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**CIRCULAR ECONOMY COMPETENCES.
MAKING THE CASE FOR LIFELONG LEARNING**



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PEDAGOGICAL MODEL TO INCLUDE CIRCULAR ECONOMY COMPETENCES IN ADULT EDUCATION

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Glossary

Adult Education:

The term 'adult education' denotes the entire body of organized educational processes, whatever the content, level and method, whether formal or otherwise, whether they prolong or replace initial education in schools, colleges and universities as well as in apprenticeship, whereby persons regarded as adult by the society to which they belong develop their abilities, enrich their knowledge, improve their technical or professional qualifications or turn them in a new direction and bring about changes in their attitudes or behavior in the twofold perspective of full personal development and participation in balanced and independent social, economic and cultural development; adult education, however, must not be considered as an entity in itself, it is a subdivision, and an integral part of, a global scheme for life-long education and learning

(UNESCO).

Non formal education:

Learning which is embedded in planned activities not explicitly designated as learning (in terms of learning objectives, learning time or learning support), but which contain an important learning element. Non-formal learning is intentional from the learner's point of view. It typically does not lead to certification (Cedefop, 2003)

Circular Economy job:

A circular economy job is an employment activity which supports the productive and safe movement of materials through continuous cycles driven by renewable energy so everything becomes a resource for something else. Waste is not part of this definition (European Commission).

Circular Economy:

A circular economy is restorative and regenerative by design, and aims to keep products, components, and materials at their highest utility and value at all times.

In a circular economy the value of products and materials is maintained for as long as possible.

Waste and resource use are minimized, and when a product reaches the end of its life, it is used again to create further value.

Circular economy aims to reduce, reuse and recycle of existing materials

From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery, and soils.

Our Common Future, From One Earth to One World – Brundtland Report (UN – 1987)

Preface

The circular economy concept is a response to the aspiration for sustainable growth in the context of the growing pressure of production and consumption on the world's resources and environment. The greening of the European economy, as outlined in the EU 2020 strategy, will have profound effects on the labour market and the development of the skills of the European population.

Making the transition to a circular economy requires a pressing need for new skills, competences and approaches. Education, initial and continuous vocational training and non vocational adult learning (or “lifelong learning”) have a critical role to play in delivering and updating relevant skills. The ‘greening’ dimension therefore needs to be integrated into each activity at national, regional and local levels: anticipation of competencies and qualification needs; recognition and validation of competencies and qualifications; information, support and guidance; and mobilising resources for lifelong learning.

As pointed out by the “Transforming Jobs and Skills for a Resource Efficient, Inclusive and Circular Economy: Recommendations and Summary of the Event” (2014): Green awareness needs to be built into the education system from an early age. The best approach may be to educate a versatile, ready-to-learn person rather than focusing on specific skills.

Furthermore, topping up and improving existing skills is at least as important as acquiring completely new skills. Complementing general skills with green skills can make a big difference.

Making the case for lifelong learning: Further support for lifelong learning initiatives could also be generated by creating a better evidence base on the positive impacts of lifelong learning activities to develop the skills needed in greening economies on long-term competitiveness and performance of enterprises and organisations.

Adult learning staff plays a key role in making lifelong learning a reality. Adult learning professionals help learners to develop knowledge, skills and attitudes throughout their lives. Indeed, the professional development of people working in education and training is one of the vital measures to improve quality of learning at all levels. And in here is where training on circular economy and developing green skills acquire a special relevance. Including these competences and skills in adult education enhances the active and more responsible citizenship and its compromise with a more sustainable community compromised with existing and future social, economic and environmental challenges. The role of adult trainers in providing transversally these competences in their training will enhance not only the training process, but a sustainable impact on the adults, able to deal in an effective way with these threats and contribute to the creation of a green socioeconomic environment.

1. Brief introduction to circular economy. What we are talking about when we refer circular economy.

Before starting to address the skills for the circular economy, it is helpful to introduce some key aspects of the circular economy. It should be pointed out that this document is not strictly aimed to provide a study or compendium of the circular economy, but rather its objective is to propose the integration of this concept into adult education models.

That is why, first of all, we must understand this section as a brief approach to the circular economy as a concept and model, providing a starting point and a contextualization to the proposed the CYCLE model of competences on circular economy.

1.1. Transition to circular economy

Recent decades have seen unprecedented growth in the demand for resources. This has been boosted by the fast industrialisation of emerging economies and the persistence of high levels of material consumption in developed countries. As highlighted in the "The Macroeconomics of the Circular Economy Transition: A Critical Review of Modelling Approaches" working paper: *By 2050, the world population is expected to increase from about 7 billion to more than 9 billion, and the per capita income of the world's population to roughly triple (OECD, 2012). This will substantially increase demand for natural resources, especially if global production and consumption patterns converge with those of OECD countries. Robust projections of future global resource consumption are scarce (OECD, 2012; OECD, 2016a), however UNEP's International Resource Panel (UNEP, 2017) has projected that total resource use may more than double by 2050 if existing trends continue. Unless the efficiency with which resources are used is significantly improved, this is likely to lead to increasing input costs*

and, for some resources, a growing risk of supply shortages (e.g. Coulomb et al. 2015)¹.

Faced with this scenario, the circular economy has started to be incorporated into the economic policies of the states in recent years. The transition to a more circular economy that ensures that the value of products, materials and resources is maintained longer in the economy and that waste generation is drastically reduced represents the contribution of this model to the achievement of a sustainable economy.

In 2015 the **European Union** approved the **Action Plan for the circular economy**². The plan defines a set of very ambitious measures to be implemented in the European Union, but which requires a strong commitment from the member states in the development of regulations and policies at national, regional and local levels, and which include the collaboration of all public and private agents. The programme emphasises the advantage of the circular economy for Europe's competitiveness and sustainability, creating an economic system that is resilient and flexible to resource scarcity and supporting innovation and efficiency and radically changing the patterns of production and consumption of the last two centuries.

On the other hand, the impact of the introduction of circular economy models will contribute to reinforce other priority objectives for the EU. Action on the circular economy therefore ties in closely with key EU priorities, including jobs and growth, the investment agenda, climate and energy, the social agenda and industrial innovation, and with global efforts on sustainable development³.

¹ MCCARTHY, A.; DELLINK, R. and BIBAS, R. (2018), "The Macroeconomics of the Circular Economy Transition: A Critical Review of Modelling Approaches", OECD Environment Working Papers, No. 130, OECD Publishing, Paris.

² COM(2015)614 final- Closing the loop – An EU action plan for the Circular Economy.

³ COM(2015)614 final

Also in 2015, the United Nations presented Agenda 2030⁴ for sustainable development, which proposes a set of 17 goals and 169 targets for sustainable development. Within this program, the circular economy appears as one of the key elements to advance towards the sustainability of the planet and contribute to the objectives of the agenda, as they are:

Goal 3. Good health and well-being: Ensuring healthy lives and promoting the well-being for all at all ages is essential to sustainable development

Goal 7. Affordable and clean energy: Energy is central to nearly every major challenge and opportunity.

Goal 8. Decent work and economic growth: Sustainable economic growth will require societies to create the conditions that allow people to have quality jobs.

Goal 9. Industry, innovation and infrastructure: Investments in infrastructure are crucial to achieving sustainable development.

Goal 12. Responsible production and consumption: Responsible Production and Consumption

Goal 13. Climate actions: Climate change is a global challenge that affects everyone, everywhere.

Goal 14. Life below water: Conserve and sustainably use the oceans, seas and marine resources

All these actions are aimed at generating small changes that can nevertheless make a decisive contribution to achieving current global challenges, such as sustainable development and the mitigation of climate change. Strategies for sustainable development have great potential to

⁴ Transforming our world: the 2030 Agenda for sustainable development. (A/70(L.1)

http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

generate wealth, strengthening production and consumption. And this is where circular economy models play a key role.

1.2. Defining circular economy

The circular economy is a key issue that has a direct relationship in sustainable development and that basically aims to make the value of products, materials and resources and minimize the generation of waste. Compared to linear models, the circular economy has as its main principle "closing the life cycle" of products, services, waste, materials and natural resources.

The term circular economy began to be introduced into models for sustainability in the 1980s. According to Wautelet, *the concept of a circular economy cannot be traced back to one single date or author, rather to different schools of thought. Many scholars considered that the circular economic system was primarily introduced by the environmental economists Pearce and Turner, who built their theoretical framework on previous studies of the ecological economist Kenneth Boulding (Andersen (2007, p.133), Ghisellini et al. (2016, p. 15), Greyson (2007, pp. 1383–1384), Heshmati (2015, p. 2), Murray et al. (2017, pp. 372–373), Su et al. (2013, p. 216))*⁵. Several authors agree in attributing to the economists Pearce and Turner⁶ the creation of the concept of circular economy, a theory that has been developed more in detail in the following decades

⁵ THIBAUT, W. (2018). The Concept of Circular Economy: its Origins and its Evolution. 10.13140/RG.2.2.17021.87523.

⁶ According to different literature consulted, Pearce and Turner introduce for the first time the concept of circular economy in their publication: PEARCE, D. W. and TURNER, R. K. (1990) Economics of natural resources and the environment, New York, London, Harvester Wheatsheaf. In the second chapter they describe a circular economy model based on the idea that there is a significant interdependence between the economy and the environment.

always on the basis that the close relationship between economy and environment and as a response to a more sustainable growth.

Today we can find different statements on the concept of circular economy. OECD defines the concept of transition to the circular economy as *any process that might lead to lower rates of natural resource extraction and use*⁷.

European Union defines circular economy as *an economy 'where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimise*⁸.

For some years now, the United Nations has been working in collaboration with the Ellen Macarthur Foundation in the field of the circular economy. As a result of this collaboration, various reports and publications have been produced for the creation of knowledge in the area of the circular economy which support the strategy of the United Nations in this field. The foundation has contributed to the construction of the circular economy concept and defines it *one that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles*⁹.

In the publication *Circular Economy. Collaborate and Circulate* (KRAAIJENHAGEN, C. et al. 2016) circular economy is defined as *an economy in which stakeholders collaborate in order to maximise the value of products and materials, and as such contribute to minimising the depletion*

⁷ MCCARTHY, A.; DELLINK, R. and BIBAS, R. (2018).

⁸ COM(2015)614 fina

⁹ TOWARDS A CIRCULAR ECONOMY: BUSINESS RATIONALE FOR ACCELERATE TRANSITION. 2015. ELLEN MACATHUR FOUNDATION.

*of natural resources and create positive societal and environmental impact.*¹⁰

As we commented at the beginning of this section, we could dedicate more space listing different definitions on the concept of circular economy¹¹. But, we think that the above definitions give us the proper starting point to adapt and conceptualize the term circular economy in the CYCLE project.

To conclude, we would like to provide the following definition of Circular Economy, which is not intended to replace any of the existing concepts but to adapt the concept to the goals of the CYCLE project.

A circular economy is restorative and regenerative by design, and aims to keep products, components, and materials at their highest utility and value at all times. In a circular economy the value of products and materials is maintained for as long as possible. Waste and resource use are minimized, and when a product reaches the end of its life, it is used again to create further value. Circular economy aims to reduce, reuse and recycle of existing materials.

CYCLE Partnership - 2018

¹⁰ KRAAIJENHAGEN, C.; VAN OPPEN, C. and BOCKEN, N. (2016): Circular business. Collaborate and circulate.

¹¹ We would like to draw the reader's attention to the following publication, which briefly analyzes 114 definitions of the concept of circular economy. KIRCHHERR, J; REIKE, D; and HEKKERT, M. (2017): *Conceptualizing the circular economy: An analysis of 114 definitions* in Resources, Conservation & Recycling, 127 (2017) 221-232. Available online 15 September 2017. <https://doi.org/10.1016/j.resconrec.2017.09.005>

1.3. Circular economy principles

We have incorporated this topic because we thought it would be interesting to expose the perspective that some authors have on the principles and/or elements that consolidate the circular economy. But as in the case of the definition of the concept, we observe different approaches.

We can find a first approach, developed from the point of industry's point of view, which, converted into a standard of action, establishes five basic principles for the transition to circular economy models¹²:

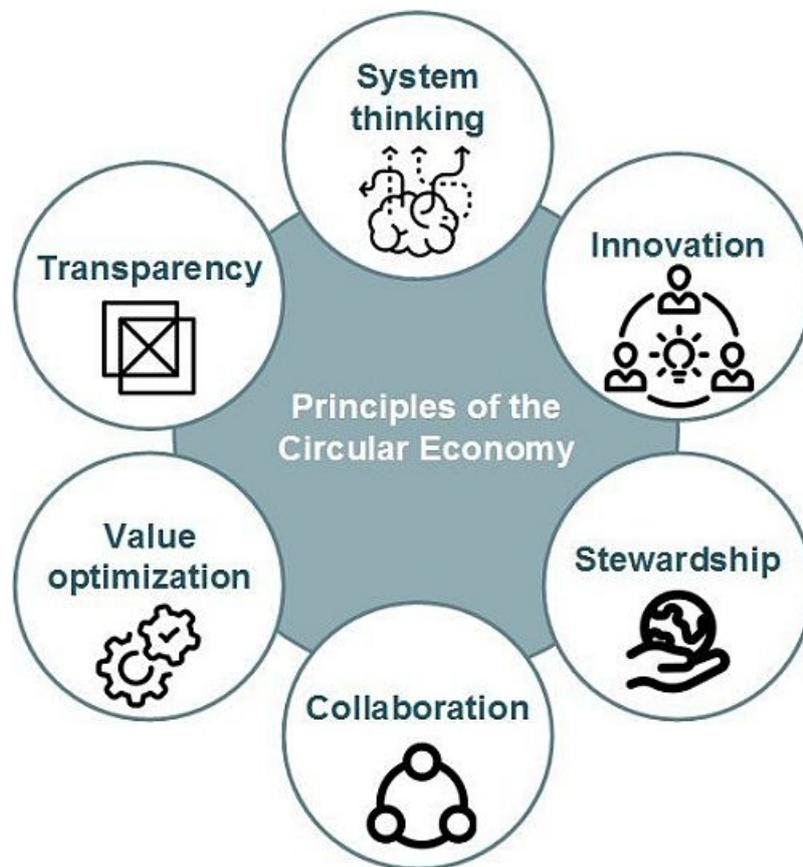


Figure 1: BS800 standard Source: <https://www.sirris.be/blog/which-principles-circular-economy-deliver-value>

¹² The annotations and explanations of each of the principles have been taken from the following web page <https://www.sirris.be/blog/which-principles-circular-economy-deliver-value>

- 1. Systems thinking:** Understanding the system-wide impacts of your activity- *Organisations adopt a holistic approach to understand how individual decisions and activities interact within the wider system they are part of.*
- 2. Innovation:** Rethinking resource management as a lens for value creation. *Organisations continually innovate to create value by enabling the sustainable management of resources through the design of processes, products/services and business models.*
- 3. Stewardship:** Taking responsibility for the ripple-effect impacts resulting from your decisions and activities. *Organisations manage the direct and indirect impact of their decisions and activities within the wider system they are part of.*
- 4. Collaboration:** Securing systemwide benefits by cooperating with others. *Organisations collaborate internally and externally through formal and/or informal arrangements to create mutual value.*
- 5. Value optimization:** Keeping materials at their highest value and function. *Organisations maintain all products, components and materials at their highest value and utility at all times.*
- 6. Transparency:** Being open and honest about circular barriers and benefits. *Organisations are open about decisions and activities that affect their capacity for transition towards a more circular and sustainable mode of operation and are willing to communicate these in a clear, accurate, timely, honest and complete manner.*

The Ellen Macarthur Foundation proposes an approach based on three principles:

Principle 1. Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows

Principle 2. Optimize resources yields by circulating products, components and materials in use at the highest utility at all time in both technical and biological cycles.

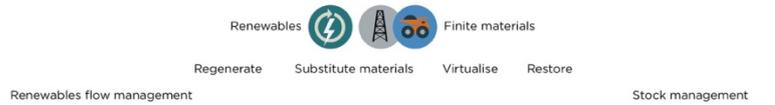
Principle 3. Foster system effectiveness by revealing and designing out negative externalities.

OUTLINE OF A CIRCULAR ECONOMY

PRINCIPLE

1

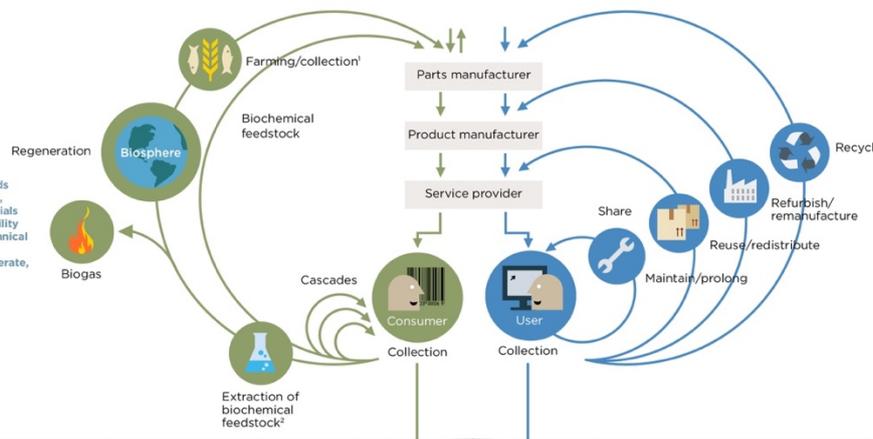
Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows
ReSOLVE levers: regenerate, virtualise, exchange



PRINCIPLE

2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles
ReSOLVE levers: regenerate, share, optimise, loop



PRINCIPLE

3

Foster system effectiveness by revealing and designing out negative externalities
All ReSOLVE levers



1. Hunting and fishing
2. Can take both post-harvest and post-consumer waste as an input
Source: Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment. Drawing from Braungart & McDonough, Cradle to Cradle (C2C).

Figure 2. Outline of a circular economy- infographic. Source: Ellen Macarthur Foundation <https://www.ellenmacarthurfoundation.org/circular-economy/infographic>

These three principles can be translated into six concrete actions to promote circular economy processes in organizations. These six actions form the ReSOLVE framework, which offers businesses and countries a tool for generating circular strategies and growth initiatives. Many global leaders have built their success on innovation in just one of these areas. Most industries already have profitable opportunities in each area¹³.

¹³ ELLEN MACARTHUR FOUNDATION (2016): Delivering circular economy. A toolkit for policy makers.

The following figure introduces the ReSOLVE framework and explain each of the six actions proposed to improve and support the transition to the circular economy.

REGENERATE	Shift to renewable energy and materials; reclaim, retain, and regenerate health of ecosystems and return recovered biological resources to the biosphere.
SHARE	Keep product loop speed low and maximise utilisation of products, by sharing them among different users (peer-to-peer sharing of privately owned products or public sharing of a pool of products), by reusing them through their entire technical lifetime (second hand), and by prolonging their lifetime through maintenance, repair, and design for durability.
OPTIMISE	Increase performance/efficiency of a product; remove waste in production and supply chain (from sourcing and logistics, to production, use phase, end-of-use collection etc.); leverage big data, automation, remote sensing and steering.
LOOP	Keep components and materials in closed loops and prioritise inner loops. For finite materials, it means remanufacturing products or components and recycling materials.
VIRTUALISE	Dematerialise resource use by delivering utility virtually: directly, e.g. books or music; or indirectly, e.g. online shopping, autonomous vehicles, virtual offices
EXCHANGE	Replace old with advanced non-renewable materials, apply new technologies (e.g. 3D printing or electric engines) and choose new products/services (e.g. multimodal transport).

Figure 3. ReSOLVE framework. Source ELLEN MACARTHUR FOUNDATION (2015): *Delivering circular economy. A toolkit for policy makers*

1.4. Final remarks

In recent years we have seen an unprecedented increase in the consumption and use of natural resources. Despite the fact that since the 1970s there has been a constant call for a change in the habits of producers and consumers (often referred to as unfounded apocalyptic appeals) that translated over time into the development of policies for sustainability, the response had to wait almost three decades. By the end of the last century, the first institutionalised steps were taken to respond to the situation.

However, despite different efforts, it seems that the consumption and use of raw materials and resources remains unsustainable. It is for this reason that there is an indisputable call to work for the transition to the circular economy, not from the academic community, but from organizations (both public and private).

If we analyse different sources, we find different definitions of the concept of circular economy. Despite the diversity of definitions, we find that the concept of circular economy develops around several ideas or concepts, such as minimizing (maintaining the value and usefulness of raw materials and resources over time and giving them their highest levels of consumption) and the 3R (reduces, reuse, recycle) approach.

To this end, different approaches have been developed on how the concept of circular economy should be developed through different principles and proposals for action. All focusing on more technical, professional and environmental aspects, little emphasis has been placed on the cross-cutting nature of the transition to the circular economy. Creating behavioural patterns for all citizens is also a key element in supporting the implementation of this process towards more sustainable growth. And this is where adult education will play an important role, both in defining more transversal competences for the circular economy that can be incorporated into existing training processes and in the development of training tools that facilitate this process.

2. State of the art of the competences for circular economy in some European countries

After a brief introduction to the concept of the circular economy, we will look in detail at the situation of competences for the circular economy in the countries participating in the project: Austria, Belgium, Spain, Italy, Poland and the United Kingdom.

The aim of this brief analysis is to understand the environment in which adult education models are developed and more in detail how the skills for the circular economy have been introduced (if at all) into their training models.

2.1. National frameworks for adult education

Although the European Commission has been working to promote common instruments for the full development of education and training policy, it must be kept in mind that each State organises different levels of training according to its educational needs and culture. The following paragraphs give a brief description of different aspects of the adult education programmes in the CYCLE project participant countries.

2.1.1. Adult education and education system

According to CEDEFOP *Adult learning covers the entire spectrum of what we learn after leaving initial education and training. This includes work- and career-oriented learning, obtaining new qualifications, up-skilling or re-skilling for employment, but also learning for personal development and active citizenship*¹⁴.

¹⁴ CEDEFOP (2011) Adult learning project

Based on this definition, we identify different approaches to determining the nature of adult education in each member state analysed.

In **Austria** Adult education or adult learning is in Austria often understood synonymous with CET and is designated to comprehensive learning by adults in educational establishments or their working environment. It's regulated by the Adult education Promotion Act (1973). Adult learning is decentralised, so the regions have the competences for regulates and implement this type of education.

In **Belgium**, the competence on education policies has been transferred from the federal state to the Regional Communities. Since 1989 the Flemish, French and German speaking Communities have their own education systems. We can highlight two main regional regulations that help to understand the concept of adult education. In the Wallonia-Bruxelles Federation, social promotion education, organised by the decree of 16 April 1991, is aimed to contribute to individual development by promoting better professional, social, educational and cultural integration (personal development); and to meet the training needs and demands of businesses, administrations, education and, in general, socio-economic and cultural circles (needs of society). In the other hand, the Flemish Decree of July 1990 established the Centres for Adult Basic Education aimed at providing adult learners with a broad and varied range of basic education services through different programmes delivered in a balanced and interrelated way.

Italy has a general regulation (not in detail) about adult learning. Thus, adult education means: Lifelong learning, opportunities to get a diploma/qualification for adult people who dropped out from school vocational training, professional development and update courses, and Non-formal education.

Adult education in **Poland** is defined as the education of adults, i.e. those who have already completed their compulsory education. Adult education is not only about gaining knowledge, but also about gaining additional

qualifications and skills (e.g. professional). The Ministry of Science and Higher Education, the Ministry of National Education and the Ministry of Family, Labour and Social Policy are responsible for the development of the lifelong learning policy in Poland. Educational reform in Poland, which has been being implemented since the beginning of 2017, has its consequences in adult education as well. Adult education is open to adults who wish to complete school education on primary and secondary level or acquire new vocational qualifications and skills for professional or personal reasons.

The denominated Education Acts¹⁵ regulates the adult education system in **Spain**. Even the regional governments have the jurisdiction to implement the activities in the field of adult education, the general regulations established the main characteristics of the adult education and some common features. According to the basic national legislation on adult education, we understand adult education as that area of education that aims to provide training to people over eighteen years of age to acquire, update, complete and expand their knowledge and skills for their personal and professional development. In keeping with the spirit of the law, adult education encompassed traditional literacy processes to training for employment or leisure activities.

Finally, in **United Kingdom** adult education is in the process of being restructured in England as government budgets become devolved into regional areas.

2.1.2. Organisation of adult education

The second issue to take into consideration is how adult education systems are organised. As in the previous case, the organisation of adult education programme is heterogenous.

¹⁵ Education Acts is referred to the three main regulations that rules the education system in Spain: LOGSE – Act 1/1990; LOCE – Act 10/2002 and LOE – Act 2/2006.

In **Austria**, adult education landscape in Austria is very heterogeneous and complex and is characterised by pluralism of providers. Training is organised according two different types of programmes:

- CVET programmes aiming to deepen and extend vocational competences and skills and/or to obtain qualifications
- General adult education aiming to expand knowledge and enhancing awareness, without primarily professional reasons

Adult education in **Belgium** is crossed by three types of borders that sometimes intersect, sometimes overlap:

- a) Two worlds, that of education and that of training
- b) Three centres of political decision-making (Wallonia, Ccof and the FWB) with power relations between them and often different majorities
- c) Five main categories of operators:
 - **Alphabetization:** In Belgium, refresher courses for literacy skills and alphabetization are organized by various associations. They can issue certificates of training follow-up, provide assistance in preparing exams for the CEB (Basic study certificate allowing access to secondary studies).
 - **Promotion sociale:** Social promotion education is aimed at young people and adults who feel the need to acquire new qualifications or to update their skills, but also to obtain a qualification that they did not attain during their schooling, especially if they left the school system early.
 - **Distance learning:**
 - In the French Community Distance learning is offered by the [Enseignement à distance de la Communauté française](#) service. The courses prepare children or adults for examinations and equivalent certificates at primary or secondary school level. Students who are not aiming for such

a certificate can also follow distance learning. Registration can be done all year round.

- In the Flemish Community [VDAB](#), [CVO](#) (Centra voor Volwassenenonderwijs/Centres pour l'enseignement pour adultes), [Syntra Vlaanderen \(link is external\)](#) and [Socius \(link is external\)](#) organize distance learning courses for adults. On [Toll-net \(link is external\)](#) (nl), which is a network of teachers, ICT coordinators, directors and coaches in continuing education, members can share their experiences and knowledge in e-learning and combined learning.

- **Continuing education for workers:**

- The EFP (Espace Formation PME) in Brussels and the IFAPME (Institut wallon de formation en alternance et des indépendants et petites et moyennes entreprises) in Wallonia offer entrepreneurial training and continuing education for workers and managers.
- Chèques-formation (financial support for unemployed adults) are available in the Brussels region, the Walloon region and the Flemish region. Specialized training agencies deliver courses on languages, ITC and entrepreneurship.

Universities and colleges also organise short training courses for further training and retraining as part of their continuing education programmes. For more information on continuing education in higher education, you can contact the university or university of your choice.

Italy started to regulate adult education by the end of the '90s. In 1997, following the 5th International Conference on Adult Education in Hamburg, which stressed the right to education and lifelong learning for adults ("Adult education must be seen as a productive investment" - 5th

International Conference on Adult Education, final report¹⁶⁾ Italy adopted a provision (“Ministerial Decree” O.M. 455, 1997¹⁷⁾ establishing local competences in adult education.

The above-mentioned law established the creation of Permanent Territorial Centres for Adult Education (CTP), in charge of providing vocational and non-vocational training for adult learners.

This territorial, local, dimension of adult education has been confirmed in 2012 by a reform that replaced the Permanent Territorial Centres with CIPIA - Provincial Centres for Adult Education and Training. CPIAs, established by the Ministry of Education, are in charge of creating new educational and organizational structures and patterns to respond to an increasingly diversified and complex demand for adult education and training. PTC are currently still in place as well.

The relevance of local associations and third sector organizations in delivering adult education is stressed by both the legal framework and its actual implementation. The cooperation of Secondary School Institutions, Universities, vocational training institutions, and associations is essential to cover all the areas relevant for AE, raise awareness on the issue and deliver a good and integrated services.

Adult education can also be delivered by “Università della Terza Età (UTE)”, usually addressing retired persons. UTEs spring from a collaboration between local universities, municipalities, and other cultural institutions. They employ retired professors or professionals willing to dedicate their time to this lifelong learning activity.

¹⁶ For the full report please visit: <http://uil.unesco.org/adult-education/confintea/5th-international-conference-adult-education-hamburg-germany-1997-final>

¹⁷ “Ministerial Decree” O.M. 455, 1977 available at <https://archivio.pubblica.istruzione.it/argomenti/ifts/eda/om455.shtml>

In **Poland**, adult education is is organised, in school- and non-school settings, by:

- continuing education institutions,
 - practical training institutions,
 - in-service training centres,
 - HEIs as non-degree postgraduate programmes.
- Training is offered also to the unemployed and to certain categories of people searching for a job.

Adult education in **Spain** is organised on the basis of three interventions:

1. Adult education in the field of Educational Administration incorporates different activities related to training: a curricular option that allows all adults to receive training at all levels and programmes of the educational system; a far-reaching extracurricular option that includes a heterogeneous series of training programmes; and finally, a series of specific or extraordinary examinations that allows adults to obtain academic and professional qualifications, so that they can access certain training programmes.

2. Vocational training aimed at the unemployed in the field of labour administration. This intervention is articulated in a series of training actions aimed at providing the unemployed with the qualifications required by the productive system, with the aim of reintegrating them into the working population.

3. Continuous training aimed at employed workers: continuous training plans for employed persons have a common reference framework with initial training programmes and occupational vocational training programmes.

United Kingdom. In its official statistics Ofsted (June 2016) identifies 238 community and skills providers whose core aim is generally to provide adult education, including in some cases work-based learning for young

people and adults. These are mostly local authority providers, not-for-profit providers with charitable status and specialist dedicated institutions (SDIs) that receive funds directly from the Education and Skills Funding Agency. These providers typically provide courses at designated learning centres and they also use a wide variety of community-based venues such as schools, community halls, libraries and children's or health centres; many of these are based in areas of deprivation. Local authority provision often takes place on many hundreds of different locations and the Workers Education Association runs hundreds of courses in different sites across the country. Some of these providers, especially the local authorities, subcontract some of their provision to small organisations that have expertise in supporting specific client groups, such as adults with mental health or drug or alcohol issues or those with specific learning difficulties or disabilities. A few local authorities subcontract a significant proportion of its adult education budget to the local general further education (FE) colleges and many FE colleges also have a direct contract with the Skills Funding Agency to deliver adult education. They also use community venues as well as their main college sites.

2.1.3. Groups

The participation rate of citizens aged 24 to 65 in training activities decreased from 7.4% in 2011 to 6.9% in 2015, in **Belgium**. In the last two years, however, participation has increased to 8.5%, remaining well below the EU average of 10.7%. Currently, the participation of women (8.8%) is slightly higher than that of men (8.1%).

A distinction can be made between three large groups of participants:

- learners who wish to obtain an additional basic qualification
- learners who want in-service training or wish to specialize
- learners who are interested in their personal development or social emancipation

Apparently, participation in adult education activities is higher among people who have already completed tertiary level education (13.7%).

Adults who have completed secondary education have a lower participation rate (6%), while the lowest participation rate is among adults who have completed ISCED 0-2 qualifications (3.2%).

The most popular fields of study for adult education and training in Italy are social sciences, business and services.¹⁸

A distinction can be made between different groups of participants:

- Participants willing to get basic skills and knowledge (literacy)
- Participants willing to get secondary education + official qualification (high school diploma)
- Participants willing to learn a profession (vocational training)
- Participants willing to improve their skills for personal development and knowledge
- Foreign citizens willing to learn Italian

All Italian and/or foreign citizens over 16 years of age can enroll in courses offered by Provincial Centres and Permanent Territorial Centres.

Adults show little interest in developing their skills or acquiring new qualifications. **Poland** faces a significant long-term challenge, which consists in creating an appropriate way of lifelong learning, especially among the elderly and the low-skilled. In 2016, the participation rate of adults in learning, which was 3.7%, was 0.2 percentage points higher than in the previous year, but still well below the EU average of 10.8%. The latest OECD Adult Skills Survey (PIAAC) shows that 15% of adult Poles have poor literacy and numeracy skills and that the IT skills of Poles of all ages are below the OECD average¹⁶ (OECD, 2016c). In 2016, an integrated qualifications system and a register of qualifications were launched. ESF projects are also being prepared to finance activities to develop and disseminate ICT-enabled tooling and methods. For these actions to be effective, there is a need to develop a coherent adult learning policy, set

¹⁸ EUROSTAT (2015), Adult Learning Statistics – characteristics of education and training, EUROSTAT. Data available at <https://goo.gl/5hFjJX>

clear objectives at national level and mobilise stakeholders. Therefore, there are some expectations for a future skills strategy.

In **Spain** this training option is aimed at any person over the age of 18 who wishes to carry out some of the training activities included in adult education programmes. In the case of actions for the unemployed, it is a requirement to be unemployed and actively seeking employment; and in the case of training actions aimed at improving their professional skills (continuous training) participants in these training activities in addition to being active and the training to be carried out must be related to their field of occupation (sectoral).

In 2017, in Spain 9.9% of the population aged 25 to 65 participated in some adult training activity, with the participation of women being higher than that of men by more than one point, 10.6% and 9.2% respectively. The highest percentages of participation occurred in País Vasco (13.2%), Melilla (12.2%) and Aragón (12.1%). The lowest percentages occurred in Catalonia (7.7%), Illes Balears (8.6%) and Andalucía (8.6%). In all Autonomous Communities, except Región de Murcia, the participation of women was greater than that of men, reaching the difference of 3 percentage points in Comunidad Foral de Navarra, País Vasco, Aragón and the Autonomous City of Melilla. In general, women participate more in training activities than men, especially women over the age of 45 with E. Superior, although the greater differences in age with men are in the younger ages due to the higher level of training of young women than that of men and to the greater participation in training of the higher educational levels.

In **United Kingdom**, Adult education providers recognise diversity and inclusivity and are therefore particularly skilled at engaging with a wide variety of people and groups within local communities and involving them in making decisions about the relevance and quality of adult education policies and practices. Their goals are to improve the experience for individuals, contribute to social justice, develop effective and efficient

services and strengthen accountability. Efforts are often concentrated on intensive work with vulnerable groups such as adults with mental health or drug or alcohol issues or those with specific learning difficulties or disabilities. Black, Asian, Minority Ethnic and Refugee (BAMER) and English for Speakers of Other Languages (ESOL) students, those on benefits and those with lower-level qualifications, tend to benefit the most from adult learning courses (WEA, 2017). Students may be employed, self-employed, unemployed or underemployed. Identifying ways to track and support adults as they progress in and out of differing modes of learning is a contemporary challenge that needs to be addressed. Unionlearn delivers courses for trade union members.

2.1.4. Programmes covered

Adult education in **Austria** covers two types of programmes:

- CVET programmes aiming to deepen and extend vocational competences and skills and/or to obtain qualifications; and
- General adult education aiming to expand knowledge and enhancing awareness, without primarily professional reasons.

In **Belgium** we can find different programmes as:

- Single learning units could cover every topic or program.
- Social promotion education, in particular, offer a very diverse range of courses.

Italy provides the following types of programmes:

- **Permanent Territorial Centers (CTP)**. CTPs are mainly focused on primary and secondary education. They offer courses to obtain the school diploma, primary literacy and Italian language courses (to get a certification), language courses (English, French, Spanish, Arabic, etc ...), IT courses (Office package, Internet, e-mail).
- **Provincial Centres for Adult Education**. The CPIA training offer includes: first level education (basic knowledge and skills);

secondary school education (professional institutes and school of art); Italian language (above A2 level). They also offer vocational training in fields such as catering and tourism, plumbing, mechanical, industry and crafts...

- **“Università della Terza Età”**. Each organization is autonomous in deciding its own educational programmes. UTEs usually offer a wide range of courses and programmes covering: philosophy, archeology, photography sports, foreign languages, history, psychology, music and performing arts, computer skills...
- **“Università Popolari”**. The educational offer is characterized by intensive customized workshops or courses, often shaped around professional objectives. Subject covered: music therapy education, entrepreneurial skills, creative writing, cutting and sewing, foreign languages, history of religions, graphology, history and geography, basic computer training, yoga etc...
- Many other associations and accredited centres offer a wide variety of courses on subjects of cultural and scientific interest.

In **Poland**, main programmes are provided at regional level. For instance: No. RPLD.07.04.04-IZ.00-10-001/17 for the co-financing of projects under the Priority Axis VII Infrastructure for Social Services, Measures VII.4 Education, Sub-measures VII.4.4 Vocational and lifelong training - the city of Łódź within the Regional Operational Programme of the Łódź Province for the years 2014-2020.

Depending on the type of adult education we find different ways of providing adult education **in Spain**.

People who participate in training actions aimed at general education - training aimed at personal development. Its most defining characteristics are the flexibility, the integrative character that is intended to give to the different offers regarding the improvement of the quality of life and personal development of attendees, and the more group conception of educational activity. These courses are organized by public or private

certified training providers, local administration and its organizations, associations and certified NGOs and Universities through their "senior classrooms".

Classroom-Workshop. The objective of the Classroom-Workshop is the learning of an occupation and the subsequent professional insertion of the adults who are trained in them. They are defined as technical-professional teachings in Classroom-Workshops. Their offer depends on the demands for professional qualifications existing in the territorial areas in which the centres are located, and to a large extent on the relations that the centres establish with other entities in the area, such as town councils, business organisations, etc. Vocational Training for the unemployed and employed

Experimental programme of training, guidance and telematic support for professional certifications. The programme consists of a computer application, configured as a "Virtual Classroom" training environment on the Internet, which allows the use of distance training, information and communication resources between participating users who are usually unemployed workers.

United Kingdom. Adult and community learning provides a wide range of educational opportunities for adults of all ages, which impacts not only on the lives of individuals but also their families and communities. The largest adult education provider (WEA) offers English, Maths and Digital; Arts & Crafts; Community and Family Learning; Health and Lifestyle; Languages and Writing; Natural and Social Sciences; Performing Arts; and Work-Related. Community learning is part-time learning which is often non-accredited and in a wide range of subjects, from English for Speakers of Other Languages (ESOL), English and maths to personal development through to languages, history and practical art. Courses support public policy objectives from increasing social cohesion and mobility to improving productivity, tackling mental and physical health issues and extending working lives.

2.1.5. Learning training methodologies

In **Belgium**, Training activities are generally carried out in dedicated structures through class activities. In certain cases, training activities may take place directly in the workplace. Distance learning activities play an important role and are also financially supported by the regional administrations.

In **Italy**, Lecturing and traditional teaching methods are preferred for basic training and the secondary school level courses. They are usually integrated with multimedia and interactive tools. The use of other methodologies, such as workshops, are more common in the “Università Popolari” and other accredited centres offering courses of on subjects of cultural and scientific interest.

Most adult education in **Spain** is through eLearning. In fact, digital empowerment is one of the most relevant training areas for adults. In fact, the regulations governing the adult education system emphasise that e-learning is the most appropriate methodology for this activity, due to its asynchronousness and its ability to reach remote areas and a large number of users at the same time. The Aula Mentor (promoted by the Spanish Ministry of Education) was at the time a pilot experience that turned out to be an important tool for the development of e-learning in adult education in Spain.

Some 5.9 million adults in the **United Kingdom** have never used the internet although between 75 per cent and 90 per cent of jobs require at least some computer use and offline households are missing out on estimated savings of £560 per year from shopping and paying bills online (RGS, 2015). There is growing demands from government to mobilise new technologies to provide more blended learning, which mixes distance learning with campus-based courses to meet the “any time, any place” agenda of modern life. Face-to-face and groupwork activities in the classroom are most common; however, there is growing interest in blended and online approaches such as: MOOCs and online communities of practice.

2.2. Circular economy competences in adult education

2.2.1. Belgium

It is important to mention that one of the themes of the programmes of social promotion centres are adult education courses to promote skills related to recycling and reuse.

For the introduction of circular economy into the education system, it is essential to analyse the PREC- Plan for the Circular Economy of the Brussels Region. One of the pillars of the PREC is based on innovation in the education and training system. The alliance between the Employment and Environment departments of the Brussels region has laid the first foundations for identifying the necessary training in certain sectoral areas, developing their training contents and organising them. The evaluation posed by the actors in this context made it possible to identify 5 areas of work necessary to fully introduce the logic of circular economy.

- Identify and anticipate the skills that circular economy development demands today and those that are expected to become fundamental in the near future, both at an organisational/managerial level and at an operational/technical level;
- Training of trainers and teachers;
- Training of company directors and managers in the new perspectives offered by the circular economy and the skills needed to
 - o anticipate and understand the new skills that the circular economy will need to ensure a smooth transition,
 - o develop new managerial skills
 - o correctly reallocate the new skills acquired by their employees within their company
- Training of middle managers and workers (via sectoral actions)

- Education and training of the younger generations to ensure that the younger generations they will be able to find their way around in the labour market linked to the circular economy

By 2025, the Brussels Region will have a complete and well-tried package of training modules and tools in circular economy constantly updated and fed by feedback from the field (notably in terms of new skills required by managers, new business models linked to the economy of functionality, etc.). These tools will integrate the notion of professional careers and training.

Main actions in the pipeline of the Regional Plan are:

1. The Employment, Training, Education and Economy Task Force will work on identifying the skills and training needed for the circular economy, both qualitatively and quantitatively.
2. Francophone employers' organization and MAD Brussels (the Brussels platform of expertise in the Fashion and Design sectors) will ensure the transmission of eco-design and eco-functionality tools to teachers in universities, secondary schools, as well as to trainers of public qualifying training operators in order to enable them to integrate them into their course curricula.
3. Development of e-learning modules on ecodesign, sustainable business models, environmental communication.
4. A database of existing initiatives on ecodesign will be developed, including contact points, trainers, designers, experimental sites for circularity in design, fashion, styling, and graphics
5. Inter-school and inter-university competitions will be set up to stimulate new ideas in circular economy in the design, fashion and styling sectors
6. The key players in training in the Brussels region will stimulate the provision of internships, company training and work-linked training activities in companies operating in circular economies.

7. The VET system will integrate the concepts of the Circular Economy in training courses for self-employed and entrepreneurs.
8. The regional agencies Impulse.brussels and Brussels Environment will ensure that the tools developed within the framework of support for businesses are made available to universities and lifelong learning stakeholders
9. The Region will finance a diagnostic study on the integration of the circular economy into university education and the vocational training system.

2.2.2. Italy

There are projects and activities aiming at raising awareness on circular economy in primary and secondary school institutions. These projects are mainly sponsored by the Regions, the Municipalities and local non-profit organizations. No framework or relevant activities for the development of Circular Economy competences in AE.

In 2017-2018, few seminars and workshops for professors and educators took place. Some teaching materials for high schools has been produced.

2.2.3. Poland

Circular economy competences in adult education have been recently promoted in Poland by various institutions within numerous initiatives and projects at national level.

Instytut Gospodarki o Obiegu Zamkniętym (The Circular Economy Institute) is a professional think tank prepared to address the problems arising with the implementation of Circular Economy (CE) principles in national economy, as well as to conduct talks and negotiations with decision-makers. The Institute is based on cooperation between the NGOs, activists, academics and practitioners, both from Poland and other European countries.

Lodzkie House, being regional authorities' offices in Brussels and Lodz conducts SCREEN "European Regions for Synergy in Circular Economy" project. According to its objectives, the SCREEN Project will contribute to: involvement of regional entities in joint undertakings aimed at the increase of synergy in the circular economy, establishment of trans-national co-operation for the development and maximization of investments by supporting enterprising initiatives.

Since May 2017 the Ministry of the Environment has been implemented the "Pilot priority programme of the Circular Economy", approved by the Board of the National Fund for Environmental Protection and Water Management. The purpose of the pilot study is to develop good practices in the field of circular economy among chosen municipalities and then introduce them all over Poland.

In 2016-2017 Association of Polish Cities participated in a project on 'Increasing the competence of Polish self-government units in the field of circular economy and the use of RES (renewable energy sources) with the use of information technologies, based on Norwegian experience.

2.2.4. Spain

Up to now we can find in Spain no specific action to introduce the competences of circular economy in training, when we speak of adult education, primary and secondary education or higher education. In recent years, some training actions have been carried out in this field, at a professional level, more with an informative character than with the aim of acquiring professional or personal competences and organised for the most part by private entities.

However, the Spanish strategy for the circular economy (draft February 2018) establishes among its objectives for 2030 training and employment within the transition to the circular economy as one of its strategic objectives.

2.2.5. United Kingdom

In the specific field of the Circular Economy, the Emma MacArthur Foundation has been working with education providers in the UK to inspire “learners to re-think the future through the circular economy framework.”

The Foundation has created global teaching, learning and training platforms built around the circular economy framework, encompassing both formal and informal education. With an emphasis on online learning, the Foundation claims they provide cutting edge insights and content to support circular economy education, and the systems thinking required to accelerate a transition.

The Foundation has worked with Higher Education organisations both to redevelop curricula and to develop courses on the circular economy. Some of these are short courses, others are MOOCs and are free for adults to participate.

There are also a considerable number of courses run by sector and trade organisations, mostly based on particular courses. Some of these are free, but other charge a fee for participation.

The Green Skills Partnership brings together unions, employers, local councils, environmental organisations, education providers, community groups and state agencies in the UK to deliver green skills training in construction, retrofit, horticulture and waste management.

The partnership has evolved from initial experimentation in East London to successful piloting in South London to a broad based partnership for the whole city that is now extending in to the regions. Its original inspiration was the US west coast 'Apollo Alliance' model, of which the IPPR and other organisations including the Trade Union Congress (TUC) were responsible for promoting awareness in the UK.

The partnership is co-ordinated by unionlearn (an organisation run by the TUC) and includes numerous London further education colleges (eg

Lewisham, CONEL, South Thames), employers (e.g. Bovis Lendlease, Lakehouse), voluntary sector (eg Groundwork), Job Centre Plus and trade unions (UCU, UCATT, UNITE). The partnership has developed collaborations between training providers, employers, trade unions, the voluntary sector and communities to deliver sustainability training and employment opportunities.

Unionlearn themselves provide two online courses for trade unionists about the circular economy.

Leading organisations from across the further and higher education sector have joined forces to create the Sustainability Exchange. Combining resources and experience from top sustainable development and education bodies, the Sustainability Exchange is the number one resource for sustainability in tertiary education, sharing a wealth of information that is available to everyone.

Delivered by the Environmental Association for Universities and Colleges (EAUC), the Sustainability Exchange provides sector professionals with up to date resources, insight, webinars, news, events and jobs connecting together sector professionals across the world, stimulating debate and the sharing of knowledge.

The Association has developed a knowledge bank of over 400 items, including approaches to integrating sustainability in the formal and informal curriculum.

3. Definition of circular economy competences – CYCLE MODEL

Competence frameworks are strategic instruments for further improving not only training environments but also the professional environment and employability. It is necessary to define an adapted and flexible framework of skills that responds to the cross-cutting nature of the economy, society and the environment.

The transition towards a circular economy model requires (as we have seen in the previous sections) not only the commitment towards the development of the technical skills that support the basic concepts that define the concept (keeping added value in products for as long as possible and reduce/eliminate wastes) but also the development of transversal skills that make persons/citizens more critical to the challenge of transition. Sustainable social capital is a key concept for new socio-economic models. It is necessary to empower citizens towards the models that promote both environmental sustainability (in a broader sense) and integrated models of circular economy.

Currently, some occupations have integrated the approach of circular economy. But it is crucial to go one step further and include skills from circular economy in general adult education. And due the wide nature of the adult education systems in the different countries, we should focus our interest in these transversal competences that could easily integrated in all the models.

CYCLE Competence Framework is a first attempt to define a set of competences on circular economy for adult education. Although our proposal of competencies is born from an approximation to the needs of some adult education system in Europe, it can nevertheless represent a starting point and reference point in the field of circular economy.

3.1. Competence: concept and methodology

The term "Competence" means:

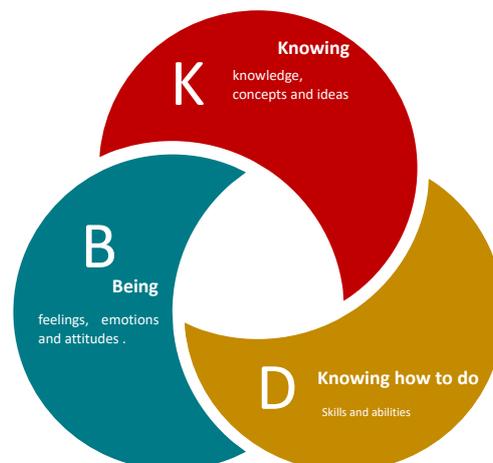
Mobilizing one's own resources (skills, attitudes, knowledge, experiences and values) and those of the environment to effectively and responsibly resolve situations and tasks in diverse contexts.

Competences refer to each of the three skills involved in your training process:

- **COGNITIVE:** Skills related to knowledge, concepts and ideas;
- **PSYCHOMOTOR:** Abilities related to the performance of actions, basically skills and abilities; and
- **AFFECTIVENESS:** Capacities related to feelings, emotions and attitudes.

This three-pronged approach shows us a model for organizing and classifying the different learning contents and objectives. Thus, when defining a competency framework, we will distinguish between:

- Knowledge - KNOWING
- Skills - KNOW-HOW TO DO
- Attitudes – BEING



Knowledge, Skills and Values. Methodological approach

Competence is enhanced through practice, experience and reflection. Usually each situation to be resolved is different, so a key aspect is to think and act strategically in front of situations and tasks: reflecting, planning, evaluating and rectifying.

In this way, attitudes acquire special relevance; that is, the form and predisposition to confront the situation and carry out the process. Good attitudes bring quality to the performance of a task.

The EU places greater emphasis on the ability to innovate and on accepting innovations and the risks of action.

It is in life that people must be competent, and life-long learning must contribute to this: by giving the appropriate tools, promoting reflective practice that facilitates later transfer to the various real contexts.

Once we have defined these competences in the field of education and training, we can:

- Promote them in general: prioritize certain types of activities that we know favour them and encourage them to put them into practice so that they emerge spontaneously.
- Teach them explicitly: not assuming that the student body is competent but giving them tools to be what and helping them to reflect on how they do it in order to improve.
- Accompany the acquisition process: through help, constant feedback, support and personalised guidance. It is important to follow the process of acquiring skills.

Monitor their development: check to what extent the learner is competent and whether it applies it to new contexts, areas, situations.

3.2. Competences for circular economy

Creating a circular economy for Europe is a key priority stabilised in the 2020 EU strategy and the same approach is included in the objectives of European Union for world sustainability and its contribution to the 2030 Agenda for Sustainable Development¹⁹ Next steps for a sustainable European future: European Union action for sustainability. As it stated in EU action plan for Circular economy, *the transition to a more circular economy, where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimized, is an essential contribution to the EU's efforts to develop a sustainable, low carbon, resource efficient and competitive economy*²⁰.

The introduction of the circular economy strengthens the competitiveness of the European economy by responding to the challenge of scarce resources and unstable pricing policies. Furthermore, the promotion of this concept in Community policies will support the opening of new and more sustainable business opportunities, creating employment and increasing the opportunities for sustainable social development.

Within the framework of CYCLE project, we can define **competencies for circular economy** as those that *are key to a sustainable future and that range from detailed knowledge of resources and raw materials to a rich understanding of social behaviours required to create a model that works for society, the economy and the environment.*

As we can observe, this concept covers the two areas of transformation of the circular economy: production and consumption. Both contain theoretical knowledge and social skills that need to be developed and

¹⁹ SWD (2016) 390 final: *Key European action supporting the 2030 Agenda and the Sustainability Development Goals*. Accompanying the document “Next steps for a sustainable European future: European Union action for sustainability” COM(2016)739 final.

²⁰ COM(2015) 614 final

updated. From this perspective, the following illustration gives an overview of the three main areas of competence that characterise the circular economy:

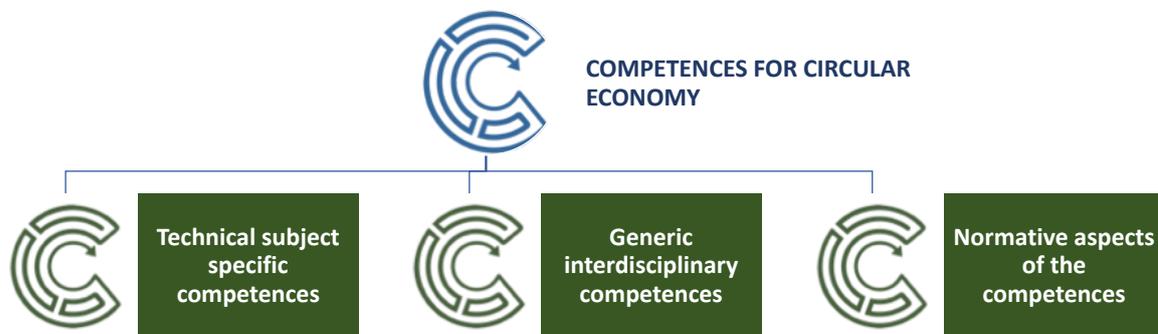


Figure 4. Fields of circular economy competences.

The picture above presents the different types of competences that contribute to the development of competences for circular economy. Thus, we can find three different fields when we talk about circular economy skills:

1. Technical competences, that is those competences related to specific tasks in each occupation.
2. Generic interdisciplinary competences, that is those related to some transversal areas of knowledge needed to support any occupation; and
3. Normative competences, that is, those (also) transversal skills related to vision and values needed to support the transition to circular economy model.

This distribution should be seen as the starting point for the development of the CYCLE competence framework for the circular economy. Here we must pay important attention. While technical competencies are a key part of the transition to the circular economy, the need to create a model that serves as a cross-cutting theme in any adult education system means that our model will focus exclusively on those cross-cutting competencies

related to social behaviours that are aimed not only at gaining greater knowledge of the fact of the circular economy, but also at generating fundamental ways of acting and thinking in the transition process.

3.3. CYCLE competence framework

We have seen in the previous sections the concept of competence and the different approaches on competences for circular economy. Now it is time to define the CYCLE competences framework.

Returning to the concept of circulating economy, we have seen in the first chapter that it moves in a model based on three key pillars:

- Value materials, products and resources for as long as possible;
- Optimize the use of materials and reuse them giving them another type of value; and
- Finally, recycle these materials and products and create others from them, thus closing the circle of their life.

These three ideas, defined in different ways, are common to all definitions of the term circular economy. And this is going to be the approach that will help us to determine three large groups of competences.

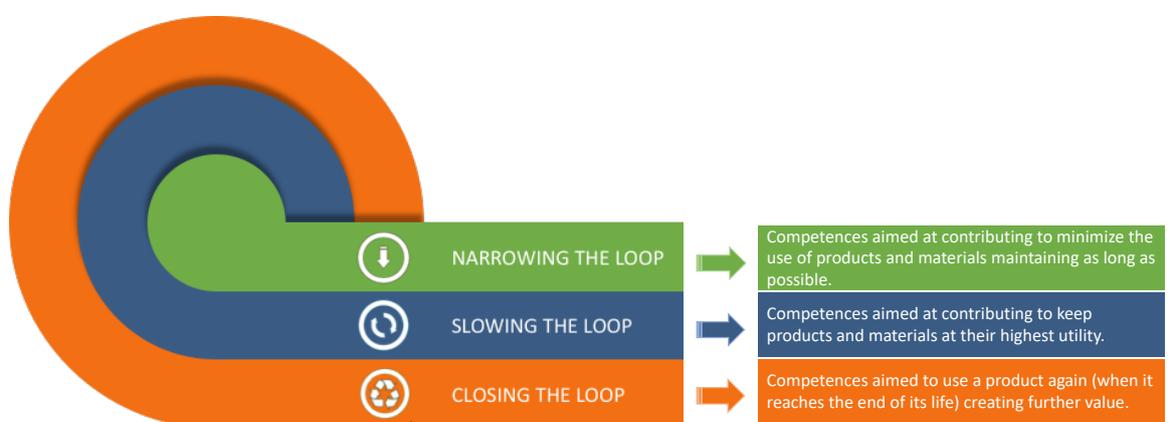


Figure 5. CYCLE competence framework structure

Based on a circular approach, there are three types of competence:

1. Competences aimed at contributing to minimize the use of products and materials maintaining as long as possible (preserving) – **NARROWING THE LOOP.**
2. Competences aimed at contributing to keep products and materials at their highest utility (optimising) – **SLOWING THE LOOP.**
3. Competences aimed to use a product again (when it reaches the end of its life) creating further value (fostering effectiveness) – **CLOSING THE LOOP.**

We will include in each of these categories, some transversal and personal competences that support the main concepts include in each of them. Thus we propose the following competences scheme:

PEDAGOGICAL MODEL TO INCLUDE CIRCULAR ECONOMY COMPETENCES
IN ADULT EDUCATION



In the following paragraphs we will define all the competences of the CYCLE competence framework for circular economy.

COMPETENCE	ENVIRONMENTAL MOTIVATION <i>Acting and behaving according to a set of reasons and/or facts in order to preserve materials, resources and products for circular economy.</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to identify the facts and reasons to contribute to the circular economy strategy; ○ Be able to analyse the facts and reasons and determinate the most relevant for circular economy; ○ Be able to integrate the facts and reasons in the regular life activity to act towards circular economy; ○ Be able to act motivated by the acts and reasons to contribute to the main principles of circular economy. 	<ul style="list-style-type: none"> ⇒ Knowing the general strategy and thoughts about circular economy; ⇒ Knowing the models to preserve the materials and resources; ⇒ Knowing the programmes to promote the preservation in the framework of circular economy; ⇒ Knowing local initiatives and tools towards circular economy. 	<ul style="list-style-type: none"> • Careful observation of environment; • Social commitment; • Focus on new generations; • Multidisciplinary approach; • Determination; • Responsibility.

COMPETENCE	SELF-AWARENESS (EFFICACY) <i>Knowing, evaluating and comparing one's own behaviors, thoughts, values and emotions in the preservation of materials and resources to contribute to circular economy.</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to accurately recognize one's own emotions, thoughts, and values and how they influence behavior towards the resources preservation; ○ Be able to successfully regulate one's emotions and thoughts to deal with circular economy issues; ○ Be able to make constructive choices about personal behavior and social interactions based on environmental standards. 	<ul style="list-style-type: none"> ⇒ Knowing the environmental value of resources and material preservation; ⇒ Knowing methods to manage emotions and ethical and environmental values to integrate them in the personal approach for circular economy; ⇒ Knowing methods and tools to support the building of constructive choices integrating elements of circular economy. 	<ul style="list-style-type: none"> • Critical thinking; • Careful observation of environment; • Social commitment; • Summarising and assessing facts and reasons; • Self-determination; • Ethical thinking; • Responsibility.

COMPETENCE	TAKING ENVIRONMENTAL INITIATIVE <i>Showing initiative and encouraging others in dealing with environmental behaviors to promote the principles of circular economy.</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to encourage others to take responsibility in environmental value-creating activities; ○ Be able to show initiative in dealing with environmental issues that affect the community; ○ Be able to value and encourage others taking the initiative in solving environmental problems and creating value; ○ Be able to face unprecedented challenges and seize new environmental opportunities. 	<ul style="list-style-type: none"> ⇒ Knowing techniques and tools to effectively communicate environmentally value ideas to others; ⇒ Knowing new working methods and incentives that enable community members to work together; ⇒ Knowing methods to face challenges and define actions to create environmental awareness in the area of circular economy; ⇒ Knowing tools to involve community in the preservation of resources and materials. 	<ul style="list-style-type: none"> • Careful observation of environment; • Social commitment; • Focus on new generations; • Effective communication with peers; • Ethical thinking; • Multicultural management; • Care for others; • Responsibility.

COMPETENCE	VALUING ENVIRONMENTAL IDEAS <i>Identifying, analysis, measuring and considering ideas to face the challenge of resource preservation in the field of circular economy.</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to identify, analyse and consider ideas to approach environmental issues. ○ Be able to measure and determine the value of ideas to deal with the threat of resource reduction; ○ Be able to connect ideas to avoid duplication and increase their value. ○ Be able to rank in an orderly manner and by category one or more ideas according to their environmental value to respond to a resource preservation challenge. 	<ul style="list-style-type: none"> ⇒ Knowing the methods and tools to create an idea that could deal with an environmental situation; ⇒ Knowing the tools to create a relation of ideas according to their environmental weight and impact criteria; ⇒ Knowing the methods to critically analysis and review ideas to avoid duplication; ⇒ Knowing the tools to create a ranking of ideas according to their environmentally value on resources and materials preservation. 	<ul style="list-style-type: none"> • Ethical thinking; • Summarising and assessing data; • Planning and reasoning; • Apply criteria for environmental sustainability; • Ethical thinking.

COMPETENCE	MOBILISING RESOURCES <i>Identifying tangible and intangible resources (included human resources) to transform and idea into action in the field of circular economy.</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to identify tangible and intangible resources needed to transform a linear idea into circular action; ○ Be able to determine realistic needs of additional resources to advance a mission; ○ Be able to understand the main functional interactions between stakeholders; ○ Be able to distinguish the resources needed at every stage of the mission life cycle; ○ Be able to analyse the existing context and the 	<ul style="list-style-type: none"> ⇒ Knowing the tools to identify the available resources; ⇒ Knowing methods to analyse and assess existing resources and make a critical analysis; ⇒ Knowing the methodologies to evaluate and define the availability of the resources to optimize their use; ⇒ Knowing the methods to identify your community stakeholders; ⇒ Knowing the theories to communicate with the stakeholders and involve them in the process for circular economy. 	<ul style="list-style-type: none"> • Planning and reasoning; • Summarising and assessing data; • Apply criteria for environmental sustainability; • Multidisciplinary approach; • Apply criteria for environmental sustainability; • Ethical thinking; • Social commitment; • Critical information management.

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ecosystem of stakeholders.		
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COMPETENCE	WORKING WITH OTHERS	
	<i>Combining different contributions and find ideas (also from outside of environment) to create environmental value to reuse and optimate recourse and products.</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to show empathy towards others; listen actively; recognise the role of emotions, attitudes and behaviours in shaping others people's attitudes and behaviours; ○ Be able deal with non-assertive behaviour that hinders my value-creating activities; ○ Be able to show respect for people's differences, their background and situations; value diversity as a possible source of ideas and opportunities. 	<ul style="list-style-type: none"> ⇒ Knowing methods to active listening; ⇒ Knowing methodologies to assess others regarding their emotions and behaviours; ⇒ Knowing method sand tools to promote the continuos collaboration in optimization of the resources; ⇒ Knowing techniques for multicultural management; ⇒ Knowing tools for on-line collaboration in environmental issues. 	<ul style="list-style-type: none"> • Commitment with others • Apply criteria for environmental sustainability; • Careful observation of the environment, • Communication effectively with peers; • Apply criteria for environmental sustainability; • Ethical thinking; • Social commitment; • Critical information management.

COMPETENCE	CREATIVITY <i>Responding in a circular economy approach to a complex situation to optimize resources and products in a new and original way</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to identify problems and creating new solutions; ○ Be able to seek different points of view: asking questions, exploring options, soliciting feedback; ○ Be able to approach challenges creatively; ○ Be able to encourage individuals and teams to bring forwards new ideas; ○ Be able to make easier for groups of people to collaborate and deliver new solutions. 	<ul style="list-style-type: none"> ⇒ Knowing the basic about creativity (concept and approach) introducing the environmental approach; ⇒ Knowing the tools and methodologies to promote new and original ways to respond to a certain context or to environmental issue to promote the circular economy. 	<ul style="list-style-type: none"> • Critical and ethical thinking; • Critical information management; • Multidisciplinary approach; • Learning from experience; • Think on future; • Communicate effectively with peers; • Learn from others.

COMPETENCE	ENVIRONMENTAL VISION <i>Communicating clearly to others a compelling and inspired vision or sense of a core environmental purpose to optimize resources to contribute to the transition to circular economy.</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to anticipate future environmental trends and strategically develop a broad vision that incorporates many groups and organizations ○ Be able to deal with the current environmental challenges and to express optimism about future impact in the medium and long term ○ Be able to discern what drives and directs the audience toward a common goal of circular economy. 	<ul style="list-style-type: none"> ⇒ Knowing the environmental strategies and policies, and policies for transition to circular economy; ⇒ Knowing methodologies and tools to analyse critically the environmental trends; ⇒ Knowing techniques to measure the different impact of environmental tools to optimize the resources; ⇒ Knowing tools and techniques to communicate with peers. 	<ul style="list-style-type: none"> • Critical and ethical thinking; • Critical information management; • Multidisciplinary approach; • Apply criteria for environmental management; • Ethical thinking; • Think on future; • Focus on new generations; • Social commitment; • Care for others; • Determination.

COMPETENCE	COPING WITH RISKS <i>Assuming the challenges, to accept the risk and to succeed in a situation of risk and doubt.</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to make a decision on basic of the information received and collected; ○ Be able to be willing and open to change and anticipate impact of change and direct self and other in smoothly shifting; ○ Be able to engage other people (cross functional collaborators) and perspective in the solution and obtain advice before making any decision; ○ Be able to assume the challenge, to accept risk and uncertainty and to succeed in a situation of risk and doubt. 	<ul style="list-style-type: none"> ⇒ Knowing the methodologies to implement a critical analysis on a specific situation; ⇒ Knowing the methods to identify, analyse and measure the risks; ⇒ Knowing the theoretical approach to define risks mitigation measures; ⇒ Knowing the methodologies and tools to identify, accept and manage the change and promote the change in the society. 	<ul style="list-style-type: none"> • Critical information management; • Summarising and assessing data; • Applying criteria for environmental sustainability; • Careful observation of the environment; • Reasoning; • Ethical thinking; • Social commitment; • Responsibility.

COMPETENCE	SPOTTING OPPORTUNITIES <i>Making connections between ideas and concepts from different fields, linking different disciplines and ideas with a circular economy approach.</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to analyse local community (environmental challenges, economic drives and social issues) and to draw a clear picture about the opportunities and risks regarding circular economy; ○ Be able to identify and define problems and situations regarding recycling and waste disposal; ○ Be able to identify and to create synergies with other local actors to deal with the challenges of resources, products and materials disposal and recycling; ○ Be able to make connections between ideas, concepts and approaches regarding to circular economy. 	<ul style="list-style-type: none"> ⇒ Knowing the methods and tools to do a critical analysis on local community regarding to sustainability of the territory; ⇒ Knowing the methodologies to identify the opportunities and risks of circular economy issues; ⇒ Knowing different techniques to identify concepts and ideas and connect with others; ⇒ Knowing techniques to identify actors and create synergies to find common solutions and action plans regarding to circular economy issues; ⇒ Knowing the environmental plan and facts on circular economy in the community. 	<ul style="list-style-type: none"> • Critical thinking; • Communication with others; • Careful observation of the environment; • Learning from experience; • Determination; • Multicultural management; • Multidisciplinary approach; • Learn from others; • Think on future.

COMPETENCE	WORK SUSTAINABLE <i>Applying the most appropriate environmental management in a given scenario.</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to applicate environmental workplace regulation, including reporting channels and procedures. ○ Be able to create working guidelines balanced with sustainability criteria and ensure long-term objectives; ○ Be able to identify the challenges in the field of work and collaboration with other environmental challenges and for the circular economy, to answer them within sustainability criteria; ○ Be able to create a work environment that takes into account environmental policies and criteria for the transition to the circular economy. 	<ul style="list-style-type: none"> ⇒ Knowing the different environmental programmes and regulations in the work environment; ⇒ Knowing the policies about circular economy (resources management, recycling and waste disposal); ⇒ Knowing the methodologies to analyse from an environmental approach the working and living environments; ⇒ Knowing the pathways to apply environmental criteria in the personal and professional life. 	<ul style="list-style-type: none"> • Careful observation of environment; • Apply criteria for environmental sustainability; • Ethical thinking; Critical information management; • Social commitment; • Care for others; • Focus on new generations; • Think on the future.

COMPETENCE	LEARNING BY EXPERIENCE <i>Applying formal learning to practices and related learning from experience to promote and share knowledge in the field of circular economy and beyond towards the sustainability.</i>	
SKILLS	KNOWLEDGE	ATTITUDES
<ul style="list-style-type: none"> ○ Be able to apply formal learning on circular economy issues to practice and to relate learning from experience to formal knowledge; ○ Be able to reflect on experiences as a self organised process and tool for learning; ○ Be able to be aware of own learning needs on circular economy and environmental issues; ○ Be identification of opportunities for learning from experience to meet those learning needs; ○ Be able to transfer learning from one situation to other new situations. 	<ul style="list-style-type: none"> ⇒ Knowing the basic principles on circular economy theory; ⇒ Knowing the tools to self-assess your knowledge about circular economy and identify the learning needs; ⇒ Knowing the methodologies to transmit the previously acquired knowledge on circular economy to others through non formal learning activities; ⇒ Knowing the information sources about circular economy to learn new concepts and theories to deal with learning needs. 	<ul style="list-style-type: none"> • Learning form experience; • Careful observation of the environment; • Communicate with others; • Communicate effectively with peers; • Multidisciplinary approach; • Critical information managements; • Learn from others; Social commitment; • Care for others.

4. Pedagogical model to integrate competences in adult education

Once CYCLE competence framework has been drafted, the next step is to ensure that we respond to the needs of our target group and also to ensure that these competencies are acquired at the present time. In addition, we must evaluate the extent to which each formation is strengthened.

That is why we would like to offer a proposal of itineraries and resources in order to facilitate an orderly and useful incorporation of the competences in adult education offer. The following lines show the general outline of the itinerary, which we have structured in three phases:

Phase 1: Awareness raising - focus more on trainers so that they are better aware of the competency model created.

Phase 2. General programming - in order to implement the curriculum in specific activities for the development of circular economy.

Phase 3. Complementary programming - to implement complementary training activities to strengthen the model.

PHASE 1. AWARENESS RAISING			
ACTIVITIES	OBJECTIVE	TOOLS	WHO
Analysis and review of the CYCLE competences framework	Knowing the approach of the competences framework and adapt it to his/her needs	CYCLE competence framework	Trainer

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PHASE 2. GENERAL PROGRAMING			
ACTIVITIES	OBJECTIVE	TOOLS	WHO
Introduction to the schema	Trainer/Facilitator to understand the different parts of the training process	CYCLE competence framework CYCLE CC	Trainer Facilitator
Analysis how contribute each competence to the learning process	Identify how each area promotes the competences and understand the transversal character of the proposed framework	CYCLE competence framework	Trainer Facilitator Expert
Linking previous step to the evaluation criteria	Identify its importance and practical value as an area for programming and competence testing	CYCLE CC	Trainer Facilitator
Linking all the steps to the competence framework	Build basic structure that allows developing of competences	CYCLE competence framework CYCLE CC	Trainer Facilitator

PHASE 2. GENERAL PROGRAMING			
ACTIVITIES	OBJECTIVE	TOOLS	WHO
Review training programme	Overview of training offer to facilitate consensus and coordination with other trainers, trainees and stakeholder	CYCLE competence framework CYCLE CC	Trainer Facilitator Stakeholders
Longitudinal and horizontal revision of the programming	Fostering coherence, coordination and complementarity on the teaching learning	CYCLE competence framework CYCLE CC	Trainer
Include the competences in a complementary training	Fostering coherence, coordination and complementarity of the teaching – learning	CYCLE competence framework	Trainer
Training evaluation practice; collecting evidence	Training in the systematic collection of evidence that makes it possible to supervise the	Evaluation approaches	Trainer Trainee

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PHASE 2. GENERAL PROGRAMING			
ACTIVITIES	OBJECTIVE	TOOLS	WHO
	development of competences		

PHASE 3. COMPLEMENTARY PROGRAMME	
METHODOLOGIES	TASKS
Introducing different training/learning methodologies and how they can contribute to the development of the CYCLE competence framework	Open horizons, showcase available methodological resources, help identify those where training is needed, find informal environments to learn
Training for implanting of integrated tasks	To become competent in the development of disciplinary or interdisciplinary activities that favour the development of competences in an integrated way

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