assessment *as* learning. The protocol state that assessment of learning is used for summative purposes to compare students and report progress according to Earl (2003). Unit tests are a used form of Assessment *of* Learning, while assessment for learning and assessment as learning both address formative assessment. Assessment for learning, a type of is utilized by teachers in order to gain an understanding of their students' knowledge and skills in order to guide instruction.[4] Assessment *as* learning, is also a formative assessment which focuses on teaching students' the metacognitive processes to evaluate their own learning and make adjustments. The principles of assessment for learning and assessment as learning strategies have some common elements. Assessment for learning and assessment as learning incorporate:

- self-assessment and peer assessment
- strategies for students to actively monitor and evaluate their own learning
- feedback, together with evidence, to help teachers and students decide whether students are ready for the next phase of learning or whether they need further learning experiences to consolidate their knowledge, understanding and skills.

The concept of assessment as learning posit that the learner is not just at the center of the process but also assessment is defined with his/her collaboration thus, the learner is autonomy to intervein, question and suggest procedures, instruments and assessment phases (Earl, 2003). In assessment as learning, learning, teaching and assessment are aligned (Dann, 2014) and the learner define their own learning objectives that are the base to delineate what should be assessed, who will be involved and when, as well as what kind or method of assessment criteria and instruments would be used (Both & Brandelise, 2018). As assessment as learning involves its planification (definition of objects, objectives, criteria, development of assessment instruments, progress monitoring and reflection throughout the process), it implies learners' ownership and responsibility as in heutagogy based learning. Moreover, in assessment as learning powerful mediation occur "in which the learner is using assessment to regulate, monitor and steer his/her own learning" (Dann, 2014, p.162). Thus, it is an integrative conceptualization of assessment where strategies as self,, peer and teachers assessment and feedback are pursuit along the process of learning (Balula, 2013; Vieira, 2016).

[4] http://etec.ctlt.ubc.ca/510wiki/Assessment_for_Learning

To make the most of learning-to-learn strategies and in order to increase the transparency of the assessment process, the potentialities of digital technologies should be explored. Thus, an understanding of assessment as learning is important in technology-rich educational learning environments, which facilitate the access to multimedia content or interactions with peers and others, as social communities, and entail the use of cross-action learning spaces (Jahnke, 2017). In short, assessment as learning allows to make the most of openness to ensure learners success and empowerment in technology-based learning environment.

The table 1 in Appendix X, a modification of the table provided by WNCP (2006), illustrates questions that should be asked when planning assessment and express the distinction between assessment for learning and assessment as learning, in technology rich environments, and tentative responses. Although, research in the field reports that assessment of learning (summative content-based assessment, supported by the use of test and exams) is still the most common type of assessment (Rodríguez-Gómez & Ibarra-Sáiz, 2015; Lima & Cosme, 2018), only two kinds of learner's assessment, assessment for learning and assessment as learning are compared. The rationale is that they both are considered as formative assessment, where learners have an active role in the assessment process as it is the case with heutagogy. Initially, with teacher guidance and tools, students learn to plan and monitor their learning process and outcomes by self-reflection and metacognitive processes. The metacognitive skills have been acquired, students can independently adjust their learning accordingly and demonstrate the "self-reflection, self-monitoring and self-adjustment" (WNCP, 2006, p.85). For learners self-evaluation it is argued that the following questions has to be raised:

- What is the purpose of learning these concepts and skills?
- What do I know about this topic?
- What strategies do I know that will help me learn this?
- Am I understanding these concepts?
- What are the criteria for improving my work?
- Have I accomplished the goals I set for myself?

When it come to the teacher's role, assessment as learning is appropriate, to ensure quality, and learners' involvement and engagement. The teacher is a guide, "Giving them [learners] the tools to undertake their own learning wisely and well." (WNCP, p. 42). In that way learners learn to

monitor their own learning and make adaptations as required. In this context teachers can be guided by the recommendations adapted from WNCP (2006, p. 42-43):

- Discuss the learning outcomes with the students
- Create criteria with the students for the various tasks that need to be completed and/or skills that need to be learned or mastered
- Provide feedback to students as they learn and ask them guiding questions to help them monitor their own learning
- Help them set goals to extend or support their learning as needed in order to meet or fully meet the expectations
- Provide reference points and examples for the learning outcomes

According to Rowe (2012), teachers are also responsible for ensuring that students have a learning environment in which they feel comfortable and safe to learn as well as have ample time to practice what is being taught.

Open Educational Resources

OER are teaching, learning or research materials that are in the public domain or released with an intellectual property license (most often creative commons (CC) that allows for free use, adaptation, and distribution (UNESCO).[5] UNESCO believes that universal access to high quality education is key to the building of peace, sustainable social and economic development, and intercultural dialogue. OER provide a strategic opportunity to improve the quality of education as well as facilitate policy dialogue, knowledge sharing and capacity building**.**

However, although OER is crucial, and a start for opening up education, and to innovative blended learning, OER is not enough, instead the implementation of Open Education Practice (OEP) and Open Education Culture (OER) is even more crucial. In the framework of *Opening up Education* content in this case OER are interrelated with all other dimensions, both the other core dimensions, but also the four transversals, strategy, leadership, quality (Inamorata et al., 2016). A more comprehensive description of content and especially on OER is provided in Annex 4.

[5] http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources/

Conclusions and summary

Based on the theories and models described in this report a frame of reference for blended learning is proposed as in Figure 11.

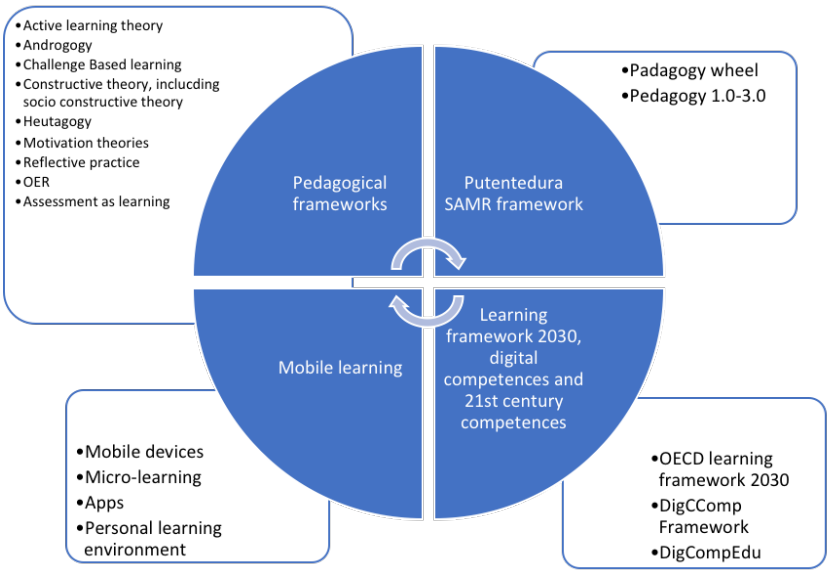

Fig. 11. A suggested frame of reference for blended learning

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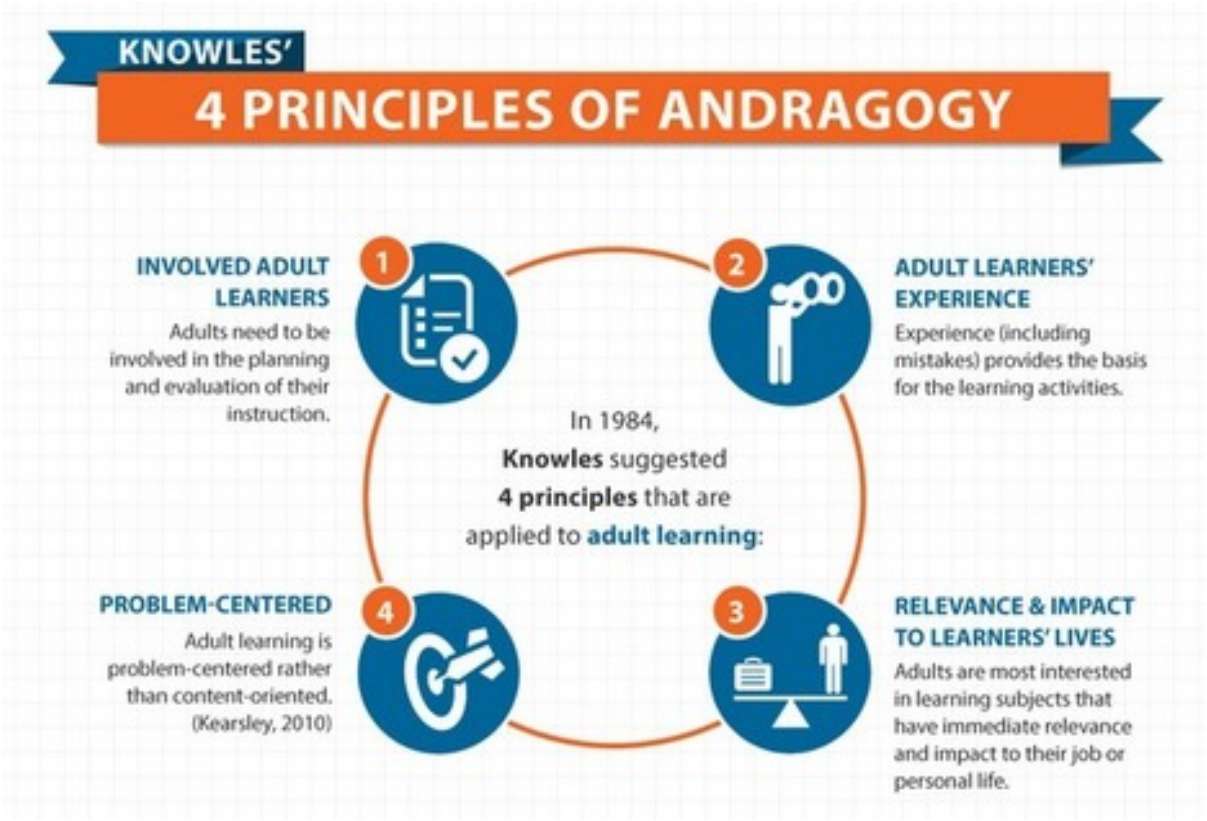
Appendix 1

Knowles four principles that are applied to adult learning



Appendix 2

Knowles' 5 adult learning theory assumptions can be applied to e-learning and or blended learning.

1. Assumption #1 (Self-Concept)
Create learning experiences that offer minimum instruction and maximum autonomy.

A major aspect of designing adult eLearning courses is having an eLearning support system to offer guidance and help, while still giving the eLearning tools and resources they need to learn on their own terms. Adult learners acquire new information and build upon existing knowledge much more effectively if they are encouraged to explore a topic on their own. While younger learners might need to be guided through the learning process, mature learners will typically get more out of the experience if they are able to work autonomously. This might come in the form of self-study or group collaboration projects that involve minimal instructor intervention. eLearning professionals can also offer simulations, scenarios, or games without prefacing them with any information. As such, the adult learners will have to explore the activity on their own, and decide which benefits and information they can take away from the eLearning experience. With that being said, you'll also want to have an eLearning support system in place if they need to ask questions or to overcome any obstacles that may be hindering the eLearning process.

2. Assumption #2 (Adult Learner Experience)
Include a wide range of instructional design models and theories to appeal to varied experience levels and backgrounds.

Adult learners are more mature. Therefore, they have had more time to cultivate life experience and typically have a wider knowledge base. That means that you'll have to take into account that your adult learning audience is going to be more diverse, especially in terms of backgrounds, experience levels, and skill sets. While one adult learner may be well versed on how to search for resources online, another may have very little experience using the Internet. All of this must be considered when designing and developing your eLearning courses and eLearning activities. To appeal to different adult learners, it's often best to include a variety of different instructional design models and theories into your eLearning course or module. Survey your audience beforehand to determine any technical knowledge limitations they may have, as well as to assess their education levels. By doing this, you will also be able to create eLearning experiences that are informative and engaging, rather than too challenging or boring. For instance, if your target audience includes a number of adult learners who may already know how to use multimedia, then including them in your eLearning course will boost its effectiveness and make it more immersive.

3. Assumption #3 (Readiness to Learn)
Utilize social media and online collaboration tools to tie learning to social development.

As we get older, we tend to gravitate more toward learning experiences that offer some sort of social development benefit. For example, we are often more ready to challenge ourselves with new learning opportunities if we know it will help us to fine tune skills that pertain to our social roles. From an eLearning professional point of view, social media and online collaboration tools can help you to incorporate this assumption into your deliverables. Create activities that encourage adult learners to use sites like LinkedIn and Google Plus as invaluable tools. This can help them to not only build their social network, but collaborate with those who share the same interests.

4. Assumption #4 (Orientation to Learning)
Emphasize how the subject matter is going to solve problems that an adult learner regularly encounters.

Adult learners, essentially, need to know the why and when before they actively engage in the eLearning process. For example, they will not only want to know why they need to acquire specific information, but whether or not that information can be applied in the immediate future. Younger learners accept the fact that the knowledge they're acquiring today may not be used for quite some time. However, mature learners prefer to engage in eLearning experiences that help them to solve problems they encounter on a regular basis (in the here-and-now, rather than the future). So, you'll want to emphasize how the subject matter is going to help them solve problems immediately by offering real world examples and scenarios.

5. Assumption #5 (Motivation to Learn)
There must be a valid reason behind every eLearning course, module or educational activity.

Motivation is key with adult learners. As such, you will need to motivate them to learn by offering them a reason for every eLearning activity, assessment, or eLearning module they'll need to complete. eLearning professionals must explain why a particular eLearning course is being taught and why an adult learner must participate in an eLearning activity, in order for the overall e-learning experience to be meaningful and engaging. For example, if you are asking adult learners to complete a group collaboration task, you should also clearly define that this exercise will help them to build their team working and

communication skills, even after the eLearning course is over. While younger learners won't need to necessarily know the reason why they are required to participate in an activity, adult learners need to feel as though they are more involved in the process of learning. Otherwise, they will question the validity of the eLearning course, given that they don't see any real need for acquiring the new knowledge or skills.

Appendix 3

Extract from: JRC. "Opening up Education. A Support Framework for Higher Education Institutions (Inamorato dos Santos, Punie, & Castaño Muñoz, 2016).

CORE DIMENSION 3	
PEDAGOGY	
Definition	Openness in pedagogy refers to the use of technologies to broaden access and make the range of teaching and learning practices more transparent, sharable and visible.
Rationale	Opening up pedagogical practices is about developing the design for learning so that it widens participation and collaboration between all involved. Pedagogical approaches with an emphasis on the learner are very suitable to open education. The goal is to open up the range of pedagogical practices via ICTs in order to enhance the effectiveness of the learning design and increase students' involvement and collaboration. It is also about making pedagogical practices visible, transparent and accessible, by making available the rationale for the learning design, the assessments and learning outcomes, and also enabling learners to design their own learning path with a wide choice of learning resources.
5 components	Supported open learning| Personalised teaching | Collaborative and networked learning | Use of authentic resources | Sharing educational resources and pedagogical practices

	ICT can enhance the variety of pedagogical approaches by facilitating: Supported open learning: Learners take the initiative and the responsibility for their learning processes, but they are supported by a mix of media, resources and practices. Learners decide what topic to study, select the learning resources and means, and manage their learning time. They also assess their own learning outcomes, at times counting on other peers or on full assessment by the institution. This type of learning can be pursued at any time, in any place and at any age, but requires commitment, self-discipline and goal-setting. The institution can provide support to open learners to follow their studies independently, such as advice on learning pathway, tutorials, call in phone line and online support, career and accreditation advice, online communities of practice and any other type of suitable support for open learning. Personalised teaching. Due to the increasing availability of learning technologies, a more personalized approach to teaching and learning can be taken. The use of learning analytics for example, to detect learners' online patterns of behaviour and preferences, and also personalised learning resources, can be pursued. Collaborative and networked learning. Digital communication and collaboration tools make it easier for learners and lecturers to collaborate. In addition, these tools, especially when they take advantage of a social network, facilitate the connection among individuals interested in the same topic. Thus they support learning in communities and networks that go beyond the institution. The nature of open education allows it to be used for implementing collaborative learning. Examples are team projects which involve searching, remixing and modifying OER. Use of authentic resources OER, collectively-produced learning materials, and real practitioner/learner networks, are useful

	resources which can make learning activities more meaningful and authentic. Technology can also enable immersive learning via simulations and virtual laboratories. Sharing educational resources and pedagogical practices. Open education calls for the use, sharing and adaptation of free- of-charge digital materials, OER and learning design rationales. It also enables educators to share their teaching practices, get advice and learn from colleagues in order to improve their own practices.
Transversal Dimensions	
Descriptors	
Supported open learning	

Strategy	The institution's open education policy supports the use of technology-enhanced inquiry-based learning in their courses. The institution's open education policy supports the use of open education in order to offer flexibility in the curricula (and learning goals), facilitate students' choice of their own learning processes (e.g. recognising participation in MOOCs or online courses offered by other universities). The institution's open education policy includes all types of learning services for open learners such as learning pathway design advice, tutoring, online resources, assessment and accreditation support. • The use of ICT/ open education for personalised learning is considered to be a tool that increases the efficiency of open education provision (reducing costs and enhancing results). • The creation of modular curricula that allow students to plan self-directed learning pathways, is considered by the institution to be one of its strategies in the provision of open education. • Other. Please specify.
Technology	The institution has technologies that support peer-reviewing by open learners. offers technologies that enable the mapping of students' own learning. • offers technologies for the creation of learning portfolios and pathways that can be openly accessed and transferred to other platforms. • makes use of a range of learning technologies to support online or blended learning. • Other. Please specify.
Quality	The institution has a quality monitoring system that checks the efficiency of its services to support open learning. Other(s) Please specify.
Leadership	• The institution's open education policy includes the offer of guidance (by lecturers, faculties or a central service) to independent learners who approach the institution for help on deciding on a self-learning path. • Other. Please specify.

Personalised teaching

Strategy	• The institution's open education policy encourages the use of diverse technology-enhanced pedagogical methods for OER, MOOCs and free (and open) online courses in order to adapt education to the needs of the learners. • The institution's open education policy supports the use of learning analytics and/or adaptive learning in order to personalise the courses, content or methods to the needs of the learners.
Technology	The institution's open education policy includes an ethical framework for the use of learning analytics in open courses.
Quality	The offer of optional paid-for teaching services to independent learners is designed as a way of enhancing the quality of the learning experience. Other. Please specify.
Leadership	The institution: • offers techno-pedagogical support and continuous professional development to its lecturers on how to innovate pedagogy. • using ICT and open education to create learner-centred courses. • offers incentives for staff who aim to innovate the pedagogical design of their courses using ICT and open education to develop learner-centred courses. □ Other. Please specify.
Collaborative and networked learning	
Strategy	The institution's open education policy supports technology-enhanced, networked and distributed learning where the teachers act as facilitators and the learners take control of their own learning (e.g. participation of registered learners in MOOCs, development of cMOOCs – connectivist Massive Open Online Courses). • The institution promotes collaborative learning via ICT as part of the pedagogical strategies for open education. • The institution promotes collaborative learning between peers using OER (e.g. team projects which involve searching, remixing and modifying OER or the searching and use of open data). • The institution's open education policy supports and encourages collaborative and networked learning which takes place • between different institutions (e.g. inter-institutional collaboration).□ Other. Please specify.

Technology	• The institution makes use of learning technologies to support collaborative learning (e.g. discussion forums, joint course assignments). • Other. Please specify.

Quality	• Peer quality check is part of the quality monitoring procedure of the institution. • Other. Please specify.
Leadership	The institution: • offers techno-pedagogical support on how to innovate pedagogy through collaborative and networked learning using ICTs and open education. • offers incentives for staff who want to innovate pedagogical practices through collaborative and networked learning using ICTs and open education.
Use of authentic resources	
Strategy	The institution: • promotes the participation of the learners in communities that go beyond the institution. • promotes the use of OER and open data for the solution of real word problems by using authentic resources. (e.g. OER, open • data). • promotes the contribution of learners to real public knowledge resources (e.g. Wikipedia, wikis).
Technology	The institution has technologies and policies that allow and support the sharing of research.
Quality	The integration of real word resources, data or communities in pedagogical practices is considered one of the quality criteria of the courses (quality check).
Leadership	The institution: • offers techno-pedagogical support on how to innovate pedagogy by integrating online real word resources, data or • communities. • offers incentives for staff who aim to innovate pedagogy by integrating online resources, data or creating/supporting communities of practice.

Sharing educational resources and pedagogical practices	
Strategy	• The institution's open education policy promotes pedagogical exchanges among teacher (lecture videos, peer learning, teaching approaches ideas etc.). • The institutional policy promotes the sharing and reuse of OER created by other lecturers.
Technology	The institution promotes the exchange of educational practices by supporting open source technologies and tools that allow users to make comments and download educational content.
Quality	The institution supports the sharing of innovative education practices and allow third parties to peer-review and comment on them to assess and improve their quality (e.g. comments from a group of teachers who collaborate openly online).
Leadership	The institution plays a proactive role in encouraging staff members to discuss their educational practices and those of third parties. □ offers techno-pedagogical support on how to share educational practices. • offers incentives for staff who want to share educational practices.

Appendix 4

Extract from JRC. ”Opening up Education. A Support Framework for Higher Education Institutions”.

CORE DIMENSION 2	
CONTENT	
Definition	Content in open education refers to materials for teaching and learning, and research outputs, which are free of charge and available to all.
Rationale	Content in open education encompasses texts of all sorts, textbooks, course materials, pictures, games, podcasts, video lectures, software, data, research papers and outputs, and any other type of educational material that conveys information which can be used for teaching and learning. It can be open licensed, in the public domain or copyrighted but should be 'gratis' and accessible by everyone without restrictions.
2 components	Open educational resources (OER) | free of charge content
	OER OER constitute a key component of open two main characteristics of OER are that they are "libre" (openly-licensed content) and at the same time "gratis"(free of charge). There are different types OER (e.g. fully licensed or partially licensed). Public domain content can also be placed in this category. Using OER for teaching and learning reduces the possibility that users infringe copyright. At the same time OER grants greater permissions in the use of content, such as adaptation, translation, remix, reuse and redistribution, depending on the type of license applied to the content. OER range from individual learning objects (e.g. a picture with a specific teaching purpose) to full courses (e.g. a MOOC or an open (libre and gratis) online course). **Free-of-charge content** Free-of-charge content refers to content that is printed or made available digitally and 'gratis' but remains copyrighted. Though users do not pay to access it, they cannot reuse, adapt or share it without seeking permission from the copyright holder. Free-of-charge content ranges from individual learning objects to full courses (e.g. a MOOC or an open (gratis) online course). Whenever appropriate, free-of-charge content should be fully licensed as OER, thereby granting users greater permissions in handling the content.

Descriptors	
OER	
Strategy	The institution has a policy on the production and use of free-of-charge content. • uses, produces and offers OER in order to improve its content production mechanisms. • produces, uses and offers OER in the form of MOOCs and/or open (libre and gratis) online courses. • offers information sessions and/or support materials on different types of open licenses. • produces, uses and offers OER as a visibility mechanism to attract students and increase its reputation. collaborates with other institutions in the production/remix/reuse/redistribution of OER. • encourages staff members to produce, use and share OER. • encourages its students to use OER. • encourages its students to produce and share OER. • Other. Please specify.
Technology	The institution explores different digital tools to create and make available meaningful content and with appropriate granularity. seeks to use audiovisual resources to enhance the content produced. • automatically monitors when the content was created and when it will need updating (e.g. every 2 years). • allows content users to revise and remix content on the institutional platform on which it is offered • allows users to create, remix and share content on the institutional platform. • seeks to tag content appropriately to increase its findability. • places its content on interoperable platforms (e.g. IMS Common cartridge compliant etc.). • Other. Please specify.
Quality	The institution has a quality check mechanism in place for its content production (both OER and free-of-charge content). • supports and encourages staff members to develop meaningful assessments for its open education offers. • makes informed decisions on the different types of robustness of assessment for open education (see OpenCred model). informs its open learners of what sorts of accreditation they may/may not get for studying with a given content. • has guidelines on different OER and free-of-charge content granularity. • encourages quality checks via social mechanisms by enabling user feedback on OER/ free of charge content. • Other. Please specify.

Leadership	Staff members at the institution proactively explore new and suitable assessment practices for the institution's open education offer. • The institution is committed to being at the forefront of free content offer in its region or country. • seeks to be at the forefront of innovation on OER assessment techniques and tools. • seeks to identify staff members who are motivated by the idea of OER and /or free-of-charge content production and use.Other. Please specify.

Appendix 5

Crucial questions for assessment, and comparison between assessment for learning and assessment as learning

Questions	Assessment for learning	Assessment as learning
Why access?	To enable teachers and students to determine learning gaps and nexts steps to advance learning.	To guide and provide each learner with opportunities to monitor and critically reflect on his or her learning and define next steps.
What is assessed?	Each learner progress and learning needs in relation to the curricular outcomes (competencies that should be developed).	Each students thinking about his or her learning. what strategies he or she uses to support or challenge that learning and the mechanisms he or she used to adjust and advance his or her learning.
Who is involved and what are their roles?	Teachers define what is assessed, when, assessment criteria and instrument… and provide feedback. Learners are enrolled in their own and peer assessment, thus they reflect about their learning and provide feedback to their peers.	Learners and teachers are involved in assessment planning, e.g., defining and negotiating assessment criteria and instrument. Thus learning have more control on what they will learn (i.e. according with their need, motivations, experiences).
What strategies are used?	Self - peer and teachers assessment. Using technologies external members of the educational community can also be involved (i.e., other teachers, experts).	Self - peer and teachers assessment. Using technologies external members of the educational community can also be involved (i.e. parents, other teachers, experts)..
What instruments are used?	A range of instruments in different modes that make learners progress and learning outcomes visible (i.e. online rubrics, grids, portfolios, learning diaries learning product).	A range of instruments in different modes that make learners progress and learning outcomes visible (i.e. online rubrics, grids, portfolios, learning diaries learning product).
When and where is it done?	All over the learning process, in formal contexts.	All over the learning process, in formal and informal contexts.
What is the relation between	Assessment support learning.	Assessment is integrated in learning.

assessment and learning?		
What is the purpose of assessment?	Improvement of learning.	Sustainability - learning to learn (i.e. increase motivation, metacognition, critical thinking, among others).
How can quality be assured?	Clear, detailed learning expectations defined by teachers. Accuracy and consistency of assessment criteria that guide the interpretation of learning (defined by teachers). Accuracy, detailed notes for descriptive feedback provided by peer and teachers.	Clear, detailed learning expectations defined and negotiated with learners. Accuracy and consistency of assessment criteria that guide the interpretation of learning (defined with the collaboration of learners). Accuracy, detailed notes for descriptive feedback provided by peer, teachers, experts, technology (adaptive feedback).

Appendix 6

The OECD learning framework 2030