



Seniors in Green Action – from Hands to Minds to Souls

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GUIDELINES

ON ENGAGING SENIOR ADULT LEARNERS IN NON-FORMAL EDUCATION ON THE TOPICS OF RECYCLING AND CIRCULAR ECONOMY

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The need for a new approach to seniors' teaching process on the environmental protection, sustainability, recycling and circular economy - the case of SenGA project

As the population in many countries around the world is ageing, interest in how older people's well-being and activity levels can be improved has increased. Hence, in recent decades, productive, successful, and active ageing studies have multiplied, and whichever of these concepts are used, continued learning is argued to be an important factor (Boulton-Lewis, 2010).

Naturally, there is not one factor that decides the outcome of an individual's ageing process. However, much research has argued that engagement in continued learning is essential for both the perceived quality of life for older people and their coping abilities. Researchers, demographic experts and trainers argue that older adults have different motives for participating in learning experiences (Boulton-Lewis, 2010).

However, in contemporary societies, in which knowledge changes rapidly and uncertainty is a defining characteristic, only some people can aspire to complete their education at a certain point (Withnall, 2000). The shift from an economy based on the linear model of production (take-make-waste) to the model of circular economy (take-make-use-dispose) requires more education. It creates new challenges, especially for older adults. By being willing to learn at any stage of life, they can find the answer to several questions, e.g., How to decrease the volume of their household waste? How to reuse and recycle some of these wastes? How to save energy? How to protect the environment?

Most of these problems have been discussed so far by researchers and policymakers referring to young people born after 1965, who can use any new information and communication technologies and are predominantly individualistic and independent thinkers. They represent three generations: 1) the Generation X, 2) the Millennial Generation, and 3) the Generation Z. The first encompasses individuals born between 1965 and 1982. They expect freedom and balance in their personal and workplace lives. They are independent thinkers who prefer to engage in interesting and efficient work. They like to question policies and projects. Therefore, those who teach them must provide credible reasons for tasks, decisions, and procedures associated with new challenges related to the environmental protection and the circular economy (Wallace, 2006). The second generation is web savvy and highly connected via social media. It is called Millennial Generation or Generation Y.

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Individuals born since 1982 belong to this generation. Because they were raised in the Information age, they frequently use technology such as computers, the Internet, and mobile phones daily. That is how they collect information about the socio-economic situation, including the problem related to the degradation of the environment. According to Dimock (2019) the youngest generation is called Z. Its representatives were born in the late 90s, and the primary means by which they were connected to the web is through mobile devices, WiFi and high-bandwidth cellular service. Their desired innovations are social media, constant connectivity, and on-demand entertainment and communication. They mainly search websites for short information, including those related to climate change risk.

However, in the case of the growing number of older people, there is a need for tailored information for them about the threats related to climate change and environmental degradation. Moreover, information about how to respond to these risks should be distributed through policy documents (e.g. The European Green Deal) and information about the development of a circular economy. So far, there was not enough attention paid to the diffusion of information related to these issues among elderly people. The response to these challenges is education at any stage of human life. In this process, an important role is played by the teachers, educators and trainers who have to explain these problems in the forms of creative workshops, courses and training. Effective teachers must understand and appreciate the learners' needs, backgrounds, interests, and learning styles (Brookfield, 2006). Understanding the differences in various generations and how they perform can help better educate and address the needs of the learners. The elderly people are separated into two generations: Silents (Traditionalists) and the Baby Boomers (Roberts et al., 2012). The Silent generation encompasses those individuals born between 1928 and 1945. They are loyal and disciplined. The majority of them learn best through traditional, instructor-led instruction; and seek to feel supported and valued by their teachers and supervisors (Wallace 2006). Individuals born between approximately 1946 and 1964 are called the Baby Boomer generation. According to Loretto and Vickerstaff (2015), they are extremely hard workers committed to their personal and professional goals and motivated by incentives, prestige, and position. The characteristics of the two generations are promising for the elderly people's teachers, trainers and educators who can succeed in teaching them within the system of informal and non-form education about the environmental problems and implementation of the circular economy idea.

The practical response to the challenges related to the education of the older generations in the area of the environmental protection, circular economy and recycling is the implementation of the international project entitled Seniors in Green Action - from Hands

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to Minds to Souls (SenGA) financed by the European Union Programme Erasmus+. One of the milestones of the project is to formulate the guidelines for engaging senior learners in informal and non-formal education on environmental protection, sustainability, recycling and circular economy.

The guidelines are split into two major parts. The first one provides basic principles of environmental protection, sustainability, recycling and circular economy. The second one deals with creating suitable learning environment for elder adult learners and basic principles of effective engagement of seniors in educational and community-based activities.

Part 1 - Basic principles of environmental protection, sustainability, recycling and circular economy

The salvation of the world lies in the human heart, in the human power to reflect, in human meekness and in human responsibility. We are still under the sway of the destructive and vain belief that man is the pinnacle of creation and not just a part of it... We still don't know how to put morality ahead of politics, science and economics. We are still incapable of understanding that the only genuine backbone of all our actions - if they are to be moral - is responsibility. Responsibility is something higher than my family, my country, my firm, my success.

Vaclav Havel

Environment

What does environment mean? If you mean physical environment, then it is defined as the surrounding conditions and elements with which a living thing interacts with. However, apart from the physical, there are other types of elements that make up an environment. They are the chemical and biological attributes. Thus, an environment contains all biotic and abiotic factors that have a role in the survival, evolution, and development of the organism occupying it. A related term “environ” is defined as “to surround” or “to enclose”. The scope of the environment varies – from the tiniest, “micro” scale to the largest, global scale.

The terms “ecosystem” and “surroundings” are the common synonyms for the word “environment”. However, they differ in such a way that the term “ecosystem” includes the interaction between the organism and its surroundings. The surroundings, in turn, refer to that which surrounds an organism or a population. In this regard, the environment is a rather vast concept whereas the term “surrounding” is relatively more specific.

Another related term is nature. What's the difference between environment and nature? Similarly, the definition of nature includes all living and non-living things on Earth but what characterizes nature is that it is a natural entity as opposed to the artificial that implicates an attribute that is not occurring naturally, and by that it is man-made or “built”.

Biology definition:

The environment is the external conditions, resources, stimuli, etc., with which an organism interacts. It may also refer to the external surroundings including all of

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the biotic and abiotic factors that surround and affect the survival and development of an organism or population, It may also be defined as the totality of the surrounding conditions and elements in an individual. However, a simple ecological definition would be is that an environment is essentially the place over a particular time where organisms live or that which is occupied by a living thing. It includes all the physicochemical and biological components of the ecosystem (Biology online).

The environment is not nature or animals in their natural state. It is about all the chemical, physical and biological elements in which living things interact. If we talk about the human being, the social and cultural elements should be included since they intervene in the interaction processes.

In this way, to see everything in a simpler and clearer way, the following are distinguished:

- **Natural environment:** This type collects everything that is the climate, flora, fauna, geography and everything that is present naturally.
- **Cultural environment:** It is everything that is artificial created by human beings and their socioeconomic activities.

Therefore, it could be said that the environment is the relationship of a system that is formed by the set of natural and artificial elements that interact with each other and that are related to each other. In addition, they have been modified by humans. Therefore, the environment must be conserved and managed, since it conditions the way of life and makes us create adaptations.

To the bad of all, a few decades ago, the impacts on the environment of human activities have reached a point where serious disturbances are caused. This has caused the extinction of animal and plant species, contamination of water, air and soil, displacement of populations of living beings, fragmentation and destruction of habitats, etc (Renewable Green).

Environmental Protection

Definition

Environmental protection is the practice of protecting the natural environment by individuals, organizations and governments. Its objectives are to conserve natural resources and the existing natural environment and, where possible, to repair damage and reverse trends.

Various core environmental issues are taking a heavy toll on human lives. Ranging from overpopulation, hydrological issues, ozone depletion, and global warming to deforestation,

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desertification and pollution, all these issues pose a severe threat to the existence of humankind. Unless environmental conservation is becoming an effective mass movement, it is futile to expect positive growth especially in the age of digital media which holds the potential to bring a revolution to save our planet from destruction.

Importance of Environmental Protection

It has become inherently important to work towards environmental conservation in present times. The following pointers explain the crucial need to save the environment from further degradation:

- To reduce air, water and land pollution
- To facilitate the conservation of natural resources for our future generations
- To ensure the protection of biodiversity
- To implement sustainable development
- To restore the ecological balance
- To save our planet from harmful repercussions of global warming (Leverage Edu)

Everyone understands the need to protect the environment in daily life for a better future. This way we can pass on a healthier planet to the coming generations. Green planet and surroundings without pollution are a must. It is much needed for living a life without any diseases. Also, only a protected environment can provide us with the right resources and places for happy living.

Ten Simple Things You Can Do to Help Protect the Environment

- Reduce, reuse, and recycle. Cut down on what you throw away. Follow the three "R's" to conserve natural resources and landfill space.
- Volunteer. Volunteer for clean-ups in your community. You can get involved in protecting your watershed, too.
- Educate. When you further your own education, you can help others understand the importance and value of our natural resources.
- Conserve water. The less water you use, the less runoff and wastewater that eventually end up in the ocean.
- Choose sustainable.
- Shop wisely. Buy less plastic and bring a reusable shopping bag.
- Use long-lasting light bulbs. Energy efficient light bulbs reduce greenhouse gas emissions. Also flip the light switch off when you leave the room!

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- Plant a tree. Trees provide food and oxygen. They help save energy, clean the air, and help combat climate change.
- Don't send chemicals into our waterways. Choose non-toxic chemicals in the home and office.
- Bike more. Drive less (National Ocean Service).

Sustainable Development

Definition

In 1987, the United Nations Brundtland Commission defined sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

In addition to natural resources, we also need social and economic resources. Sustainability is not just environmentalism. Embedded in most definitions of sustainability we also find concerns for social equity and economic development.

Three Pillars of Sustainability

Environmental Pillar

The environmental pillar of sustainability involves regulations, laws, and other tools used to deal with environmental facts and issues such as the management of land, freshwater, oceans, forests, air, natural resources, and wildlife. This pillar involves direct management of the environment and taking action on the human consumption side. Environmental management involves the use of environmental science and conservation biology to manage at a high level the allocation of resources such as land, water, and emissions to achieve a sustainable future. This process takes also into account the resilience of the ecosystems and their capacity to absorb disturbances caused by human activities.

Economic Pillar

Economic sustainability means using a particular set of resources in a responsible way that will allow them to be used on a long-term basis. Furthermore, it means making money and growing the economy without negatively impacting the other two pillars, people and planet or environment.

Social Pillar

The social pillar refers to initiatives, public policies, planning, and regulations supporting social issues. These include things such as fighting poverty, social justice, peace, promoting diversity, quality of living, access to healthcare, education, community

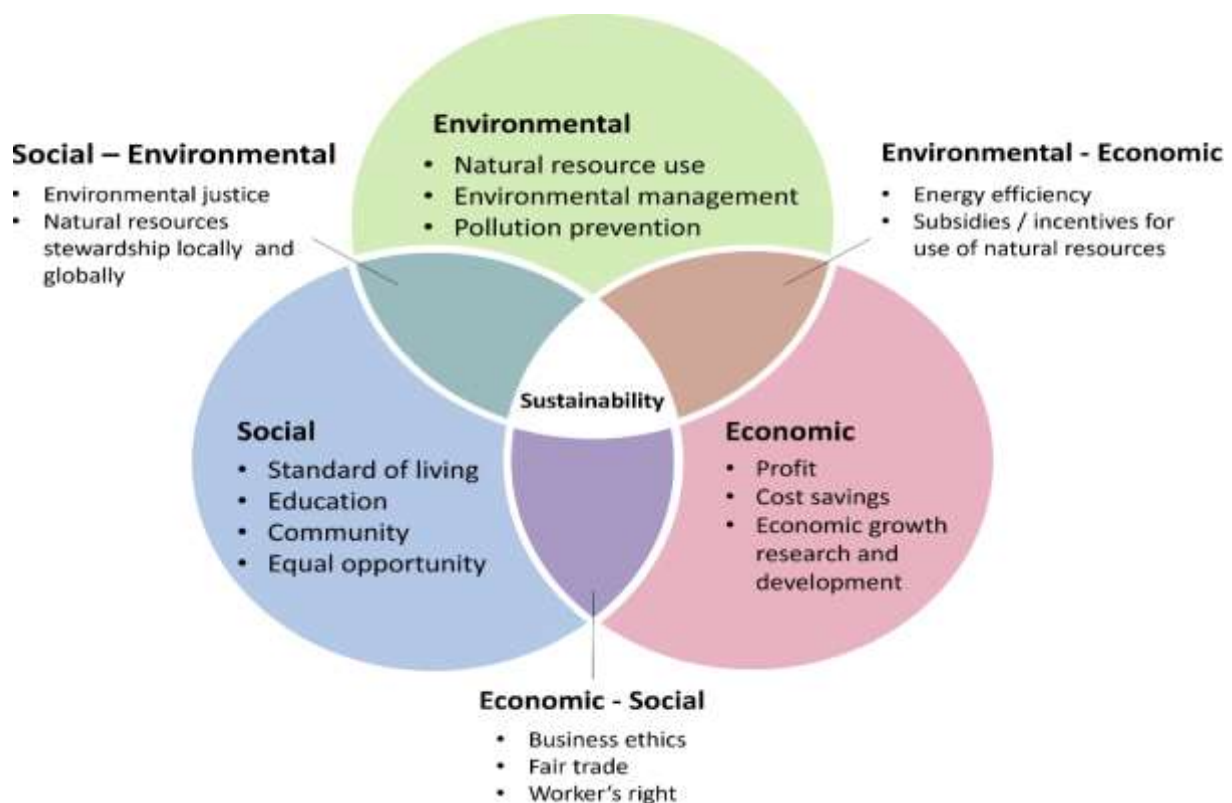
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development, cultural sustainability and heritage, and some aspects of religion. Unfortunately, this is the least defined and understood pillar of sustainability compared to ecological and economic ones. However, the social factor is influencing all human activities and as such, is strongly linked also to the economic and ecological dimensions of sustainability and sustainable development.

Figure 1: The Three Pillars of Sustainability

Source: Slovenian Institute of Quality and Metrology

Accessible at: <https://www.siq.si/en/our-services/organization-certification/about-us/sustainability/#>



Sustainable Development Goals and the 2030 Agenda

To gain an in-depth understanding of sustainability and its implications, it is essential to mention the Sustainable Development Goals and the 2030 Agenda. The 2030 Agenda is the successor to the Millennium Development Goals and is structured through the so-called Sustainable Development Goals (SDGs), of which there are a total of 17 goals.

Accordingly, the United Nations (UN) publishes an annual report analysing how each goal is progressing. Below is a brief outline of current fulfilment of the SDGs based on the 2021 report:

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1. **Ending poverty.** This goal has been impacted by the Covid-19 pandemic, since it has been calculated that in 2020, some 119 - 124 million people fell into extreme poverty.
2. **Ending hunger.** The pandemic has also affected this goal, given that 70-161 million people around the world went hungry as a result of the health crisis.
3. **Ensuring good health and fostering the well-being of all age groups.** After a decade of advances in this field, the pandemic has resulted in a shortening of life expectancy. Additionally, it is difficult to measure the real impact of the pandemic due to a lack of data.
4. **Ensuring inclusive and equitable quality education.** Although the completion rates for primary and secondary education have increased, in many countries, there is a lack of basic school infrastructure in terms of drinking water and electricity.
5. **Achieving gender equality and empowering all women and children.** In this area, more needs to be done, since women make up just 25.6% of national parliaments, 36.3% of local governments and 28.2% of managerial positions.
6. **Ensuring the availability and sustainable management of water and sanitation for all.** According to UN data, 129 countries are not on track to achieve sustainable water resources by 2030.
7. **Ensuring access to affordable, reliable, clean and modern energy for all.** In the world there are still some 759 million people without access to electricity.
8. **Promoting sustained, inclusive and sustainable economic growth.** Although the economic recovery is underway, the pandemic has meant a loss equivalent to 255 million full-time jobs.
9. **Building resilient infrastructure, promoting inclusive and sustainable industrialisation and fostering innovation.** Global manufacturing production fell in 2020 but, at the end of the same year, the production of medium and high-tech goods boosted the economic recovery.
10. **Reducing inequality within and among countries.** To achieve this objective by 2030 further development is required because the pandemic is expected to affect the progress achieved so far in terms of reducing inequality.
11. **Making cities and human settlements inclusive, safe, resilient and sustainable.** UN data reveals that 156 countries have already developed national urban policies, but only half have been implemented.
12. **Ensuring sustainable consumption and production patterns.** Just as we noted at the start of the article, there is still widespread consumption of plastic. In 2020, however, a total of 700 policies and implementation activities were reported under the framework of programmes on sustainable consumption and production.

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13. **Taking urgent action to combat climate change and its impacts.** Many countries and companies are making a major effort to reduce greenhouse gas emissions, but more actions need to be taken to curb climate change.
14. **Conserving and sustainably using the oceans, seas and marine resources for sustainable development.** Without doubt, as shown by the data cited in the introduction, the sustainability of our oceans is threatened above all by plastic pollution.
15. **Protecting, restoring and promoting the sustainable use of terrestrial ecosystems.** Progress to protect key areas of biodiversity has stalled over the past 5 years and there are ever more endangered species.
16. **Promoting peaceful and inclusive societies for sustainable development.** The pandemic has intensified children's risk of exploitation for child labour, and only 82 countries have independent national human rights institutions that meet international standards.
17. **Strengthening the means of implementation and revitalising the global partnership for sustainable development.** Some 63% of low and lower-middle income countries need additional funding to cope with the pandemic (Santander Scholarships).

Figure 2: Sustainable Development Goals

Source: European Commission

Accessible at: https://international-partnerships.ec.europa.eu/policies/sustainable-development-goals_en



Circular Economy

Definition

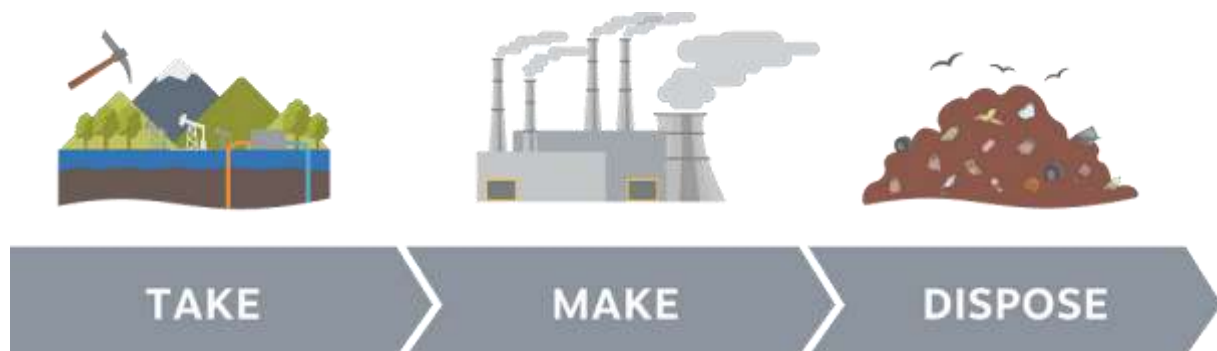
According to the United Nations Industrial Development Organization circular economy is a new way of creating value, and ultimately prosperity. It works by extending product lifespan through improved design and servicing, and relocating waste from the end of the supply chain to the beginning—in effect, using resources more efficiently by using them over and over, not only once.

By and large, today's manufacturing takes raw materials from the environment and turns them into new products, which are then disposed into the environment after use. It's a linear process with a beginning and an end. In this system, limited raw materials eventually run out. Waste accumulates, either incurring expenses related to disposal or else polluting. On top of that, manufacturing processes are often themselves inefficient, leading to further waste of natural resources.

Figure 3: Linear Economy

Source: Metabolic

Accessible at: <https://www.metabolic.nl/what-we-do/circular-economy/>



However, in a circular economy, products are designed for durability, reuse and recyclability, and materials for new products come from old products. As much as possible, everything is reused, remanufactured, recycled back into a raw material, used as a source of energy, or as a last resort, disposed of.

Figure 4: Circular Economy

Source: European Parliament

Accessible at:

<https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits>



The Seven Pillars of Circular Economy

- **Materials are cycled at continuous high value.** Material complexity is conserved by cascading materials in their most complex form for as long as possible. Material cycles are designed to be of appropriate lengths for human time scales and the natural cycles to which they are connected. Scarce materials are preferentially cycled at shorter intervals so they can be recovered sooner for reuse. Materials are transported within as small a geographic range as possible. Materials are not mixed in ways which preclude separation and recovery, unless they can continue to cycle infinitely at high value in their mixed form (although this is still not ideal because it limits choice). Materials are used only when necessary: there is an inherent preference for dematerialization of products and services.
- **All energy is based on renewable sources.** The materials required for energy generation and storage technologies are designed for recovery into the system. Energy is intelligently preserved and cascaded when lower values of energy are available for use, such as heat cascading. Density of energy consumption is matched

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to density of local energy availability to avoid structural energetic losses in transport. Conversion between energy types is avoided, as is transportation. The system is designed for maximum energy efficiency without compromising performance and service output of the system.

- **Biodiversity is supported and enhanced through human activity.** As one of the core principles of acting within a circular economy is to preserve complexity, preserving biodiversity is a top priority. Habitats, especially rare habitats, are not be encroached upon or structurally damaged through human activities. Preservation of ecological diversity is one of the core sources of resilience for the biosphere. Material and energetic losses are tolerated for the sake of preservation of biodiversity; it is a much higher priority.
- **Human society and culture are preserved.** As another form of complexity and diversity (and therefore resilience), human cultures and social cohesion are extremely important to maintain. In a circular economy, processes and organizations make use of appropriate governance and management models, and ensure they reflect the needs of affected stakeholders. Activities that structurally undermine the well-being or existence of unique human cultures are avoided even at high cost.
- **The health and wellbeing of humans and other species are structurally supported.** Toxic and hazardous substances are minimized and kept in highly controlled cycles, and should ultimately be eliminated entirely. Economic activities never threaten human health or well-being in a circular economy. For example, successfully recycling e-waste by having people burn it over open fires is not considered a “circular” activity despite the fact that it results in material recovery.
- **Human activities maximize generation of societal value.** Materials and energy are not currently available in infinite measure, so their use should meaningfully contribute to the creation of societal value. Forms of value beyond financial include: aesthetic, emotional, ecological, etc. These cannot be brought down to a common measure without making gross approximations or imposing subjective value judgements; they are, therefore, recognized as value categories in their own right. The choice to use resources maximizes value generation across as many categories as possible rather than simply maximizing financial returns.
- **Water resources are extracted and cycled sustainably.** Water is one of our most important shared resources: sufficient quantity and quality of water is essential to our economy and our survival. In a circular economy the value of water is maintained, cycling it for indefinite re-use while simultaneously recovering valuable resources from it whenever possible. Water systems and technologies minimize freshwater

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usage, and maximize energy and nutrient recovery from wastewater. Watershed protection is prioritized, and harmful emissions to aquatic ecosystems are avoided as a top priority.

Figure 5: Seven Pillars of Circular Economy

Source: Metabolic

Accessible at: <https://www.metabolic.nl/news/the-seven-pillars-of-the-circular-economy/>



Evidence of the economic opportunities that a circular economy could bring is mounting. The potential environmental impact is also clear. The move to a circular economy—a system that aims to reduce, reuse and recycle materials—could address 70% of global greenhouse emissions. As the benefits stack up, this transition is becoming a key focus for policymakers around the world. But there remains much confusion about what a circular economy is, and how it might be achieved.

One common misunderstanding is the notion that it is simply a rebrand of recycling—the recovery and reprocessing of waste materials for use in new products. This perception is reinforced because recycling is the most common component of almost 80% of circular economy definitions. But, although recycling is an important element, there are many others. Before recycling comes into play there are several steps in a product’s life cycle that should be addressed, such as redesigning products and processes so that they use less

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virgin material, and re-using items rather than discarding them. New business models such as sharing and repairing can be adopted. These approaches prioritize smart designs that extend a product's useful life, before reaching the stage of recycling. These steps are consistent with the central aim of a circular economy: to provide economic productivity by eliminating the concept of waste.

Recycling is often criticized as insufficient compared with earlier interventions such as reuse or reduce. And it is true that a circular economy requires a great deal more than recycling. But recycling remains a fundamental strategy to extract value from resources, as evidenced by its current contribution to 8.6% global circularity.

To improve recycling rates, we need to recognize that the waste and resource recovery sector is positioned at the end of the supply chain, often known as end of life. This sector has limited influence over the materials and resources they collect. Recycling could improve if more effective changes are made upstream, such as in product design, material use, manufacturing, collection infrastructure and consumer behaviours.

Many countries, institutions and organizations need to increase resource recovery and shift away from the cheapest waste-management solutions such as landfill and incineration. This is a key barrier to realizing a circular economy (King, S. 2022).

Reduce, Reuse, Recycle Approach

In order to keep as much material out of the landfill as possible, it's important for each of us to do our part. One of the ways to put that plan into action is through the 3 Rs of waste management – Reduce, Reuse, Recycle.

Reduce, Reuse, Recycle - these three 'R' words are an important part of sustainable living, as they help to cut down on the amount of waste we have to throw away.

It's Really simple!

1. Reduce the amount of waste you produce.
2. Reuse items as much as you can before replacing them.
3. Recycle items wherever possible (Solar Schools).

Figure 6: Reduce, Reuse, Recycle

Source: City of Paterson

Accessible at: <https://www.ci.patterson.ca.us/173/Reduce-Reuse-Recycle-Program>



Recycling

Definition

Recycling is the process of converting waste materials into new materials and objects. The recovery of energy from waste materials is often included in this concept. The recyclability of a material depends on its ability to reacquire the properties it had in its original state. It is an alternative to "conventional" waste disposal that can save material and help lower greenhouse gas emissions. It can also prevent the waste of potentially useful materials and reduce the consumption of fresh raw materials, reducing energy use, air pollution (from incineration) and water pollution (from landfilling).

Recycling is a key component of modern waste reduction and is the third component of the "Reduce, Reuse, and Recycle" waste hierarchy. It promotes environmental sustainability by removing raw material input and redirecting waste output in the economic system.

International Recycling Symbol

The international recycling symbol is a widely used symbol used to designate recyclable materials. It consists of three „chasing“ or „pursuing“ arrows that form the so-called Mobius strip with triangular outline symbolizing the circle of nature and the closed cycle („creation - use - processing“).

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Figure 7: International Recycling Symbol

Accessible at: <https://www.nature.com/articles/s41393-019-0246-8>
<https://www.recycling.com/downloads/recycling-symbol/>

**Types of recycling**

Mechanical Recycling: One of the most globally used methods of giving residues new usages is mechanic recycling. It is an essential component of the circular economy. It can be applied to various material classes like plastics, lithium-ion batteries for electric vehicles, or metals. End-of-life materials can be processed via collecting, sorting, shredding, melting and transforming it into secondary raw materials for a new application. Manufactured from recycled material, the article enters its new use-phase before the next end-of-life management. For plastic waste, mechanical recycling is the preferred recycling solution if ecologically most beneficial, technologically possible, and economically attractive.

Energy Recycling: The method used to convert plastics into both thermal and electric energy is called energy recycling. This approach only works with plastic waste and it consists of converting plastic into both thermal and electric energy by leveraging, through incineration, the heat power released by these materials in the form of fuel.

Chemical Recycling: Chemical recycling is a novel approach to plastic waste recycling that opens up a whole host of new possibilities. It breaks the plastic waste down to its constituent molecular parts. When plastic is broken down like that, it directly affects the chemistry of its polymers, making it possible to reconstitute them back to their original raw materials - and ready to be reconverted into new polymers or a petrochemical feedstock.

Part 2 - Creating suitable learning environment for elder adult learners and basic principles of effective engagement of seniors in educational and community-based activities

Meaning and types of education systems

The literature related to educational studies has numerous definitions of education. Based on Schaffler's (1960) approach, two significant definitions of education can be delimited: 1) descriptive and 2) programmatic. The descriptive type of definitions explains the nature of the meaning of the word education by using a variety of words. These words explain the phenomenon or how the term is to be understood ([Chazan, 2022](#)). Following the criteria of this type of definition, the contemporary word "education" is sometimes traced to the Latin root *educare*, which means "to train" or "to mould". Based on this linguistic root, some people argue that training or moulding is what education today should be.

However, there are also definitions of education that meet the criteria of the second type - programmatic. It comes to advocating for or prescribing a belief of what education should be or should do. A programmatic definition concerns promulgating a particular practice of education that is regarded as desirable. According to these criteria, Romanelli, Bird and Ryeane (2009) define education a gradual process which brings positive changes in human life and behaviour. The positive message in the definition of education related to future learning outcomes complements the approach used by the European Union Commission (2020), which indicates the critical role of experience in the educational process. The definition proposed by the Commission notes that it is any act or experience that has a formative effect on an individual's mind, character, or physical ability. In its technical sense, education is the formal process by which society deliberately transmits its cultural heritage and accumulated knowledge, values and skills to the next generation through schools, colleges, universities and other institutions. More practical suggestions are included in Achal Mehrotra (2022) definition, who defines it as the process of obtaining knowledge via study or sharing knowledge through instructions or other practical procedures. Lawrence Cremin also presents the process-oriented approach. He was the most distinguished historian of twentieth-century education who proposed in 1976 the most complex definition of education. He states that education is the deliberate, systematic, and sustained effort to transmit, provoke or acquire knowledge, values, attitudes, skills or sensibilities, as well as any learning that results from the effort (Cremin, *Public Education*, p. 27).

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Based on the review of definitions of education, education brings a natural and lasting change in an individual's reasoning and ability to achieve the targeted goal. It facilitates us to investigate our considerations and thoughts and makes them ready to express themselves in various shapes. Education gives people a vital ability to distinguish between right and wrong or helps us achieve our goals. These goals might have innovative character, and to achieve them, we first need to gain proficiency with learning and abilities to wind up increasingly imaginative. So education stimulates learning abilities and the creation of ideas that can make us increasingly innovative and issue solvers.

Moreover, it also improves the capacity and motivation to solve problems. All these positive attributes of education are included in the statement that it is a passage to progress. However, the education process requires a teacher who can explain the problem and stimulate learning. Therefore, educators need to know how to teach ways to find and use information. Through education, the knowledge of society, country, and the world is passed on from generation to generation.

The pace of civilizational progress makes the traditional model of finishing education between the ages of twenty and thirty obsolete. There is a need to rearrange the continuum of human life to enable leaving and returning to the educational system at its various stages. The possibility of learning is extended throughout life. It becomes imperative if a person is to cope with the explosion of knowledge, information and modern technologies, understand social changes and be active in retirement. At the same time, along with the progressing ageing of societies, the role of andragogy addressed to adults and geragogy, specializing in the education of the elderly, are growing, both based on the idea of lifelong learning (Åberg, 2016).

Learning is essential in productive ageing (Ardelt, 2000). Ardel made a case for lifelong learning and continued education for older persons in a society that is characterized by rapid technological changes. Lifelong learning and continued education would enable elderly people to keep up with technological and scientific advances and maintain the quality of their lives by enhancing their self-reliance, self-sufficiency, and coping strategies in physical, health, and social relationships. In particular, lifelong learning and continuing education help to develop wisdom, which requires different approaches to learning - such as reflection.

Today, education for any age group goes beyond what takes place within the four walls of the classroom. An interested in learning people get an education not only from the teachers in the classroom but more often from their experiences outside, in the form of learning by doing, by participation in workshops, training courses using new technologies, e.g. internet, computer applications, social media. All of the forms of teaching can be classified into three

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types of education: formal, informal and non-formal, that are discussed in the next subchapters.

Formal Education

Formal education is defined as education that is institutionalized, intentional and planned through public organizations and recognized private bodies. In contrast, a learning program is defined as a coherent set or sequence of educational activities designed and organized to achieve pre-determined learning objectives or accomplish a specific set of educational tasks over a sustained period ([United Nations Educational Scientific and Cultural Organization, 2011](#)). Formal education or formal learning usually occurs on the premises of the school, where a person may learn basic, academic, or trade skills. Small children often attend a nursery or kindergarten, but formal education often begins in elementary school and continues with secondary school (Gulzar 2020). Post-secondary education (or higher education) is usually at a college or university which may grant an academic degree. It is associated with a specific or stage and is provided under a particular set of rules and regulations. Specially qualified teachers or trainers give formal education. They are supposed to be efficient in instruction ([Villar, Celdrán, 2013](#)). It also observes strict discipline. The student and the teacher are both aware of the facts and engage themselves in the education process.

Strengths of formal education are as follows:

- An organized educational model and up to date course contents;
- Students acquire knowledge from trained and professional teachers;
- Structured and systematic learning process,
- Intermediate and final assessments are ensured to advance students to the next learning phase;
- Institutions are administratively and physically organized;
- Leads to a formally recognized degrees and certificates;
- Easy access to jobs.

Limitations of formal education are as follows:

- sometimes, brilliant students are bored due to the long wait for the expiry of the academic session to promote to the next stage;
- chance of bad habits' adoption may be alarming due to the presence of both good and bad students in the classroom;
- wastage of time as some lazy students may fail to learn properly in spite of motivation by the professional trainers;

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- some unprofessional and non-standard education system may cause the wastage of time and money of the students which leads to the disappointment from formal education and argue them to go for non-formal education;
- costly and rigid education as compare to other forms of learning ([Gulzar 2020](#)).

As it was investigated by Noble et.al. (2021) formal education can significantly positively impact several domains of seniors' well-being, including quality of life, physical functioning (including balance), life satisfaction, and objective health. Another study reported that healthy ageing for people with dementia could be achieved or enhanced through formal education that uses digital gaming technologies ([Cuthill et al., 2016](#)) and specific locations (e.g. green areas of the cities, museums). The formal education of the seniors in circular economy and recycling should concentrate on high-quality trainers, well-organized and planned but provided by the less formalized institutions (e.g. local community clubs, cultural centres, and senior centres).

Informal Education

Informal education is training in everyday life, at work, at home or leisure time. There is no structure and certification related to training objectives or duration of training. The term "informal" suggests that such activity occurs without procedural formalities. It corresponds to the structure of adult life (Kominarets, et al. 2022). Some aspects of learning are present in almost all forms of social activity. Moreover, it no longer matters how a person has acquired the knowledge and skills necessary for effective action (Hiemstra, 1994).

Informal or non-institutional education received under the direct influence of human life is treated as a form of learning that is not part of formal and non-formal education. Examples of informal learning are as follows:

- trial and error method;
- spontaneous self-education as an independent search for answers to difficult questions;
- mutual learning in the joint implementation of specific tasks;
- listening to radio broadcasting or watching TV programmes on educational or scientific themes;
- reading texts on sciences, education, technology, etc. in journals and magazines;
- participating in scientific contests, etc.;
- attending lectures and conferences.

Unlike formal education, informal education is not imparted by an institution such as a school or college. Informal education is not given according to any fixed timetable. There

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is no set curriculum required. Informal education consists of experiences and living in the family or community. An example of informal education is a parent teaching a child how to prepare a meal or ride a bicycle.

The strengths of informal education are as follows:

- more naturally learning process as you can learn at anywhere and at any time from your daily experience;
- utilizes a variety of techniques;
- no specific time span;
- less costly and time-efficient learning process;
- no need to hire experts as most of the professionals may be willing to share their precious knowledge with students/public through social media and the internet;
- learners can be picked up the requisite information from books, TV, radio or conversations with their friend/family members.

Limitations of Informal Education are as follows:

- information acquired from the internet, social media, TV, radio or conversations with friends/family members may lead to disinformation;
- utilized techniques may not be appropriate;
- no proper schedule/time span;
- unpredictable results which simply the wastage of time;
- lack of confidence in the learner;
- lack of discipline, attitude and good habits.

This education is one type that meets older people's expectations related to the life-long learning process, especially concerning mutual or peer-to-peer learning. Moreover, it provides possibilities for learning in a friendly and inclusive atmosphere of, e.g. cultural institutions.

Non-Formal Education

As many sources state, it is problematic to define non-formal education. Ward et al. (1974) say: "A comprehensive and standard definition of non-formal education is not yet available in common usage. Perhaps such a definition will not emerge until after much more study of the educational issues and potentialities inherent in the variety of experiences now called non-formal education has been done." However, non-formal education could be defined within an education spectrum that incorporates how it relates to formal education and informal learning. Based on this approach, UNESCO defined non-formal education as an additional, alternative and/or complemented to formal education within individuals'

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lifelong learning process. It is often provided to guarantee all the right to access education. It caters to people of all ages but does not necessarily apply a continuous pathway structure; it may be short and/or low intensity and is typically provided in short courses, workshops or seminars. Non-formal education mostly leads to qualifications that need to be recognized as formal by the relevant national educational authorities or to no qualifications. Non-formal education can cover programmes contributing to adult and youth literacy and education for out-of-school children, as well as programmes on life skills, work skills, and social or cultural development (ISCED, 2011)

Non-formal learning is also the product of a planned, organized and systematic educational activity to improve skills or competencies. However, it takes place outside recognized educational institutions, and the activities are not usually interconnected in an age-graded and systematic way. It provides selected types of learning to specific groups in places such as businesses, senior citizen centres or libraries (Villar 2013).

Non-formal education includes adult primary education, adult literacy education or school equivalency preparation. In non-formal education, someone (who is not in school) can learn literacy, other basic skills or job skills. Other possibilities include home education, individualized instruction (such as programmed learning), distance learning, and computer-assisted instruction.

Non-formal education is imparted consciously and deliberately, and systematically implemented. It should be organized for a homogeneous group. Non-formal education should be programmed to serve the needs of the identified group.

The strengths of non-formal education are as follows:

- practiced and vocational training;
- naturally growing minds that do not wait for the system to amend;
- literacy with skillfulness growth in which self-learning is appreciated;
- flexibility in age, curriculum and time;
- open-ended educational system in which both the public and private sector are involved in the process;
- no need to conduct regular exams;
- diploma, certificates, and award are not essential to be awarded.

The limitations of non-formal education are as follows:

- attendance of participants is unsteady;
- sometimes, it is just a wastage of time as there is no need to conduct the exam regularly and no degree/diploma is awarded at the end of the training session;
- essential reading and writing skills are crucial to learning;

- no professional and trained teachers;
- students may not enjoy complete confidence as the regular students enjoy;
- some institutes provide fake certification through online courses just for the sake of earning ([Gulzar 2020](#)).

Despite a recent increase in adult and older students studying at regular universities, formal educational programs are restricted to the initial stages of life. As for non-formal learning, its promotion has become the core of lifelong learning policies. These learning opportunities have arisen in different settings and are sponsored by different institutions, including universities, senior centres and self-organized courses. The main concern of the education organizing entity is not to acquire work-oriented skills or qualifications but for participants to socialize and remain active and to promote their personal development (Jamieson 2007). Universities have been particularly active in sponsoring non-formal courses for older people, the best examples being the Universities of the Third Age (in Europe) or the Institutes for Learning in Retirement (in the United States; Villar et al. [2010](#)).

What type of education system to choose?

The elderly vary in their preferences about how and where they want to learn. Some want organized courses and activities. Others want one-to-one tuition or to learn on their own. Some want the courses to be formal, and others want informal activities. A study by the Economic and Social Research Council (2003) in the UK found that many seniors prefer less traditional forms of learning such as reading, conversation and watching educational television. They also found that formal learners are more likely to have had professional or semiprofessional jobs, and women are more likely to have worked. Cruikshank (2003) noted that one of the more significant ways people can be self-reinventive in ageing, particularly women, is through education. However, the educational system does not necessarily welcome older individuals. Lifelong learning has become a catchphrase in education, and the basics of learning and knowledge laid down early in life are critical for learning as people age. It is also commonly argued that feelings of well-being and remaining healthy is vital to achieving successful ageing.

Ward and collaborators (1974) suggest the promise of non-formal education concerning their professionals and leaders. Firstly, he argued that non-formal education promises a more practical approach to relating education to national development. Secondly, he states that non-formal approaches offer functional and practical education, i.e., related to the life needs of the people. Thirdly, non-formal education seeks to maintain a benefit/cost consciousness of what it does to efficiently provide the most effective and purposeful consequences. Fourthly, the inherent commitment to seek innovative means to achieve

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goals. Fifthly, non-formal education offers a more eclectic, multidisciplinary approach to a country's development problem. Sixthly, non-formal education promises to produce short-term effects and long-term achievements. Moreover, last but not least, the seventh promise: non-formal education assists in the decision-making of educational and development funding agencies nationally and internationally. In light of the above-discussed problem on the types of education, the most suitable form of education of seniors in the area of circular economy and recycling is non-formal education with implementations of some methods and techniques used in formal and informal education, including the Kolb's learning cycle.

Kolb's learning cycle and its implications for the seniors' informal and non-formal education

Among many learning methods developed mainly in the 70s or 80s (e.g. Learning Together and Alone Teams-Games-Tournaments (TGT), or Group Investigation) was one proposed by David Kolbe in 1974. It is based on the experiential learning theory that older people can adopt to improve their learning process. The method uses the design of learner-centred experiences that promote balanced learning.

Although it is mostly used in the learning process of students or adult learners, there were already some cases of its implementation to improve older people learning process, to measure self-care behaviors of elderly patients or the individual learning preferences using Kolb's Learning Style Inventory (LSI; Truluck; Courtenay 1999). Due to the balanced and straightforward process of learning proposed, this method is suitable for improving the learning process of older people related to the circular economy and recycling. Moreover, it is the universal method, that can be used in the formal, informal or non-formal type of education system.

The experiential learning theory is a model of adult development that assumes that experiences play a vital role in the learning process. Experiential learning theory postulates that learning is the process by which knowledge is created through the transformation of experience (Kolb, 2014, Table 1). In addition, Kolb postulates that complete learning occurs when students engage in all learning cycle phases (Figure 1). Learning begins when a student engages in an experience and continues as they reflect on that experience. The student's reflection leads to logical conclusions to which theoretical or expert ideas can be added. Finally, students apply and test new concepts and skills to develop templates for new experiences. Often referred to as "teaching around the cycle", Kolb's theory of experiential learning suggests that the instructor can promote complete learning by

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designing course materials to encourage students to complete all phases of the learning cycle. In "cycle teaching", students are encouraged to learn as they are taught using their preferred styles; however, teaching students using less preferred styles can help them develop new ways of thinking about problems or ideas. Kolb believed there are four different stages of learning: concrete experience, reflective observation, abstract conceptualization, and active experimentation. They will be described more precisely in the following subchapters.

Figure 8: Kolb's learning cycle of adults

Source: Kazimierska, I., Lachowicz, I., Piotrowska L., (2014), Kolb, D. A. (2014)

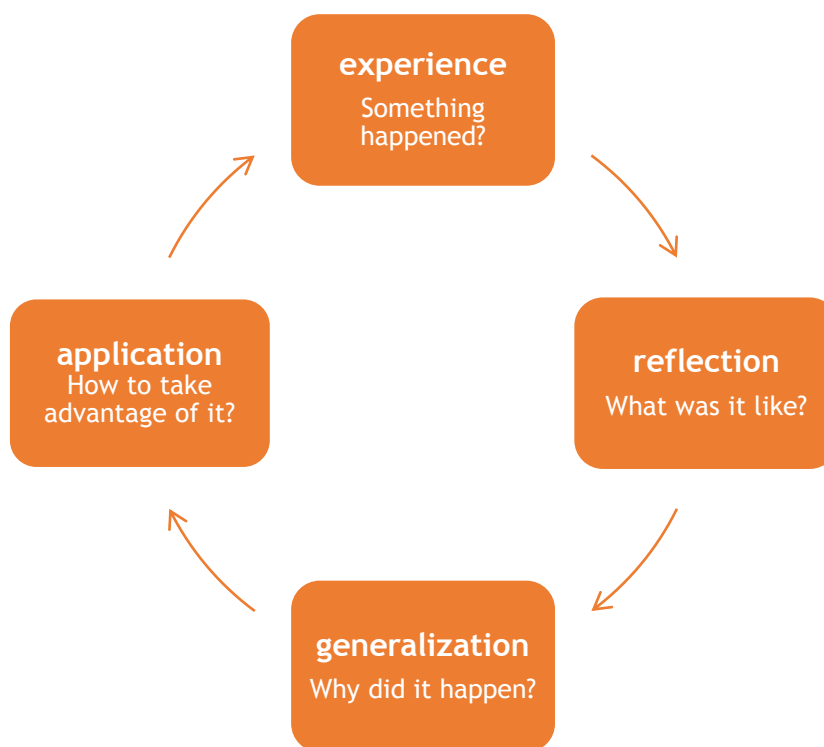


Table. 1: The six main features of the Kolb Learning Cycle

Source: Kolb, D. A. (2014)

Main features of the Kolb Learning Cycle	
1.	Learning is better viewed as a process rather than as a result.
2.	Learning is a continuous operation based on experimentation.

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3.	Education requires resolving conflicts between dialectically different ways of adapting to the environment (education is inherently tense).
4.	Learning is an integral part of adapting to the world.
5.	The study covers interpersonal and environmental transactions.
6.	Learning generates information resulting from transactions between social information and personal knowledge.

Concrete experience

The first stage of learning is known as concrete experience. This is the phase where students actively participate in the experience and can reflect on their actions. Students must know their learning preferences at this stage, which will help them make the most of the experience. For example, some students prefer to work alone, while others prefer to work in groups.

Some students may also prefer learning through hands-on activities, while others prefer learning through observation and reflection. By being aware of their learning tendencies, students can make the most of the Concrete Experience stage and ensure they benefit from it.

Reflective observation of a new experience

Reflective observation is the second stage of Kolb's learning cycle. At this stage, students reflect on their concrete and reflective experiences to better understand them.

This understanding is then used to shape future behaviour. Reflective observation requires a willingness to reflect on one's own experiences and the ability to look at these experiences from multiple perspectives. We can only learn from our mistakes and make meaningful life progress through reflective observation.

This is essential in learning as it allows learners to combine their experiences and existing knowledge. By reflecting on new experiences, they can learn from their mistakes and solve problems better.

Abstract conceptualization

The third stage of Kolb's learning cycle is abstract conceptualization. This is when students begin understanding the abstract concepts behind what they observe.

They begin to see the connections between ideas and develop their theories about how things work. This is the active stage when students constantly test their ideas and validate their understanding based on new information. Abstract conceptualization is a critical moment in the learning process, as is when students develop a deep understanding of the subject. This stage requires students to repeat what they have observed without understanding it.

Active experimentation

At the fourth stage of the process student relates his thoughts to the world around him to see what is happening. Applying learning to other activities is more important than learning from a completed experience. It would be easier if people in their offices could make an analogy of implementing learning in everyday life or the case of work.

Based on the experiential learning theory Kolb defined four types of learning that correspond to active experimentation phase. The models highlight situations where students perform better. These types are as follows:

- Assimilators: who learn better when they make solid logical hypotheses.
- Convergers: who learn better when they have a realistic implementation of rules and hypotheses.
- Accommodators: What is learned more when given "hands-on" opportunities.
- Differences: what can be learned more by observing and collecting diverse information.

Why is Kolb's learning cycle important? Kolb's learning cycle is essential for understanding how people learn and remember new information. It also provides a framework for designing learning experiences that are more effective for different people.

The four stages of Kolb's learning cycle are concrete experience, reflective observation, abstract conceptualization, and active experimentation. Most people prefer one stage over another, but all four stages are essential to successful learning.

For example, someone who prefers abstract conceptualization may need help with tasks that require hands-on experience. On the other hand, someone who prefers concrete experience may need help with tasks requiring much reflection and contemplation.

Benefits of experiential learning and Kolb's learning styles

Experiential learning is a hands-on learning approach that encourages students' active participation. This type of learning can be especially beneficial for students who prefer a convergent learning style, as it allows them to apply what they have learned to solve real-world problems. Technical tasks are often a good fit for experiential learning because they lend themselves well to trial and error. However, it is essential to note that all students can benefit from experiential learning, regardless of their learning style preferences. Furthermore, Kolb's learning cycle provides a valuable framework for constructing experiential learning activities. The learning cycle consists of four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. By following this cycle, students can ensure they get the most out of their experiential learning experiences.

Why is the Kolb cycle suitable for senior learning?

Older learners prefer a stress-free learning environment with no assignments, tests or mandatory assessments (Duay & Brian, 2008). Finally, in addition to these cognitive and motivational trends, diversity is a significant challenge teacher of older students face. Teachers are faced with a wide range of learning environments, expertise and learning skills developed over six, seven or eight decades of life experience (Villar et al., 2010). It is because of this experience that seniors have at their disposal that the Kolba cycle is the most appropriate way to acquire knowledge. While recalling experiences (in Kolb's specific experience), seniors will learn. The knowledge they acquire will be combined with a specific experience and what they have achieved thanks to this experience (reflective observation of a new experience). Another indication that Kolb's cycle may be valid for adult learning is the fact mentioned by Craik and Jennings (1992), namely that the ability of older adults to remember new information presented visually or aurally shows deficits compared to that of younger adults.

The experiences of seniors' teachers - review

It has been recognized that non-formal learning activities are preferred by older adult participants (Jenkins, Mostafa, 2015; Bjursell, 2018). Furthermore, it is crucial that older adults can control their own time and choose the activities they wish to engage in. They are willing to do a great deal in this area if they can do it on their own terms, as autonomy is an even more articulated need as we age (Bjursell, 2019).

The basic premise in geragogy (teaching older adults) is that learning should be based on enjoyment and curiosity, and consequently, tutors should

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stimulate learner engagement with positive comments and encouragement. Geragogy further provides tutors with a set of principles that can guide them in how they might structure a course:

- to present the outcomes of a course before the course is taught,
- to use of a variety of teaching methods,
- to adopt a flexible approach,
- to take the learners' past experiences into consideration, since they can be useful in grounding the learners' understanding,
- to maintain a clear focus on the topic,
- to adapt the course structure to the learners' pace,
- to pay attention to cases where a participant may need to “unlearn” certain information from the past.

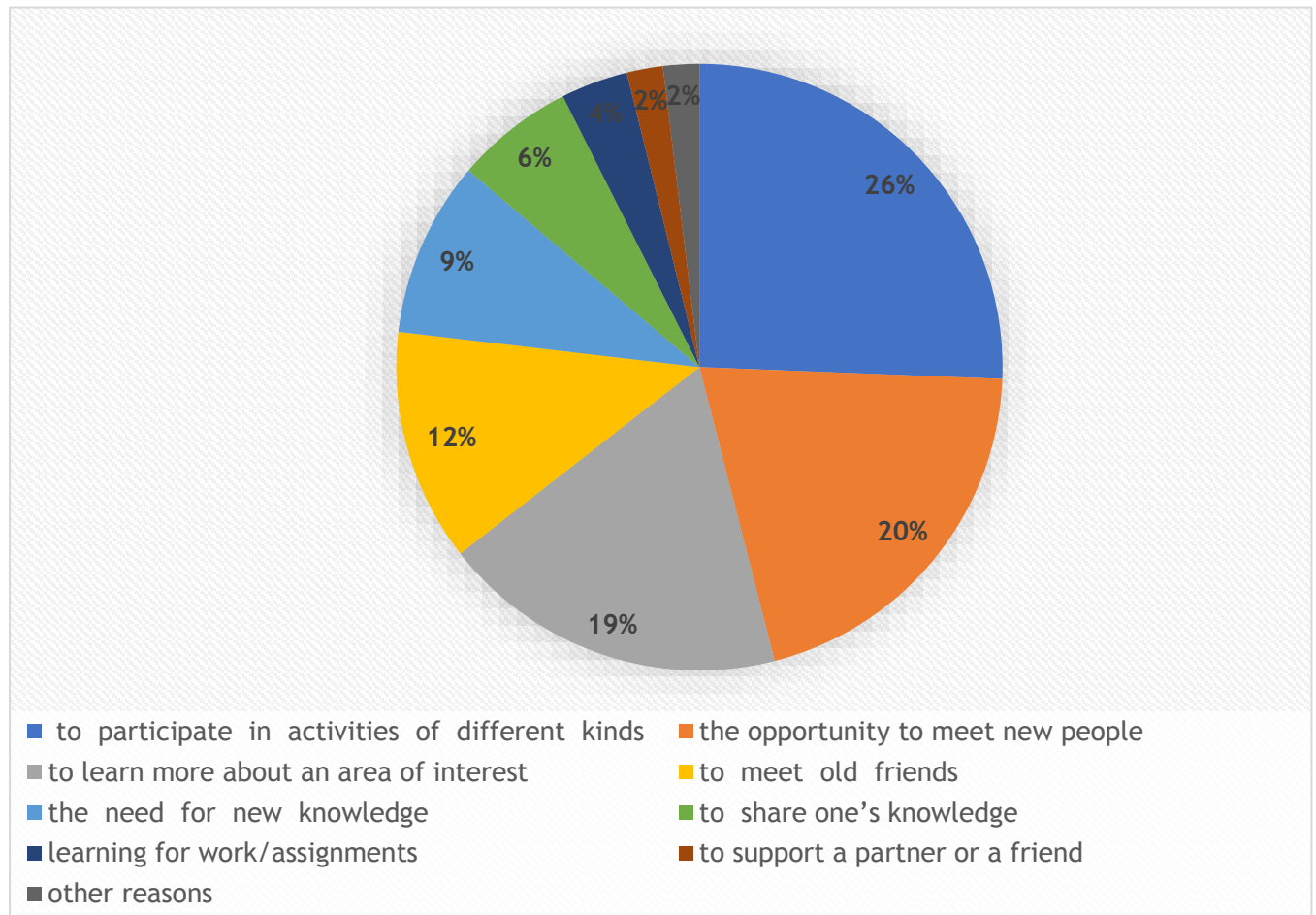
However, it should not be forgotten that geragogy has been subject to some criticism. For example, Findsen and Formosa (2012) state that this theory promotes a distinctly top-down approach, where teachers are expected to satisfy older adults' need for stimulation. This approach can also be seen as counter-productive because it treats participants as education consumers rather than creators of knowledge. In the education of older adults, it should be remembered that they are not only consumers, but also co-creators of knowledge.

In the context of older adults' learning, the learning atmosphere is also very important. In contrast to formal educational settings, older adults are reported to thrive in settings that enable peer-teaching, where the curriculum is developed in consensus with the group of learners, and wherethey can learn through activities that are perceived as being meaningful. Older adults are positive towards peer teaching for example, which is a learner-centred activity where members of an educational community plan and facilitate learning opportunities for one other (Brady et al., 2003). A positive rapport between tutor and learner and a feeling of social inclusion generates a great deal of motivation within older learners and provides them with a sense of community.

There are several reasons why older adults might wish to engage in learning. However, they can be summarised as wanting to stay active and socialize, which is confirmed by numerous studies, e.g. Bjursell, 2019 provides arguments why the respondents participate in education activities as presented in Figure 2.

Figure 9: Reasons why older adults might wish to engage in learning

Source: Authors' own work based on Bjursell, C. (2019)



It is worth noting that the importance of ‘engaging in activities’ and ‘the opportunity to meet new people’ was mentioned more frequently than the actual content in the course (‘to learn about an area of interest’ - that is, a particular subject). The three most common arguments are in accordance with the observation that the study circle is the dominant education activity form, since it is based on active participation, social interaction, and the content of study (Bagchegi et al., 2021).

The only factor relevant to predicting participation in education, according to the latter study, consisted of the individual’s previous level of educational attainment: the higher the level of educational attainment achieved earlier in life, the more probable it was that the individual would take part in educational activities later in life. That is why, efforts to support participation and inclusion in education should take this into consideration. Participation and inclusion in this case concern not only people with physical limitations, but also educational or financial ones (Cera et al., 2018). In the education of older adults, people with different levels of education and material status should be taken into account.

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Organization of the model workshop on recycling for seniors - general recommendations

- **Workshop - information channels** - various information channels - press, radio, television, leaflets, application, word of mouth marketing, a group of information volunteers.
- **Educator** - He/she must carefully prepare for classes - the elderly are among the most demanding, exciting and inquisitive educational groups. The tutor can propose his rules, e.g. "we do not judge ourselves and others", and use the term "agreement" or "set of rules". The educator presents the effects of the course before it begins. The workshop leader should answer questions but also be able to admit that he/she does not know something, apologize, and look for answers. Everyone ages differently, and a good educator should be able to deal with it; he/she must be familiar with the specifics of working with the elderly. During the workshop, the tutor tries to get to know the group, is interested in the participants, and adjusts the language, speech clarity, and volume to the needs of the people participating. The educator should be a nice person, creating a positive atmosphere. He/she should transfer knowledge and not appropriate it, and emphasize creative thinking and methods of integrating knowledge with experience, e.g. "let's talk about your experiences with ...". He/she stimulates the engagement of participants. He/she applies good practices in educational work with seniors: sympathy, respect, patience, lack of criticism, commitment, partnership, support, empathy, motivation, sense of humour, assertiveness, and gratitude.
- **Workshop title and description** - the workshop should have an encouraging name, i.e. a catchy, "sexy title", and at the same time, a meaningful topic/s; the substantive content should be conveyed "by the way", e.g. "let's talk about..." It is necessary to present the workshop's goal, plan and outcomes.
- **Workshop content** - the knowledge transferred should be of the best quality, and the form of the workshop cannot exceed the content.
- **Workshop location** - older adults prefer activities that do not require a longer journey. The workshop can be conducted both indoors and outdoors. Close to where they live; a safe neighbourhood, a safe road to the workshop site (taking into account the time of year and day), and close to public transport.
- **Building** - A friendly, cool place, e.g. a cafe, gallery, club, library, etc., where we can "talk about something", preferred level "0", a place adapted to the needs of the

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elderly (e.g. ramps, stairs, handrails, elevators, type of surface), need to be close to the bathroom.

- **Workshop room - *spacious*** (cannot be too cramped; there must be room, for example, for participants' personal belongings and rehabilitation aids), *appropriate furnishings*, i.e. durable furniture, comfortable seats, preferably chairs with backrests and handrails (easy to get up from); *the arrangement of furniture*, i.e. furniture that can be easily rearranged, e.g. preferred tables arranged in a circle; *safety*, among others no sharp edges, lots of cables, unstable carpets and rugs; *appropriate temperature and ventilation, lighting*: preferred daylight, glare avoidance - use of curtains, blinds; *sound system*: elimination of noises, humming; attention to good acoustics, the possibility of closing doors and windows if necessary.
- **Time arrangements** - not too early - "after coffee, but before lunch"; duration - 2 to 3 hours, the public transport timetable should be considered (bus, tram, metro etc. - if possible, check if it includes low-floor vehicles).
- **Participants** - choose people who can later act as leaders in their environments; strive for social integration - try to invite people from different groups to classes - activate men, people with lower education and income; smaller groups - up to 15 people, the group can be very diverse - there is a strong variation in the course of aging.
- **Educational aids** - use traditional educational aids (e.g. boards) and teaching materials (e.g. presentations, leaflets) adapted to the needs of older people (page layout, text formatting, font, contrast, colour saturation and shading, graphics). When using new technologies, it is also important to take into account the needs of the participants - preferred tasks using the phone, with which older people are more familiar than with the computer.
- **Working materials to be used during the workshop** - the choice of materials depends on the workshop subject; they may be related to participants' experiences. When inviting them, one can ask to bring some of the materials that will later be used during the workshop, depending on the types of waste to be recycled.
- **Learning atmosphere - "*incentives*,"** e.g. coffee, tea, water; tasty refreshments; *attractive place* (aesthetic, nice, festive space); *building relationships* - the relationship between participants and the educator as well as between participants themselves are very important; the possibility of establishing and deepening acquaintances; casual/friendly atmosphere conducive to active participation , e.g. asking questions and *building a sense of community*.

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- **Workshop assessment** - evaluation survey.
- **End of the workshop** - distribution of educational materials related to the promotion of the circular economy. Development of, e.g. a book of good practices, a library of recommendations, prepared following the needs of the older adults. Offering a meaningful souvenir (something reasonable/valuable that can be taken home and will remind the participants of the workshop's leitmotiv and motivate them to apply the acquired knowledge). It is essential to summarize and thank them for participating in the workshop.

Seniors' teaching methods to be used

- When using Kolb's learning cycle in teaching older people, one should abandon the traditional approach to teaching methods that focus on teaching them theory (only theory; first theory and then conducting practical classes) and rely on their experience. Learning is an active process. Engaged older people transform experience into learning and development through action and reflection (Kolb 2014, Kolb et al. 2001, Watson et al. 2019). Learners' understandings deepen and broaden through an iterative process, supported by teaching actions and assessment processes (Bransford et al. Schultz et al. 2016). In addition, subsequent experiences may be an opportunity for the participants of the classes to draw further conclusions and, consequently, initiate the next learning cycle, which will enable them to constantly confirm and update their skills (Zabłocki, Nowacka 2014).
- The selection of methods affects the form and effectiveness of teaching this age group as well as the attractiveness of the training itself. When educating in accordance with the Kolb cycle, a variety of teaching methods should be used. We suggest focusing on the most effective ones (Tabel 2), i.e. those based on the activity and commitment of the learner.

Table 2. The effectiveness of adult teaching methods

Source: Karney (1998)

Categories of methods	Methods	Effectiveness of methods (in points from 1 to 9)
Spoon-feeding	1. Lecture	3
	2. Talk	4
	3. Models	2
Direct teaching	1. Trening	9

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	2. Show	6
	3. Observation	6
	4. Models	4
	5. Case study	9
	6. Demonstration	7
	7. Staging	9
	Exploring	1. Discussion
2. Experiment		7
3. Practicing skills		9
4. Brain storm and similar methods		8
5. Didactic games		9
6. Problem groups		9
7. Discourse		9

- Base no the Karney’s (1998) research it is effective to use (during the workshop) the mixed-method approach:

a) spoon-feeding based:

- **a talk** - a guided conversation between the teacher/trainer and the students, during which questions are asked. They should inspire expression. The chat resembles a lively, everyday conversation. This form can be taken, for example, by classes conducted by an expert who is a specialist in a given field,
- **a lecture** - a planned speech to convey knowledge of a topic to the audience.

b) direct teaching based:

- **case study** - analysis combined with a discussion on the presented case (real or imaginary). The problem situation is presented in such a way as to use the acquired knowledge and experience of the participants,
- **staging** - listeners assume roles. A script and appropriate props are required for the classes.

c) Exploring:

- **discussion** - conversation, exchange of opinions of participants in the training; sharing experiences and opinions,
- **skills training** - enables students to use and creatively apply acquired knowledge in practice,

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- **brainstorming** - aims to create as many ideas as possible by the participants, and then select the most valuable ones to achieve the assumed goal.
- A valuable supplement to the "in-room" classes will be outdoor activities, e.g. in the form of thematic walks, exploratory walks. This type of classes is conducive to observation, developing creativity and testing your knowledge and skills in practice.

The methods used allow mastering the material, new skills and habits in an accessible way, in an atmosphere of acceptance, triggering curiosity and a sense of comfort.

Workshop scheme

- **Introduction** - Welcome; "Let's get to know each other" - educator and participants. Presentation of the workshop's aim and introduction to the topic. Using commonly known terms in conversation: ecology, climate, recycling, what is CO2 on examples ("Let's talk about..."). Hierarchy - start with the participants (everyone is interested in aspects from their backyard, practical matters), then: home, village/housing estate/city, country, world.
- **Stage I: concrete experience (feeling)** - concerns specific experiences of workshop participants related to the circular economy. We can refer to what the participants have already experienced (we reach for experiences and memories) or create new experiences if they did not have them (e.g. by presenting exemplary situations). The educator initiates specific problems, proposes tasks, and asks questions.
Method proposed: a talk, staging, case study, exploratory walks
- **Stage II: Reflective observation (observing) theorising** - participants share their opinions and conclusions, they have possibility to talk a lot. Through reflection, they become aware of the mechanisms that drive the circular economy. The educator moderates new threads and allows the participants to draw their conclusions. Finally, he/she shares his/hers observation. What has your experience shown? Why is this important? What are the conclusions? What questions need to be answered? Regarding recycling, it is worth asking questions: "Why are we doing this?" "Why should I segregate garbage when my neighbour doesn't?" "I have a small apartment, where should I fit 5 bins for sorting waste?"
The aim should be to "pull information from the participants about what they have a problem with. What do they want to pay attention to? What annoys them? This is important because, generally, no one listens to them.

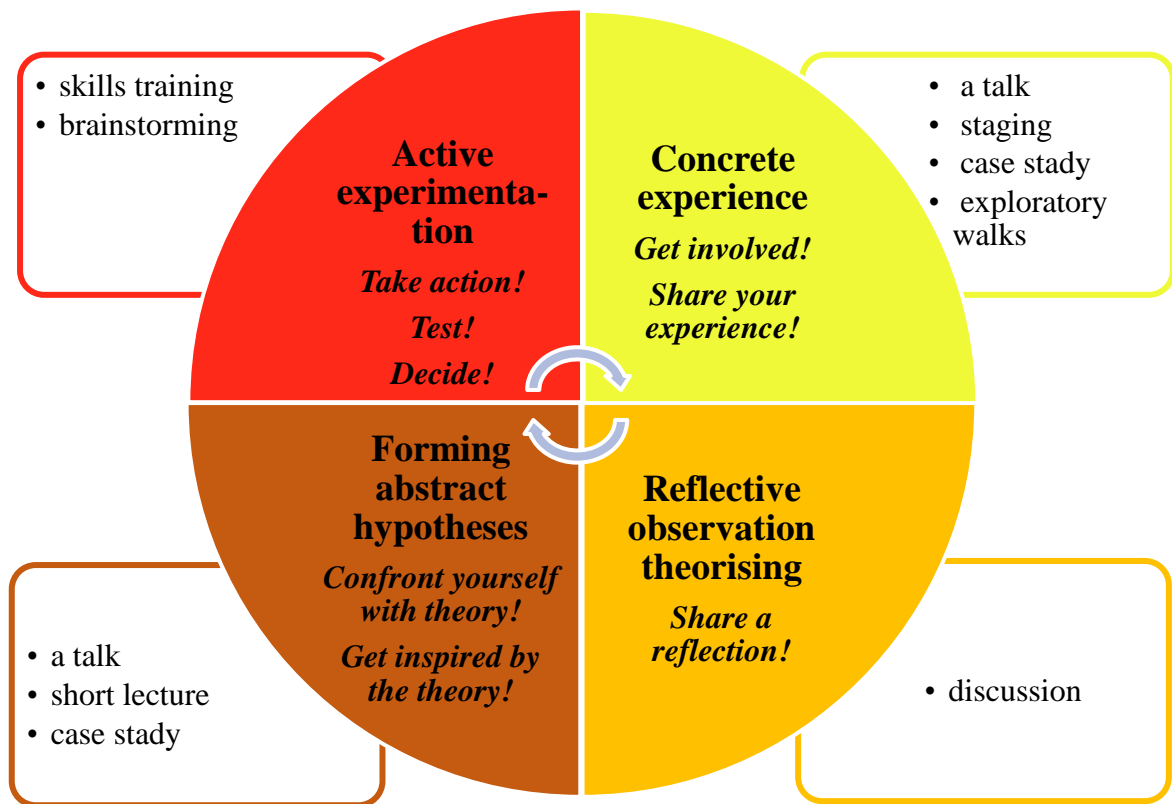
Method proposed: discussion

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- **Stage III: Forming abstract hypotheses (thinking)/Abstract Conceptualization** - participants confront their conclusions with the theory of the circular economy and its correct practical application (embedding in theory). The task of the educator is to summarize the conclusions drawn by the group and relate them to the theory. In this part of the process, the educator enables the group to learn, recall or expand (depending on the level of knowledge) the circular economy concept. Practitioners and people related to the circular economy (e.g. representatives of offices, and professionals dealing with waste management) can be invited to the workshops, they will support the process of expanding knowledge about the circular economy by presenting, for example, legal conditions, and practical aspects. Participants' activity consists, for example, in writing down the most important conclusions, e.g. What does all this mean? Can you put it all together?
Method proposed: a talk, short lecture (with presentation, film), case study.
- **Stage V: Active experimentation (action)** - participants apply new knowledge in practice. Under the supervision of the educator, whose task is to make corrections, the participants check whether they can use the new knowledge. This stage leads to learners consciously changing their behaviour and using the acquired knowledge about the circular economy to solve problems and make everyday decisions (implementation of acquired skills). Creativity. Going outside the box. What can I do? What am I still unable to do? What is easy, and what is difficult for me? How can I use the acquired knowledge? What can I change?
Method proposed: skills training, brainstorming.

Figure 10. Organisation of the workshop based on the Kolb's Learning Cycle

Source: Authors' own work based on Kolb (1976, 2014)



The workshop in the proposed form allows participants to supplement and deepen the necessary knowledge and practical skills in the field of circular economy and shape habits helpful in their everyday lives. According to Kolb (1974), learning is an integrated process - each stage being mutually supportive of and feeding into the next. The workshop should be structured so that the participant can freely start learning at the stage of their choice. However, it should be remembered that effective learning only occurs when a learner can execute all four steps of the model. None of the cycle stages is effective as a learning procedure in itself. The learner “touches all the bases” in a four-stage learning cycle” (McLeod, 2017).

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