



Competence frameworks as orienteering tools

Los marcos de competencia como herramienta de orientación

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ABSTRACT

This paper provides an overview of what European key competence frameworks are designed to do, how they are created and how they can be used for different lifelong learning purposes. It explains that they are built on multi-stakeholder consensus, which makes them well suited to provide a common language for all actors that are interested in transversal competences. The paper also highlights that competence frameworks are not binding, and users are not expected to comply with them, but rather to use them flexibly, to unbundle them and to re-bundle them to achieve their own goals.

KEYWORDS

21st century skills; key competences for lifelong learning; digital competence; entrepreneurship competence; personal, social and learning to learn competence; sustainability competence.

RESUMEN

Este artículo proporciona una descripción general de para qué están diseñados los marcos europeos para las competencias clave, cómo se han creado y cómo se pueden utilizar para diferentes propósitos en el mundo del aprendizaje permanente. Explica que los marcos se basan en el consenso de múltiples partes interesadas, lo

que los hace muy adecuados para proporcionar un lenguaje común para todo actor interesado en las competencias transversales. El artículo también destaca que los marcos de competencias no son vinculantes, y no se espera que los usuarios los cumplan, sino que los utilicen con flexibilidad, para desagregarlos y reagruparlos para lograr sus propios objetivos.

PALABRAS CLAVE

Habilidades del siglo XXI; competencias clave para el aprendizaje permanente; competencia digital; competencia empresarial; competencia personal, social y de aprender a aprender; competencia de sostenibilidad.

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Main contributions of the article and future research lines:

- The article highlights that competence frameworks can be unbundled into their constituting elements, which, in turn, can be re-bundled in different combinations to meet diverse needs and adapt to specific contexts.
- The flexibility that characterises competence frameworks allows for creative customizations. By using the same language, such customizations are easy to communicate, compare and combine, which facilitates the learning, teaching, validation and recognition of key competences.
- Future research lines can focus on i) curriculum design, addressing how education and training providers can create derivative reference models (e.g. sustainable entrepreneurship, or digital wellbeing); ii) *pedagogov*, focussing on how teachers and educators can foster diverse mixes of competences in the

planning of their interventions; iii) exploring how

different combinations of competences acquired in informal learning settings can be certified through the recognition of prior learning and how these can be transacted with the education system and/or in the labour market.

1. INTRODUCTION

Competence-oriented education focuses learning outcomes, it shifts the focus what is taught to what is learnt, from the transmission of knowledge, to the design of learning experiences that foster the development of knowledge, skills and attitudes can be learnt. If competences are developed through experience, then they can be acquired outside the formal education system, in non-formal and informal learning setting as well. Through the validation of

competences acquired in different contexts, individuals can have their prior learning recognised and obtain full or, where applicable, partial qualifications that can enhance their employability and career mobility (Council of the European Union, 2012).

Competences are everywhere and they are many. They can be looked at as stars in the sky. Like stars, they can be clustered in constellations that help us orient ourselves: frameworks are our constellations in the competence universe.

Constellations, vary from culture to culture, sometimes they surprisingly overlap across cultures sometimes they differ profoundly. Figure 1 below shows how different cultures have built different constellations around Pollux: in the Western culture Pollux, is part of Gemini. The heavenly twins have been clustered together by other cultures like the Arabic, or the Belarussian. For the Dakota culture, however, Pollux is part of the Bear's Lodge, and for the Inuit, Pollux is part of the Collar bones.

Figure 1.

Culture that use Pollux to build constellations. Focus on the Western Astronomy (Gemini).

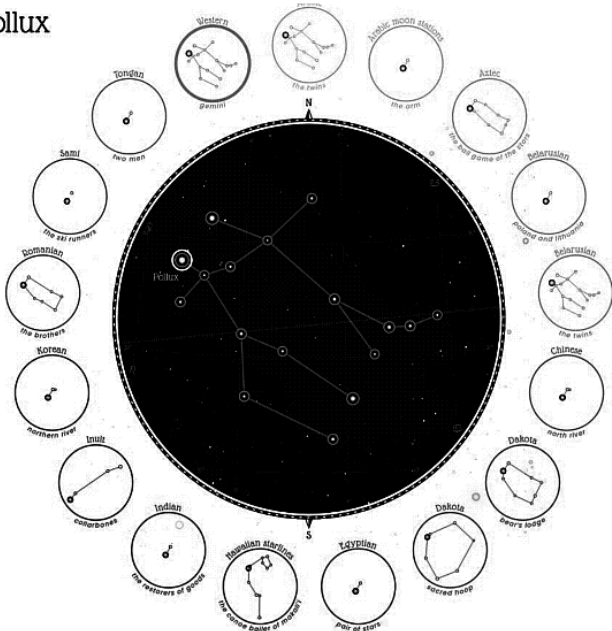
The cultures & constellations

x

that use the star

Arcturus

Pollux



Source: <https://figuresinthesky.visualcinnamon.com/>

Sometimes constellations share stars as in the case of the Plough and the Ursa Major. The plough is made up of the seven brightest stars in the Ursa

Major and correspond to the Bear's hindquarters and its long tail (Figure 2).

Figure 2.

The Plough is part of the Ursa Major.

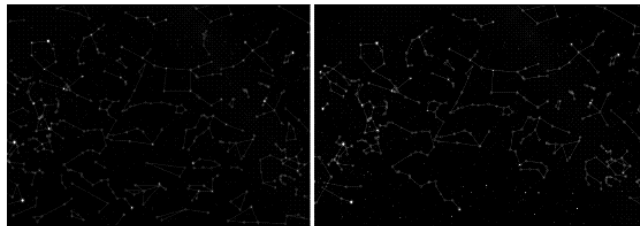


Source: <http://www.constellationofthemonth.com/2014/10/the-plough.html>

Figure 3 below shows two different ways to read the celestial sphere, the Western and the Arabic.

Figure 3.

The Constellations according to the Western observational astronomy (left side) and the Arabic one (right side)



Source: <https://figuresinthesky.visualcinnamon.com/>

Text o Comparing our competence frameworks to constellations serves us to emphasise that in the universe of knowledge, skills and attitudes there is greater richness than the one we focus with the lines we draw, and that these lines are arbitrary, even if consensual. They do not exist, but because they are shared by a community of people.

In 2018 the Council of the European Union revised the Recommendation on Key Competences for Lifelong Learning (2018/C 189/01) originally adopted

in 2006 which established the reference framework on key competences. By doing so it highlighted eight main constellations (key competences), which provide us with a map to orient ourselves in the lifelong learning universe. The eight key competences constellations are:

- Literacy competence;
- Multilingual competence;
- Mathematical competence and competence in science, technology and engineering;
- Digital competence;
- Personal, Social, and Learning to Learn competence;
- Citizenship competence;
- Entrepreneurship competence;
- Cultural awareness and expression competence.

The Council Recommendation on Key Competences for Lifelong Learning states (2018, p.7):

“The key competences are all considered equally important; each of them contributes to a successful life in society. Competences can be

applied in many different contexts and in a variety of combinations. They overlap and interlock; aspects essential to one domain will support competence in another. Skills such as critical thinking, problem solving, team work, communication and negotiation skills, analytical skills, creativity, and intercultural skills are embedded throughout the key competences”.

As illustrated in figure 4 the eight key competences overlap and in terms of the constellation metaphor, they share a number of stars, such as, for instance, “collaboration”, which is embedded in all constellations.

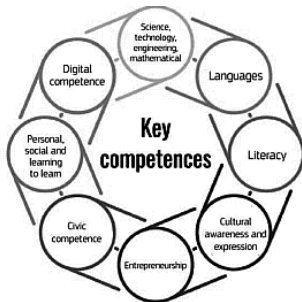
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Figure 4.

Key Competences for Lifelong learning. Source Commission Staff Working Document accompanying the document Proposal for a COUNCIL RECOMMENDATION on Key Competences for Lifelong Learning [COM(2018) 24 final].



Text In sum, the different competences frameworks that stem from the Council Recommendation on key competences for Lifelong Learning can be seen as different constellations that pertain to the same astronomic system¹, share a few stars (competences) and have been outlined to help users navigate the universe of competence-based learning. Other systems exists and - once more - it is worth underling that key competences frameworks do not aim at establishing a hegemonic approach to competence development, rather to establish a common language for those actors who find it useful, to achieve different goals such as:

- Adopting a common language that bridges the world of education and the world of work,
- Teaching and learning competences,

- Assessing competences levels,
- Demonstrating progress,
- Recognising prior learning or
- Certifying competence levels.

2. COMPETENCE FRAMEWORKS IN THE CONTEXT OF EUROPEAN EDUCATION POLICIES

Education and Training is policy area where the European Commission has a supporting competence². The responsibility for the content of teaching and the organisation of education systems and their cultural and linguistic diversity rest solely with the Member States.

Competence frameworks are thus supporting measures that European Commission has created to help Member States in the implementation of the Recommendation³. They are not binding in

¹ Following this metaphor, for instance, the UNESCO Media and Information Literacy Framework would be part of a different

astronomic system, but would be made up of stars that are also included in DigComp.

² Article 165(1) subparagraph 1, 165(2) bullet points 1-6, 166 TFEU

³ In the SWD(2018) 14 final accompanying the proposal for a Council Recommendation on n Key Competences for LifeLong Learning, “the Commission proposes to work in close cooperation with Member States on targeted reference material, guidelines and tools to support competence development. This can include also the development of

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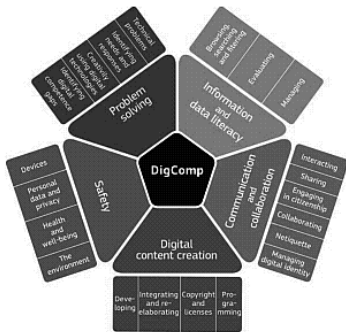
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nature nor they aim to homogenize the way how the key competences are taught or learnt across learning settings in Europe. In this context, the JRC has developed several conceptual frameworks describing in details some of these competences, in particular:

- The European Digital Competence Framework for Citizens (DigComp) originally published in 2013 (Figure 5) (Ferrari, 2013), updated to version 2.0 in 2016 (Vuorikari, Punie, Carretero & Van den Brande, 2016), to

version 2.1 in 2017 (Carretero, Vuorikari & Punie, 2017) and to version 2.2 in 2022 (Vuorikari, Kluzer & Punie, 2022). **Figure 4.**

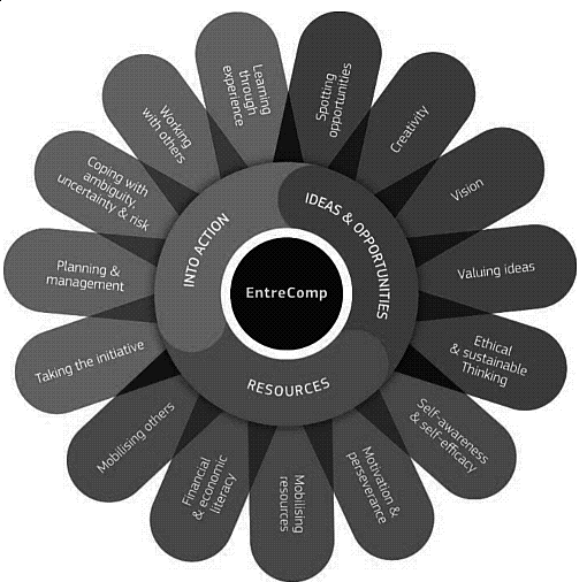
DigComp, competence areas and competences



- The Entrepreneurship Competence Framework, published in 2016 (Figure 6) (Bacigalupo, Kampylis, Punie & Van den Brande, 2016).

Figure 6.

EntreComp, competence areas and competences

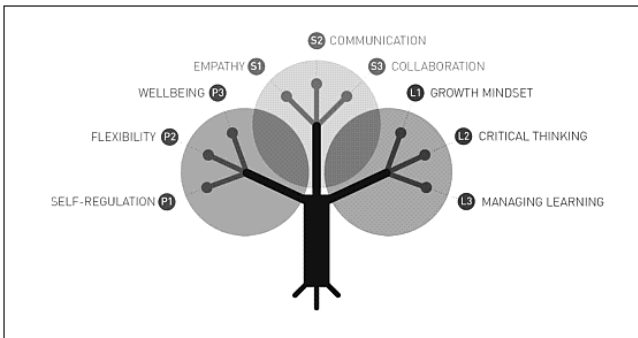


competence frameworks for specific competences, support tools for teachers, trainers and educators as well as guiding material on supportive learning approaches and contexts”.

- The European Framework for Personal, Social and Learning to Learn Key Competence (LifeComp), published in 2020 (Figure 7) (Sala, Punie, Garkov & Cabrera Giraldez, 2020)⁴.

Figure 5.

LifeComp, competence areas and competences.

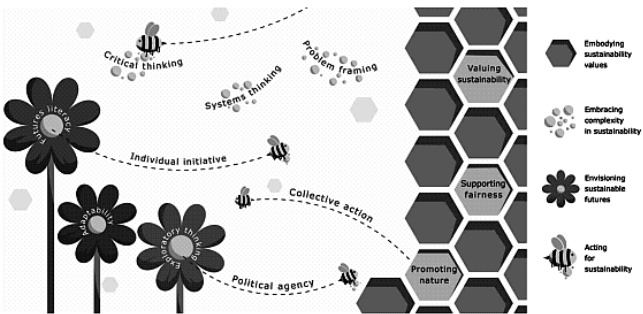


In 2022, the JRC has also published Greencomp (Figure 8), the European reference framework for sustainability competences (Bianchi, Pisiotis &

Cabrera Giraldez, 2022).

Figure 6.

GreenComp, competence areas and competences.



⁴ The Council of Europe has also contributed to the implementation of the Council recommendation by targeting the multilingual competence and citizenship competence, with the Common European Framework of Reference for Languages (<https://bit.ly/3wjTBpS>) and the Reference Framework of Competences for Democratic Culture (<https://bit.ly/3yGAeZw>)

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The first goal of developing such frameworks was to create a common language to bridge the world of education and the world of work, by providing a shared definition of what key competences are, what their components are and how they are related.

What's more, DigComp, EntreComp, LifeComp and now GreenComp - by providing a fine-grained level of detail on each competence - support stakeholders in overcoming the three main challenges identified by the Council Recommendation with respect to the transition to competence-oriented lifelong learning, without being prescriptive. Such challenges relate to:

- 1) the use of a variety of learning approaches and contexts;
- 2) support for teachers and other educational staff; and
- 3) assessment and validation of competence development.

Even if a Council Recommendation is a call to action and cannot guarantee that Member States will actually take any action, competence frameworks

are instruments that can be used to reach different goals. De facto, they can inform curriculum reforms, training requirements, learning outcomes, job descriptions, interview processes, assessments, and performance evaluations and activate an ecosystem of actors including education and training bodies, employers, labour market intermediaries, third sector organisations resources, as well as tools to develop and assess competences that can be shared and re-used by all (Kluzer, Centeno & O'Keeffe, 2020; Kluzer & Pujol Priego, 2018; McCallum, McMullan, Weicht, Kluzer & Punie, 2020; McCallum, Weicht, McMullan & Price, 2018).

It is important to underline that competence frameworks are not standards. They are reference documents that need to be adapted and contextualised to meet real-world needs. By no means they shall be interpreted as rubrics to assess super-humans who master all competences at the highest level of proficiency possible.

3. BUILDING EUROPEAN COMPETENCE

FRAMEWORKS

As mentioned in the introduction, competence frameworks are clusters of competences built on consensus among scholars, policy makers and practitioners. They are not classifications of competences that create rigid taxonomies. Rather are conceptual tools, aimed at facilitating the understanding of competences as lifelong learning sets of knowledge skills and attitudes that all citizens shall be afforded the opportunity to develop. What makes up a competence depends very much on perspective adopted and the type of learners one has in mind when developing the framework (Bacigalupo, 2021).

The European Commission work on key competence frameworks focuses on lifelong learners, thus adopting a broad approach and seeking to develop reference documents that are comprehensive, flexible and multipurpose. This means that framework like DigComp or EntreComp do not provide a description of competence tailored to professionals, such as IT

developers or deep tech entrepreneurs. They identify those competences that can be applied transversally, by any actor in any setting: from school curricula, to extra-curricular activities, from value creation in the workplace, to community initiatives, from activism to scaling up a business. With this in mind, it is clear that key competences are not there to undermine the importance of subject matter expertise, domain specific knowledge or disciplinary competencies; they are there

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to enable and empower learners to face-up to present and future challenges and thrive in a fast changing world.

3.1. A mixed-method approach to framework creation

JRC has consolidated the method to develop the

competence frameworks at over the years, since it started the work on digital competences in late 2010. The work always starts from desk research aimed at understanding how each set of competence is set in academic literature and policy documents or education and training practice (Ala-Mutka, 2011; Guia Bianchi, 2020; Caena, 2019; Komarkova, Gagliardi, Conrads & Collado, 2015). It follows with various rounds of stakeholder consultations on progressively refined proposals until a consensual version is consolidated and then released in the public domain. Consultations happens with physical or virtual workshops, through the Open Method of Coordination and in particular through Education and Training working groups, through ICT mediated interactions on the framework content.

Let us take the creation of the EntreComp as an example. The development of the framework has comprised the following phases:

1. Desk research, made by:
 - a. A literature review of existing concepts, policies and initiatives referring to entrepreneurship as a competence (Komarkova

et al., 2015).

b. An inventory of 42 initiatives where entrepreneurship as a competence is either defined, taught, learnt and/or assessed (ibidem).

c. An in-depth case study analysis, where 10 existing initiatives were selected to capture in detail the elements that make up entrepreneurship as a competence and the key features

of state-of-the-art entrepreneurial learning processes (Komarkova et al., 2015).

2. An expert consultation, made by:

a. An expert workshop, where the preliminary findings from the literature review, inventory

and in-depth case studies were presented and the scope of entrepreneurship as a competence was defined.

3. A creative phase made by:

a. A draft proposal for a conceptual model based on the previous steps.

b. A benchmark of the draft proposal against existing frameworks.

c. The development of a set of use scenarios to evaluate the applicability of the draft conceptual model.

4. A stakeholder consultation phase, made by:

a. A set of iterative multi-stakeholder consultations, where progressively refined proposals were distributed for comments, until a final proposal for a conceptual model consisting of 3 competence areas and 16 competences was prepared.

b. A draft Entrepreneurship Competence (EntreComp) Framework which has 8 proficiency levels and an extensive list of approximately 500 learning outcome statements.

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c. Twelve multi-stakeholder online panel discussions to review the draft Entrepreneurship Competence Framework proficiency levels and learning outcomes, with more than a

hundred experts in the field of entrepreneurial learning.

5. A consolidation phase, whereby:

a. Three competence areas and 15 competences which unfold into 442 learning outcomes

on 8 levels of proficiency have been consolidated in the EntreComp framework (Bacigalupo et al., 2016)

Among the frameworks developed by the JRC, only the digital competence one has required updates since its first publication in 2013. This is due to the pace of evolution of digital environments and the subsequent need to update or further specify the conceptual reference model posited in the first version of the DigComp or to develop further the descriptive dimensions of the framework. As thoroughly explained by Vuorikari and colleagues, DigComp was originally published in 2013 (Ferrari, 2013), its conceptual reference model, i.e. the five areas (Dimension 1) and the 21 competence titles and

descriptors (Dimension 2) were updated in 2016 in version 2.0. Based on DigComp 2.0, DigComp 2.1 introduced 8 proficiency levels, expanding on Dimension 3 of the framework which reflects proficiency levels of each competence illustrating the progression in the acquisition of the competence (Carretero et al., 2017). Finally, the 2.2 update focuses on examples of the knowledge, skills and attitudes applicable to each competence (Dimension 4). For each of the 21 competences, it adds 10-15 statements to illustrate timely and updated examples that highlight contemporary themes. As such, the update does not alter descriptors of the conceptual reference model (Figure 5) and it does not change how proficiency levels are outlined (Dimension 3), nor use cases (Dimension 5) (Vuorikari, Kluzer & Punie, 2022). Updates of European Competence Frameworks have been always driven by stakeholder demand, channelled via different Education and Training 2020 Working Groups over the years, and have been developed with the participation of the DigComp

Community of Practice (CoP). In the case of the 2.2 update, the DigComp CoP - which is open to any individual and organization that works on digital competence development and has experience in using the DigComp framework - has convened in a platform hosted by ALL DIGITAL (<https://all-digital.org/invitation-to-digcomp-cop/>).

Details on stakeholder involvement in each stage are summarised in Annex I to DigComp 2.2 “Methodology underlining the DigComp framework and its updates”(Vuorikari et al., 2022, pp 68-76).

4. TURNING EUROPEAN COMPETENCE FRAMEWORKS INTO ACTION

As mentioned in the introduction competence frameworks are not standards, not they are binding in any ways. The first step to turn them into action is for users to appropriate them and adapt them to suits their needs and goals.

4.1. Adapting frameworks to the operational

context

Like sailors at sea during a moonless night, users can look up to framework to know where they stand and in which direction to go to reach their destination, as they can unbundle and re-bundle them to create their new constellations that better serve their teaching learning purposes. No matter how detailed they are on providing learning outcome statements or long list of knowledge,

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skills and attitudes statements, competence frameworks remain generic and they will always need to be adapted when applied especially at level of learning interventions.

Adaptations can take many forms, including:

- Full or partial translations, see for instance the ones listed in (Vuorikari et al., 2022, p.

55).

- Adaptations of the terminology to suit the context (for example changing the word learner into managers, if a set of competences is used for executive training).
- Contextualisations aimed at providing relevant guidance to specific group of users (see for instance the translation of EntreComp by the public network of telecentres in Andalusia – Guadalinfo - which includes an interpretation of each learning outcome statement into a language that resonates with the work Guadalinfo facilitators do with their end users (http://entrecomp.guadalinfo.es/puesta_en_marcha.html)).
- Unbundling of different competences frameworks to create new sets of competences that responds to specific requirements (e.g. the sustainable entrepreneurship competence framework, the digital lifelong learning framework, etc....).
- Transformation into self-reflection tools

(e.g. <https://mydigiskills.eu/>), competence indicators (e.g. <https://digital-strategy.ec.europa.eu/en/policies/desi>).

4.2. Creative use versus normative use

Frameworks - as their name says - frame a combination of competences in a given set. Like staged photographic compositions, they are very selective of what is to focus on and leave everything else outside. Their distinctive features is that to integrate a series of competence in a cohesive bundle, but they are also repeatedly defined as non-prescriptive. Users are not expected to comply with the frameworks, but rather to use them flexibly, to unbundle them and to re-bundle them to achieve their own goals. Of course, such freedom leaves room for using the framework as shopping lists and does not grant any coherence in the way the different competence frameworks are turned into action. This risk is worth being run when the goal is to inspire policy makers, education and training institutions, educators, employers and learners

to create meaningful lifelong learning experiences and not to benchmark education provision or to create the ideal setting for comparative research. It is not by chance that through Erasmus+ the European Commission has funded more than 103 project that refer to DigComp or 121 project referring to EntreComp 9 (<https://erasmus-plus.ec.europa.eu/projects>) or that at present there are two Horizon 2020 projects worth a total of 10 million euros that aim at defining education pathway for a low carbon economy and green future (<https://www.green-scent.eu/> and <https://www.ecf4clim.net>). The funds allow different groups of researchers and practitioners to use the frameworks to advance in competence-based education in different ways. Similarly, the Commission has published various collections of examples of use of the frameworks (Kluzer et al., 2020; Kluzer & Pujol Priego, 2018; McCallum et al., 2018; McCallum et al., 2020) to give visibility to the diverse use and adaptation possibilities, encouraging different actors to use the frameworks to engage

interest and inspire action, to create value means through local adaptations, to implement project and initiatives, to understand the starting point or demonstrate progress made or to recognise skills.

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This variety of uses shall not be seen direct applications of the framework, rather as derivative work based on the frameworks.

The Commission has also produced guiding material to help different type of users take up the frameworks (Bacigalupo, Weikert García, Mansoori & O’Keeffe, 2020; Centeno, 2020) and it is working on developing a set of guidelines and teaching strategies to support educational practitioners in promoting life skills as a follow-up action to LifeComp (Sala, Forthcoming). In addition, in 2022, a series of three online courses on “Teaching Life Competences” will be launched in collaboration with the School Education Gateway.

5. DISCUSSION AND CONCLUSIONS

When facing the operationalisation of competence frameworks into educational practice, a few considerations shall be made. Let us focus on an imaginary digital entrepreneurship programme design. Whereas competence frameworks provide robust reference material to design learning pathways that allow learners to develop the desired array of competences, programme managers still have a number of decisions to make. These involve defining:

- How the learning experience they are setting up will combine the competences they want learners to develop
- What the specific learning outcomes are that each course or module will actually allow to reach proficiency in the given competences
- How the different competences will be integrated into the learning experiences, (e.g.

which competences will be developed in the classroom and which during an internship and what actions will be taken to ensure that they two set of competences will be integrated).

- What pedagogies will best support the development of the desired set of competences in parallel to the domain specific knowledge, skills and attitudes
- What assessment methods will best suits the learning experience and the appraisal of the different competences along the learning journey.

Competence frameworks do not tell how these decisions shall be made, leaving users a broad space for customisation. Customisations however do not happen in the void and the success of the interventions will be largely affected by contextual elements, such as institutional buy-in, the willingness of educators to engage in competence-based education, the availability of peer networks and community of practice where professional learning can happen.

To close where we started, competences frameworks shall not be seen as a destination to reach, nor as a means of transport, but as an orienteering tool on the lifelong learning journey, where each learner will take an individual path.

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Research Officer at the Joint Research Centre, the science service of the European Commission. In this role, she coordinates research in the area of key competences, encompassing digital, entrepreneurial, personal, social, learning to learn and sustainability competences. She works with stakeholders at all levels, sharing information and best practice across diverse fora and platforms. Lead author of the European Entrepreneurship Competence Framework (EntreComp) In collaboration with international researchers, she has compiled examples of use of the EntreComp in *EntreComp into Action* (2018) and *EntreComp at work* (2020). She has looked into its usefulness for informal learning sector through the *Entrepreneurial Employee in the Public and Private Sector* (2020). She has also co-authored the *EntreComp Playbook* (2020), to support educators embed entrepreneurial learning practices in their

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