

# Transnational Information Literacy Ecosystem Mapping (TILEM) – Book

*Building the Capacity of Educators &  
Librarians in Information Literacy  
(EDUCABILITY)*



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## Building the Capacity of Educators & Librarians in Information Literacy (EDUCABILITY)

(1/12/2020 – 28/02/2022)

**“Intellectual Output 1”**

# Transnational Information Literacy Ecosystem Mapping (TILEM) – Book

coordinated by the partner UNIWA-Greece  
with the contribution of CUT-Cyprus, UC3M-Spain, UNS-SERBIA,  
CSICY-Cyprus



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## Preface

EDUCABILITY is a transnational Program which is implemented by the following partners within the framework of ERASMUS +: CUT-Cyprus, UNIWA-Greece, UC3M-Spain, UNS-Serbia, CSI-Cyprus (for more details see <https://educability.cut.ac.cy/>).

EDUCABILITY main objectives are: **(A)** Development of a freely available, electronic, unified “Information Literacy Training Package” for educators and librarians. **(B)** Distance, asynchronous, free of charge training of educators in all levels of education and of librarians, in the basic skills of Information Literacy, as a horizontal goal, and as vertical goals, training in the following six (6) emerging literacies: Digital Literacy, Mobile Literacy, Media and Information Literacy, Critical Information Literacy, Data Literacy, Sustainable Development Literacy. **(C)** Convergence in strategy, know-how and infrastructure for Information Literacy initiatives through a Transnational Memorandum of Cooperation, Sustainability and Transferability between EDUCABILITY partners.

In order to achieve the **first objective**, namely the creation of a freely available, electronic, unified “Information Literacy Training Package-ILTP” for educators and librarians, a division of labor was made between EDUCABILITY partners, aiming to produce two (2) Intellectual Outputs-IOs. IO1 - "Transnational Information Literacy Ecosystem Mapping - TILEM", coordinated by the partner UNIWA-Greece, concerned four (4) Tasks. Task-1 was about the mapping of the international literature on six (6) scientific subjects related to information literacy: Digital Literacy & Mobile Literacy that CUT-Cyprus carried out; Media and Information Literacy carried out by UNIWA-Greece; Critical Information Literacy & Data Literacy carried out by UC3M-Spain; Sustainable Development Literacy carried out by UNS-Serbia. Task-1 was carried out on the basis of a pre-agreed, among EDUCABILITY partners, protocol of systematic review of sources, which examined the latest research and publications on the aforementioned literacies and classified them by the type of each source and their relevance to EDUCABILITY objectives. Also, using the text analysis method, it identified the reliability of the sources, their key concepts and content and recorded all the information that could form the basis for the development of six (6) relevant curricula. The content of these curricula aims to train educators of all levels and types of education, as well as librarians of all types of libraries and information organisations. Each proposed curriculum was summarized and codified in the following categories:1) New and/or supplementary definitions of each literacy;(2) Key concepts and content of each literacy; (3) Learning objectives and outcomes integrated in distinct thematic units of each curriculum;(4) Teaching approaches and evaluation methods common for the six curricula. To ensure the adequacy of the proposed curricula, EDUCABILITY partners implemented Task-2 and Task-3 of IO1. “Task-2 Needs Analysis”, was about selecting approximately fifteen (15) experts per literacy, a total of sixty (60), that was based on a predefined "Knowledge Resource Nomination Worksheet", agreed between the partners of EDUCABILITY. The above experts, who are active in the broader field of Information Literacy and on a case-by-case basis, in the six (6) aforementioned information-related literacies, were invited to act as critics of the six (6) proposed curricula. “Task-3 Delphi Studies”, concerned six (6) different surveys that were conducted with the method of Delphi Study. The process took place online, during December 2021, via a special software (Welphi), which can support the Delphi method requirements. Their findings were properly processed and recorded by each partner, in six (6) separate Delphi



Studies Reports, one per literacy. “Task-4 TILEM Book” of IO1, is pulling the content of the three previous Tasks together and is presented in the form of a book.

The findings of IO1-TILEM will be used as the ground floor to build the full curricula of the six (6) aforementioned literacies and to deliver the second Intellectual Output, namely “IO2-Six Information Literacy Learning Modules Curriculum Development (SILLMCD)”, coordinated by CUT-Cyprus. The curricula will be gradually integrated, piloted and delivered into a virtual learning environment (VLE), specially configured for the purposes of EDUCABILITY during the third Intellectual Output, namely “IO3-Information Literacy Training Package (ILTP)”, coordinated by the partners UC3M-Spain & CSI-Cyprus. By completion of IOs 1, 2 and 3 will be fulfilled the **second objective** of the Program, namely the infrastructure for distance, asynchronous, free of charge training of educators and librarians, in the basic skills of Information Literacy, as a horizontal goal, and as vertical goals, training in six (6) emerging literacies. The **third objective**, coordinated by UNS-Serbia, concerns the compilation and approval of a transnational memorandum of cooperation, sustainability and transferability between EDUCABILITY partners and is implemented in the context of the fourth Intellectual Output, namely “IO4-Transnational Memorandum of Cooperation, Sustainability and Transferability (TMCST).

# 1. Partners' contribution to the Program

EDUCABILITY implementation process was based on a division of labor between the partners for the production of four (4) Intellectual Outputs - IOs, which are interconnected in order to bring innovative results. Each IO includes specific tasks with intermediate and final deliverables, that are guided each time by one of EDUCABILITY partners. It is important to mention that all partners contribute collaboratively to the process of achieving the results.

In more detail, whilst partners have specific roles and responsibilities, the Program was designed so that all partners were involved in every stage, meaning that knowledge and expertise could be more effectively pooled and shared. Each partners' detailed contribution is showcased throughout the various chapters of TILEM Book, the IO1 of this transnational cooperative initiative.

## 2. Introduction

EDUCABILITY Program started in the fall of 2020 as a pioneering effort, which seeks to meet specific urgent requirements of the current Information and Knowledge Society. The innovations it proposes aim at four directions:

1. Conceptually, it attempts to promote six emerging information-related literacies from a holistic perspective, that of Information Literacy (IL).
2. Strategically, it aims to cultivate cooperation and create the common infrastructure for IL development at transnational level.
3. Technologically, it seeks to demonstrate and expand ICT capabilities in the context of learning environments.
4. Educationally, it wishes to support the ongoing training of those human resources, namely educators and librarians, who can disseminate knowledge with pupils, students and the general public.

The Program is implemented in English, within the framework of ERASMUS +, with the participation of the following five partners: CUT-Cyprus, UNIWA-Greece, UC3M-Spain, UNS-Serbia & CSICY-Cyprus.

At the transnational level, it is estimated that EDUCABILITY Program contributes to the consolidation of a common perception about the value of Information Literacy among the Program's partners as well as among the organisations and the stakeholders that these partners represent. At the same time, establishment of the know-how and infrastructure that support collaborative initiatives for Information Literacy has started.

After the completion of the Program it is estimated that the integration of Information Literacy and the information-related literacies in various educational settings (formal, informal, non-formal) and in the real world, will result in the development, implementation and dissemination of a variety of skills necessary for a democratic and sustainable society.

Additionally, the experts invited to participate in the Delphi Studies that were conducted in the frame of the Program welcomed this initiative, the overall aim of which is to offer a freely available and open electronic course for educators and librarians. Their meaningful contribution in the six aforementioned literacies, the curricula of which they evaluated, in terms of importance and suitability, will offer the target audience the opportunity to improve their existing skills, but also to develop new ones that aim to support their ongoing professional and personal development.

It is important to mention that educators and librarians are placed at the heart of today's Information and Knowledge Society and can act as multipliers of Information Literacy skills to the communities they serve. Therefore, any benefits are directed to the society as a whole.

### 3. Objectives of EDUCABILITY Program

The main objectives of EDUCABILITY Program are the following three: **(2.1)** Development of a freely available, electronic, unified “Information Literacy Training Package” for educators and librarians. **(2.2)** Distance, asynchronous, free of charge training of educators in all levels of education and of librarians, in the basic skills of Information Literacy, as a horizontal goal, and as vertical goals, training in the following six (6) emerging literacies: Digital Literacy, Mobile Literacy, Media and Information Literacy, Critical Information Literacy, Data Literacy, Sustainable Development Literacy. **(2.3)** Convergence in strategy, know-how and infrastructure for Information Literacy initiatives through a Transnational Memorandum of Cooperation, Sustainability and Transferability between EDUCABILITY partners.

In order to achieve the first objective, namely the creation of a freely available, electronic, unified “Information Literacy Training Package-ILTP” for teachers and librarians, a division of labor was made between EDUCABILITY partners, aiming to produce two (2) Intellectual Outputs-IOs. **IO1 - "Transnational Information Literacy Ecosystem Mapping - TILEM"**, coordinated by the partner UNIWA-Greece, concerned four (4) Tasks.

The findings of IO1-TILEM will be used as the ground floor to build the full curricula of the six (6) aforementioned literacies and to deliver the second Intellectual Output, namely “**IO2-Six Information Literacy Learning Modules Curriculum Development (SILLMCD)**”, coordinated by the partner CUT-Cyprus.

The curricula will be gradually integrated, piloted and delivered into a virtual learning environment (VLE), specially configured for the purposes of EDUCABILITY during the third Intellectual Output, namely “**IO3-Information Literacy Training Package (ILTP)**”, coordinated by the partners UC3M-Spain & CSI-Cyprus.

By completion of IOs 1, 2 and 3 the second objective of the Program will be fulfilled, namely the infrastructure for distance, asynchronous, free of charge training of educators and librarians, in the basic skills of Information Literacy, as a horizontal goal, and as vertical goals, training in six (6) emerging literacies.

The third EDUCABILITY objective, coordinated by UNS-Serbia, concerns the compilation and approval of a transnational memorandum of cooperation, sustainability and transferability between EDUCABILITY partners and is implemented in the context of the fourth Intellectual Output, namely “**IO4-Transnational Memorandum of Cooperation, Sustainability and Transferability (TMCST)**”.

## 4. Transnational Information Literacy Ecosystem Mapping (TILEM) - BOOK

As mentioned before, for the implementation of the first objective, namely the creation of a freely available, electronic, unified "Information Literacy Training Package-ILTP" for teachers and librarians, a division of labor was made between the partners of the Program. The aim was to produce two preparatory projects (Intellectual Outputs-IOs).

This publication presents the first intellectual output (IO1), entitled "Transnational Information Literacy Ecosystem Mapping - TILEM" in the form of a book. IO1 coordinated by the partner UNIWA-Greece, concerned four (4) tasks, the actions and the results of which are detailed in the following chapters.

### 4.1 Task 1 – Mapping of the state of research in Information Literacy and in Emerging Literacies

The first task was about the extensive and systematic review of the international literature on six scientific subjects related to information. The task was carried out on the basis of a pre-agreed, among EDUCABILITY partners, protocol of systematic review of reliable and relevant sources [see Annex 1 - General Guidelines & Suggestions for the Source Mapping]. It was delivered in the form of six source mappings, one per each scientific subject, by each specific partner who was in charge for the pertinent subject. Each source mapping, examined the latest research and publications on each of the six literacies, using as main eligibility criterion their relevance to EDUCABILITY objectives and classifying them by the type of each source.

Also, applying the text analysis method, it identified the reliability of the sources, their key concepts and content and recorded all the information that could form the basis for the development of a relevant curriculum per literacy<sup>1</sup>. In each source mapping, the proposed curriculum was summarized and codified in the following categories: 1) New and/or supplementary definitions of each literacy;(2) Key concepts and content of each literacy; (3) Learning objectives and outcomes integrated in distinct thematic units of each curriculum;(4) Teaching approaches and evaluation methods common for the six curricula.

The six source mappings concerned the following:

- (1) Digital Literacy - DiL, which mainly deals with the development of skills for locating, accessing, managing, integrating, evaluating, analyzing and synthesizing information circulated in digital form. It also focuses on how individual points of view and communication with others can be effectively expressed in a variety of digital media within specific life situations. In addition to the production of new knowledge, the ultimate goal is for individuals to participate constructively in social action and reflect on their "digital" participation.
- (2) Mobile Literacy - MobL, which focuses on the use and creation of customized learning content for mobile devices, that are cost-effective and accessible to all and especially to people with learning disabilities. The partner CUT-Cyprus carried out the source mappings of the above two subjects.

<sup>1</sup> Krippendorff, K. (2018). *Content analysis: An introduction to its methodology*. Sage publications.

- (3) Media and Information Literacy – MIL, which fosters the ability to understand the ways in which the media, the Internet, and information organisations, such as libraries, archives, and museums, operate as information providers. It is important that it focuses on the critical evaluation of both the media and organisations themselves, as well as their diverse and rich content. It also aims to empower individuals to make informed decisions and take ethical responsibility, not only when using and sharing but also when producing their own information and multimedia content. The source mapping of this subject was carried out by the partner UNIWA -Greece.
- (4) Critical Information Literacy - CrIL, which focuses on decoding the multiple forms of content in print and electronic documents, as well as in digital media. In particular, it focuses on the detection and correct treatment of any prejudices, social, racial, religious and others, that may be expressed by the author / creator of various texts, images and audiovisual material, such as videos.
- (5) Data Literacy - DataL, which focuses on how to find, manage and understand different data sets. It also concerns the development of skills both in the interpretation and the creation of representations of data sets. The source mappings of the above two subjects were carried out by the partner UC3M-Spain.
- (6) Sustainable Development Literacy - SDL, which deals with building the ability to make sustainable decisions in various areas of life. It promotes their implementation in ways that meet the needs of the present, without compromising the ability of future generations to meet their own needs. The source mapping of this subject was carried out by the partner UNS-Serbia.

The content of each proposed curriculum aims to train educators of all levels and types of education, as well as librarians of all types of libraries and information organisations. The reason it was decided to develop educational content for educators and librarians rather than end-users, is because they can act as multipliers of the above information-related literacies, in a variety of settings, such as schools, universities, libraries, communities and a variety of constantly emerging physical and virtual ecosystems related to information and knowledge.

It is obvious that the above scientific subjects differ in content. However, the literature review reveals that they have many similarities in their scope. In essence, the skills they offer and the adoption of the effective behaviors they suggest are directly related to the information produced and consumed in today's Information and Knowledge Society. In short, all six subjects are more or less concerned with the development of adequate skills in the search, evaluation, analysis, synthesis/production and dissemination of information. In addition, they all support the concept of learning through the contact of the individual with information, a complex process that goes beyond simply locating information and finding answers to a specific question. They essentially focus on the search and interpretation of elements that will allow a multifaceted and more objective perception around a topic, on the effective and ethical use of information and on the effective production and dissemination of new information and knowledge. In this light, we can confidently place them in the broader context of Information Literacy and call them information-related literacies.

## 4.2 Task 2 – Trainees’ needs analysis & creation of a Pool of 60 experts

In order to ensure the adequacy of the six (6) proposed curricula, each source mapping was designed and implemented in a way that is primarily aimed at an audience of experts. Experts, as they are already active in the broader field of Information Literacy and on a case-by-case basis, in the six aforementioned information-related subjects, are best placed to evaluate the curricula intended for the training of a large number of educators and librarians. Therefore, the experts were invited to act as critics of the proposed curricula, which was recorded in six source mappings, one for each literacy, the content of which was used to design six different surveys with the method of Delphi Study.

The selection of approximately fifteen (15) experts per literacy, a total of about sixty (60), was based on a predefined "Knowledge Resource Nomination Worksheet (KRNW)" – *[see Annex 2 – UNIWA [Task 2] Trainees’ needs analysis for the creation of a Pool of 60 experts - Intellectual Output 1 [IO1] - Leading partner: UNIWA-Greece]*, agreed between the partners of the EDUCABILITY Program and concerned the following:

- Determination of scientific profile, area of specialisation and professional practice of experts active in the wider field of Information Literacy, e.g. information scientists, teachers of all specialties, librarians, ICT trainers and other stakeholders, such as education policy makers
- Search and collection of names and contact details of the experts, which they themselves had posted and made public, through their freely accessible personal websites, the freely accessible social media and the freely accessible websites of the organisations in which they work
- Sending an invitation to the experts, via e-mail, by which they were informed about the context and purpose of each Delphi Study and were invited to express their intention and availability
- Collection of answers and categorisation of experts in an appropriate list based on their scientific profile and their availability

A more detailed information of the experts concerned the following:

- Invitation to experts to participate in an informative tele-meeting for each Delphi Study, to which a form on how to submit possible complaints or grievances was also attached
- Conducting an online meeting, through teleconferencing services, to further inform the experts about their participation in each respective Delphi Study, e.g. for the steps and the rounds of each DELPHI Study, information on the specialised software through which the rounds would be conducted, information of the participants' answers to the survey's questions and other procedural and technical details of its conduct. Each of the tele-meetings took place in the language of the relevant country

Each EDUCABILITY partner followed the above steps, created their pools of experts and uploaded the related documents on the common electronic intra-communication infrastructure of EDUCABILITY Program.



### 4.3 Task 3 – Delphi Studies

Essentially, to evaluate the proposed curriculum of each literacy, six different surveys took place, with the method of Delphi Study. At this point, it should be mentioned that through the Delphi method, which is internationally suitable for the development of educational programs, the aim is to achieve the maximum possible consensus of a group of experts on the order of importance and appropriateness of the curriculum of a scientific subject. The overall aim of conducting the Delphi Studies within the framework of EDUCABILITY Program, was to engage educators and librarians in the creation of the curriculum design of the six literacies in a more active way.

Therefore, the six surveys through the Delphi method were necessary as their findings would be used for the implementation of the freely available and open electronic course for educators and librarians, in each of the six aforementioned information-related literacies. The findings, once properly processed, would be integrated into a virtual open access learning environment (VLE), specially configured for the purposes of the EDUCABILITY Program.

Each of the six surveys involved approximately fifteen different (15) experts, namely a panel of fifteen experts from Greece and an equal number of experts from Cyprus, from Spain and from Serbia. The process took place online, during December 2021, using a special software (Welphi, [www.welphi.com](http://www.welphi.com)), which could support the Delphi method requirements.

All six surveys followed the same procedure, as described below.

#### First round of the Delphi study:

In the first round, experts were invited to study a list of topics that had been compiled after an extensive and systematic review of the relevant literature. The list of topics was presented in the form of formalities in which participants were asked to respond to their degree of agreement. The answers collected during the first round were quantitatively analysed, i.e., response rates, degree of agreement in each statement, average value, prevailing value, standard deviation, etc.

Furthermore, the primary data that were collected in the special software of the Delphi method, underwent an anonymisation process so that it was not be possible to connect the answers with a specific person.

#### Second round of the Delphi study:

Before the second round, the researchers sent the findings to each expert in a report format, which contained graphs and tables that provided statistics and texts describing the data. The report also presented the findings to which there was no consensus, but a possible polarisation of the experts' answers or a clear disagreement. In this way it was estimated that satisfactory information was provided which could lead to a broader consensus among the experts.

In the second round, the experts were asked to study the overall results, as they emerged after the first round's statistical processing, without knowing the answers of the others. In more detail, the experts were informed of the points of convergence or divergence of their views from the collective opinion.



The list of topics was presented again in the form of formalities, which the experts were re-evaluating, but in relation to the overall score of the previous round, in order to determine the maximum possible consensus between them. An appropriate statistical indicator to determine consensus between participants is the Kendall W agreement index, which is often used for its simplicity and was therefore used in each of the six surveys. The answers collected during the second round were statistically processed and analysed, as in the first round.

According to the relevant literature, all the above actions were considered necessary as the detailed information on the degree of consent in each round and the citation of data, adequately document the research method and help any reader to gain a comprehensive understanding of its outline.

### **Closing stage of each survey with the Delphi method:**

During the closing stage, a final report was compiled, which included the grouping and interpretation of the results, as well as the formulation of conclusions and suggestions for each survey. Also, the number of issues that arose in the first and second round were reported, as well as the stability or oscillation of the experts during the feedback process. The secondary data that emerged after the processing of the primary data was used to compile a report on the results of the surveys, which would be the theoretical background for the implementation of “IO2-Six Information Literacy Learning Modules Curriculum Development (SILLMCD)”.

# 5 Digital Literacy

by CUT



## 5.1 CUT Source mapping for Digital Literacy

Summary of key findings of Task 1: Mapping of the state of research in Information Literacy and in Emerging Literacies: “Digital Literacy (DiL)” by the partner CUT-Cyprus - <https://library.cut.ac.cy/el>

### 5.1.1 “Digital Literacy (DiL)” Definitions

The following definitions concerning “Digital Literacy- DiL” emerged after an extensive and systematic review on the subject. In particular, the definitions below refer to the key issues of DiL and have been selected to be evaluated by experts in the field. Moreover, DiL definitions have been semantically analyzed and classified in the conceptual categories, as they are depicted in **Table 5.1** below.

**Table 5.1. DiL Definitions Conceptual Categories**

Conceptual Categories	Meaning
<b>Strongly IL related</b>	The definition underlines the core information literacy skills, such as knowing when and what information is needed, where and how to obtain this information, how to critically assess and organize it and how to use it ethically
<b>IL related</b>	The definition stresses the core information literacy skills but it also includes other concepts of digital literacy
<b>Technical – operational skills</b>	The definition refers to the core digital skills and reflects the ability to technically use digital technologies and their functional features
<b>Safety</b>	The definition stresses the core safety and privacy skills when communicating and socializing digitally
<b>Cognitive – critical skills</b>	The definition refers to the ability to think in a critical way when searching, evaluating and creating digital information, and evaluate and select appropriate software programs for learning or to carry out a task

Conceptual Categories	Meaning
<b>Social – emotional skills</b>	The definition stresses the core social- emotional skills relating them to social-structural literacy and involves knowing how information is socially situated and produced and being able to use the digital environment for learning and communication, both responsibly and morally
<b>Communication related skills</b>	The definition refers to core communication skills on how to communicate information or material to various audiences
<b>Content creation</b>	The definition stresses core skills to create content in a variety of forms, making use of language, images, sound, and new digital tools and technologies, and construct new knowledge or digital sources

**Definition 1.** DiL skills can be distinguished: (1) formal operational skills in order to navigate digital media, access information by locating and sharing materials; (2) analytical and evaluation skills - analyzing messages in a variety of forms, obtaining information critically, identifying the source of information, and evaluating the quality and credibility of the content; (3) create and communicate digital information - create content in a variety of forms, making use of language, images, sound, and new digital tools and technologies, and collaborate to construct new knowledge or digital artifacts using technology and media. (Technical operational skills & Cognitive skills & Strongly Information Literacy related & IL related & Communication skills & Content creation)

**Definition 2.** Digital Literacy is the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyze and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process. (Technical operational skills & Strongly Information Literacy related & Social- emotional skills)

**Definition 3.** DiL embraces a range of skills and knowledge embedded within critical literacy (the ability to critically analyze, select and use digital resources ethically), multiliteracies (the ability to decode and synthesize meanings in multimodal format), technical and operational literacy (the ability to technically use digital technologies and their functional features) and social-emotional literacy (the ability to communicate effectively using digital technologies and safeguard oneself online). (Technical operational skills & Cognitive skills & Strongly Information Literacy related & IL related & Social- emotional skills)

**Definition 4.** DiL can be clarified as the ability of individuals to apply functional skills to digital devices in order to locate information, think critically, collaborate and communicate with others in a creative and effective form, and also be aware of electronic safety. (Technical operational skills & Strongly Information Literacy related & Social- emotional skills & Communication skills & Content creation)

**Definition 5.** DiL is a skill perfectly related to ICT skills. In addition to the other skills, it includes a combination of basic ICT skills which they include the knowledge of basic concepts and

functions of computers, the ability to identify, connect and operate hardware, the ability to deal with standard office applications (word processors, spreadsheets and presentation software), the ability to deal with software programs on mobile devices, the ability to use the internet (browsers, e-mail), and to be aware of and deal with security and privacy issues. (Technical operational skills & Safety)

**Definition 6.** When referring to digital competences, this involves a set of knowledge and technology skills and attitudes than could result to educating learners to be creative, confident and be able to critically use different tools when learning, in order to safely use and disseminate information for their work and everyday life that will allow them to fulfil their personal and social goals. (Technical operational skills & Cognitive skills & Communication skills & Content creation & Social emotional & Safety)

**Definition 7.** Being a digital literate means being able to process various information in the form of messages and communicate effectively with others in various forms, and understand when and how technology must be used so that it is effective in achieving the intended goals. (Technical operational skills & IL related & Communication skills)

**Definition 8.** Digital literacy as a concept is much broader than the technical aspects of using digital tools. It encompasses the cognitive and social–emotional perspectives of using digital tools that includes the ability to understand multimodality to construct new meanings and in interpreting meanings embedded within digital resources in their various formats as well as the dialogues in online communities. (Technical operational skills & Cognitive skills & Communication skills & Content creation & Social emotional & IL related)

### 5.1.2 “Digital Literacy (DiL)” key concepts and content

Many researchers refer to Glister, who was the first that define ‘digital literacy’ as the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers (Agustini et al., 2020; Atoy et al., 2020; Burcin Hamutoglu et al., 2020; Falloon, 2020; List, 2019; Martínez-Bravo et al., 2020; Pangrazio et al., 2020; Reddy et al., 2020; Samani et al., 2020; Saputra & Al Siddiq, 2020; Sivrikaya, 2020; Soltovets et al., 2020).

Digital literacy as a construct is much broader than the technical aspects of using digital tools. It encompasses the cognitive and social–emotional perspectives of using digital tools that includes the ability to understand multimodality to construct new meanings and in interpreting meanings embedded within digital resources in their various formats as well as the dialogues in online communities (Howard Nicholas; Donna Starks, 2014). DiL involves more than the ability to use software programs, computers, or other types of hard-ware. Rather, it is about using technology to think critically, solve problems, and produce meaningful content (Shively & Palilonis, 2018). DiL can be defined as an expanded conceptualization of literacy that is responsive to the ongoing changes in information and communication technologies that are part of everyday life (Santiago De Roock, 2021). It is knowledge and skills in using digital media, communication tools, or networks to find, evaluate, use, create information, and use them in a healthy, wise, intelligent, accurate, precise, and law-abiding manner in order to foster communication and interaction in everyday life (Wayan Widana, 2020). (Clark, 2020; Khan, 2020; Rudowsky et al., 2019) agree with the American Library Association (ALA) that the concept of DiL includes both cognitive and

technical skills of using information and communication technologies (ICT) to identify, locate, select, evaluate, use and share information.

Furthermore, the European Parliament and Council of the EU definition identifies that DiL contains not only the operational application of digital devices but also cognitive skills, capacities and attitudes. DiL is a “transversal competence that enables people to acquire other competences” (Bejaković & Mrnjavac, 2020).

Many studies in bibliography (Agustini et al., 2020; Mishra, 2019; Moon & Bai, 2020; Rahmi & Cerya, 2020; Sadaf & Gezer, 2020; Sivrikaya, 2020; Soltovets et al., 2020) adopt DiL definition by the European Information Society which declare:

“Digital Literacy is the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyse and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process”.

Eshet-Alkalai (2004, as cited in Soltovets et al., 2020) (Soltovets et al., 2020)(Soltovets et al., 2020)(Soltovets et al., 2020)(Soltovets et al., 2020)concludes that DiL is more than the ability to use software or operate a digital device; it includes a large variety of complex cognitive, motor, sociological, and emotional skills. This shapes his framework into a holistic tool that includes three strands: technical-procedural, cognitive, and emotional-social skills.

Martin and Grudziecki (2006, as cited in Soltovets et. al., 2020) also recognize three levels of DiL: digital competence (skills, concepts, approaches, attitudes), digital usage (application of digital competence within specific professional or domain contexts), digital transformation (achieved when the digital usages which have been developed enable innovation and creativity, and stimulate significant change within the professional or knowledge domain).

In addition (Ng, 2015) described DiL as “the integrated cognitive, technical, and social–emotional ability of an individual to competently use digital technologies across the various contexts of life” (Maureen et al., 2020). It embraces a range of skills and knowledge embedded within critical literacy (the ability to critically analyze, select and use digital resources ethically), multiliteracies (the ability to decode and synthesize meanings in multimodal format), technical and operational literacy (the ability to technically use digital technologies and their functional features) and social–emotional literacy (the ability to communicate effectively using digital technologies and safeguard oneself online).

Following the model developed by (Ng, 2012) DiL embraces the perspective of cognitive, technical and socio- emotional learning in an offline or online mode. On the one hand, cognitive aspect includes choosing the technology, searching, assessing and selecting information using critical thinking skills, etc.; and on the other hand, technical abilities are a key component of DiL and its dimensions include owning the skills required to operate digital technologies for learning (Anthony et al., n.d.-a; Samani et al., 2020).

These competencies include knowledge, skills, behavior to effectively use digital technology and smart devices such as smartphones, tablets, laptops and personal computers for purposes of collaboration, communication, support, and expression. DiL includes information management, digital skills, ethical awareness, etc. (Anthony et al., n.d.-b).

Thus, DiL is a set of knowledge, abilities, and skills necessary for life in the modern world (V.I. et al., 2020). These skills are important in this digital era, because people are faced by various online information sources (Liu et al., 2020). Considering DiL as a life skill, it is important for individuals to have the ability to access digital resources, use digital tools, and access information safely and ethically through digital tools (Dedebali, 2019). It is not only the ability to use and create technology-based content, including finding and sharing information, answering questions, but also interacting with others and computer programming (Widana et al., 2020).

We conclude that DiL can be clarified as the ability of individuals to apply functional skills to digital devices in order to locate information, think critically, collaborate and communicate with others in a creative and effective form, and also be aware of electronic safety (Zulkarnain et al., 2020). The term “digital literacy” is defined by (Reddy et al., 2020) as an individual’s ability to find and evaluate information, use this information effectively, create new content using this information and share and communicate this newly created information using appropriate digital technologies. Being a digital literate means “being able to process various information in the form of messages and communicate effectively with others in various forms, and understand when and how technology must be used so that it is effective in achieving the intended goals” (Widana et al., 2020).

Digital literacy refers to technical abilities in the use of technologies in a digital environment (Khan, 2020). In more detail the basic digital literacy skills include the following: the ability to read, write, understand symbols to represent language and perform numerical calculations, and basic computer literacy skills, namely to use computer hardware and software.

Digital Literacy is not only the ability to create and communicate digital technology or use software and operate digital devices but also as (Agustini et al., 2020) indicate is an effort to know, to search, to understand, to analyze, and to use digital technology. The skills in the technical dimension revolve around the ability to operate digital technologies and their functional features (Maureen et al., 2020).

As (Polizzi, 2020) refers “practical digital skills and functional knowledge about the Internet and what it offers are also essential” when evaluating online material, in addition to the knowledge you need to have about the subject. Over the time, developments and needs both in daily life and work have “forced” people to develop their skills, especially their technological skills. And as article 48 discuss humans need adequate digital literacy skills so they can keep up with changes and dynamics that prominently relate to technology (Wayan Widana, 2020).

With the development of digital technologies, the groups of people who have access to them gain more and more opportunities. At the same time, the opportunities of social groups that have less access to digital technologies or do not have it at all decrease, their competitiveness decreases (Aymaletdinov, 2012; Franco and Bedin, 2019). A computer literate person understands the technical components of a computer and the principles of their interaction, easily uses digital devices regardiess of platform/ interface, and also understands the "purpose" of the computer and the purpose of its use (Anisimova & Anisimova, 2020).

DiL is a skill perfectly related to ICT skills. In addition to the other skills, it includes a combination of basic ICT skills which they include the knowledge of basic concepts and functions of computers, the ability to identify, connect and operate hardware, the ability to deal with



standard office applications (word processors, spreadsheets and presentation software), the ability to deal with software programs on mobile devices, the ability to use the internet (browsers, e-mail), and to be aware of and deal with security and privacy issues (Fisser et al., 2020). Moreover, ICT is used for daily duties and assignments such as sending e-mails, video calling, browsing in the Internet, and using a tablet or cellular phone. The basic competencies in ICT refer to those abilities to understand the work of the computer and its nets to solve the problems of the limitations of various technological devices (Rusydiyah et al., 2020). That's why (Rusydiyah et al., 2020) explains that "basic competencies in ICT become the first indicator of digital literacy".

In nowadays it is essential to have the knowledge to retrieve, evaluate and use information on the internet, especially after various fake news is detected. That's why "digital specialists engage online reveal that a layer of practical digital skills and functional knowledge about the internet is also necessary, which underpins how they use multiple sources. Such a layer of functional skills and knowledge about the internet consists of functional digital literacy, which has generally been subordinated to the critical dimension of digital literacy" e.g., Buckingham as cited in (Polizzi, 2020).

Communication through writing in digital environments is mostly done through digital writing which "includes a broad array of composition practices involving digital technologies, some of which have clear analog ancestors and others that are unique to digital environments, but all of which have distinct technological and sociocultural qualities. The software can be accessed on and across a wide range of hardware devices (computer, smartphone, smartwatch, gaming console, etc.), but increasingly are spread across networked server systems (in the cloud). Practices include long-form writing based on a written (or typed) page, such as done within Microsoft Word, Google Docs, or similar applications. They also include multimodal messaging on private chat platforms (WhatsApp, WeChat, iMessage, and other formats, including plain SMS and MMS), social media engagements and composition (Twitter, Facebook, Instagram, etc.), video editing 184 R. S. DE ROOCK for online video platforms (such as YouTube and TikTok), Google searches, messaging or descriptions within videogames, MS PowerPoint presentation creation, meme and animated gif creation, and so on. They form parts of an even more diverse range of social practices too numerous to list, since they are now essential if not ubiquitous parts of social, economic, leisure, and other aspects of daily life" (Santiago De Roock, 2021).

Through the changing society in which modern man lives, evolves a new kind of man who uses technology every day. In fact, this need is so great that many times in daily tasks not only at work, most of the people depend on technology. Prensky, 2001 as cited in (Samani et al., 2020) claimed that the generation born after 1980 are digital natives. He characterized digital natives as multi-taskers who can quickly receive information from different sources and prefer one medium of information to another like graphics to texts. According to him, digital natives" lives revolve around writing blogs, spending time in online games, music download and upload, online purchase and sell, socializing online, using entertainment websites, and so forth (Samani et al., 2020).

This framework that protects the user's data, his identity as well as the internet actions he does is called digital security. Digital security is important because it allows the user to use the internet and all its services while protecting him from the theft of personal data and information. Digital security includes attitude to software and media content piracy, ability to secure personal

information and computer, level of communication culture in social networks, ethical norms in the placement of digital content, etc. (Davydov et al., 2020). In connection with the expansion of access to the Internet in modern society, the problems of computer and internet addiction of children and adolescents, cyberbullying, their involvement in dangerous games with calls for suicide, etc., are of great concern. Therefore, in addition to recognizing the need for people to develop new competencies in the development of information and communication technologies, this area focuses on the problems of cybersecurity and on learning skills to withstand negative phenomena of a social nature. And one of the most important elements of such an approach is the formation of a person's ideas about threats of a socio-psychological nature in the process of using new information and communication technologies (Davydov et al., 2020).

### **Cognitive dimension of the literacy**

According to researches DiL involves not just the technical skill to use software or operate digital devices, but also it involves cognitive and socio-emotional skills for problem solving in the digital environment (Eshet-Alkakai, 2004). The aspect of cognitive ability is connected with resource, research, and critical literacy (Pieterse, Greenberg and Santo, 2018) and for the development of DiL critical and multimodal thinking are two relevant skills (Ng, 2015)

Becker (2018) clarify that nobody is born digitally literate; he elucidates that new generation might have the technical skills, but lack the cognitive skills to find, evaluate, create, and communicate. On the other hand, he continues that older generations might have the cognitive skills, but lack the technical skills to find, evaluate, create, and communicate. Many researchers agree to the point that these abilities are developing progressively; basic skills are just the first step and the top end is the growing level of cognitive competencies used in task solving, learning, creating, and expressing new ideas, and which also relates to social and cultural attitudes and aspects' (Ala-Mutka 2011, 17; European Commission, 2013 cited in (Potyrała & Tomczyk, 2021)

Earlier Gilster (1997), emphasized in the cognitive dimension of digital literacy. As Ng (2012) stated the cognitive dimension is related to the ability to think in a critical way when searching, evaluating and creating digital information (Anthonysamy et al.,). Thus, an individual must be able to evaluate and select appropriate software programs for learning or to carry out a task.

### **Technical- operational dimension of the literacy**

Technical abilities are a key component of DiL and its dimensions include owning the skills required to operate digital technologies for learning (Anthonysamy et al.,). These technical skills are one of the three indicators mentioned previously, which as (Prasolov et al., 2020) refers "reflects the ability to find the right information, media, as well as an understanding of how digital devices and new technologies work" (V.I. et al., 2020).

As (Ilomäki et al., 2011) explain that digital literacy or digital competence is the most recent concept describing technology-related skills. He also elaborated that digital skills are the Besides critical thinking, he later adds the multimodal thinking as a relevant skill for the digital literacy development (Ng, 2015).

Evaluation: Researchers agree on the point of evaluation; the problem is how to assess the credibility and originality of information (Eshet-Alkalai, 2004). The same research points out that



sometimes people can't define which information is true and which is not, that's why critical thinking individuals, are ready to doubt the quality of information and not take it for granted. Because of the rapid development in ICTs the information is available in variant formats and it produced easily, so the ability to evaluate it properly has become a survival skill (Eshet-Alkalai, 2004).

**Problem solving:** An additional skill that a digital literate person must have is the ability to solve problems in digital environments (Eshet-Alkalai, 2004; Ng, 2012). As defined by the European Commission, 2018 in Digital Competence Framework 2.0 (as cited in Bejaković and Mrnjavac, 2020) the component of problem solving is the ability to identify needs and issues and to resolve different kinds of problems in a digital environment. This component is an essential life skill not only in workplace but in real world, too. It demands the whole process; from locate and access the right information, understanding, analyzing, evaluating the message so to apply the information in a proper way to solve a problem in an individual or social life context (Moon and Bai, 2020). Widana (2020) states "critical thinking and problem solving reflect the ability to identify, analyze, and evaluate situations, ideas, and information to convey responses and solutions".

**Creativity:** Linking the above meaningful skill of problem-solving, creativity is also a significant skill especially in education. In contemporary societies, creativity is a necessity for peoples' survival (Alt & Raichel, 2020). Digital literacy involves the skills in creating and evaluating information using technology applying the skills in technology literacy (Baterna et al., 2020). Creativity and innovation connected with the ability to imagine and design innovative new ways to solve problems, answer questions and express meanings, for the acquiring diverse knowledge (Wayan Widana, 2020). By practicing DiL skills, students are encouraged to create and produce knowledge, therefore, creativity is deeply connected to technology integration and DiL skills and practices (Černočová & Selcuk, 2019 cited in Alt & Raichel, 2020)

**Understanding:** The discovery of information in a technological environment is so important as the ability to use it (Fuad & Hamid, 2019). The user must be able to navigate intelligently through hypermedia environments to construct knowledge and to synthesize new understandings to convey the meanings in the best sense (Eshet-Alkalai' 2004). At the level of higher education cognitive engagement involves the amount of mental effort and willingness of students to attain, retrieve and retain knowledge as well as to take on a learning task at hand (Anthonysamy et al 2020)

**Motivation:** Self-regulative abilities is a must in digital learning in managing students learning progression and to actively engage with themselves and the environment through cognitive, metacognitive, behavioral and motivational components in order to achieve their goals (Anthonysamy et al, 2020). The same researchers conclude that students must develop metacognitive processes, utilize resource management and motivational belief strategies to elevate their digital literacy competency. "Commitment is driving factor for internal motivation, namely consistent attitude in the form of promise that comes out of a person to complete certain jobs" (Erjati Abas, 2019 cited in Widana et al., 2020).

### **Social – Emotional dimension of the literacy**

A key concept related to digital literacy is the socio-emotional dimension which is associated with social-structural literacy and involves knowing how information is socially situated and

produced and being able to use the digital environment for learning and communication, both responsibly and morally. Therefore (Pieterse et al., 2018) refers to “the understanding that each source has its social background and behaving in ethical and moral ways (e.g., avoiding impersonation, shaming, and plagiarism)”.

According to Ng Wan (2018), the socio-emotional dimension refers to communication and social skills. According to this dimension it is considered crucial to understand and protect one’s own safety and privacy when communicating and socializing digitally. Moreover (List, 2019) points out that communication in the digital communities can contribute to shaping learners’ digital literacy.

Through further research onto how to use social-culture literacy, learners will be able to distinguish, learn and conceive organizational culture, know how to interact with others via social media and be responsible when writing or posting messages which could possibly hurt other people and also be able to understand privacy. (Silamut & Petsangsri, 2020).

When referring to digital competences, this involves a set of knowledge and technology skills and attitudes than could result to educating learners to be creative, confident and be able to critically use different tools when learning, in order to safely use and disseminate information for their work and everyday life that will allow them to fulfil their personal and social goals. (Martzoukou, 2020).

In addition, communication allows to connect with others through the web. One of the major roles of social media is that by providing access to public forums users are able to discuss and share opinions on social issues. Within the concept of public discussion which takes place in diverse forms users negotiate meanings within the community. (Moon & Bai, 2020). In line with (Hobbs & Coiro, 2019) learners become able to collaborate, discuss, be creative, understand and resonate in the social environment as they wonder in the network environment and discover new knowledge.

Creative human beings equipped with critical thinking will eventually pay more attention to social issues. “By choosing how to creatively express ideas and create media, as well as explore different ways of taking social action, learners may explore their identities as citizens who can improve their communities and society” (Hobbs & Coiro, 2019). On the other hand, (Mihailidis & Thevenin, 2013) support that social change is the result of digital and media literacy. They explained that digital communities could be activated by a collaborative culture, where individuals participate, collaborate, reflect, create and disseminate messages and also become members of a broader societal context. Digital literacy education provides them with a new way of looking and perspective.

Furthermore, (Bawden, 2008) advocates for a sociocultural perspective arguing for the significance of context and meaning, whereas (Lankshear, Colin Knobel, 2008) argue that digital literacies could be seen as a sociocultural practice and that there are a number of different ways of reading and writing when using digital texts.

Jones and Hafner frame digital literacy as much broader than simply functional use of digital devices, but as “the ability to creatively engage in particular social practices, to assume appropriate social identities, and to form and maintain various social relationships”. (Pangrazio et al., 2020).

Moreover, (Agustini, D, Lian, B, Sari, 2020; Castañeda et al., 2020; Rintamäki & Lehto, 2018; Wayan Widana, 2020) argued that learning ICT is not only about referring to technical perceptions, but also about referring to other dimensions, such as social, communicative and cognitive.

Additionally, Gros and Contreras take up Wenger's (1998) pedagogic theory, “where learning implies taking part in cultural practices and in the activities shared by social communities. They also base their proposal on the educational approach of John Dewey (1995), who stresses the importance of experience, reflective and thinking skills, as well as democratic and humanitarian ideals” (Pangrazio et al., 2020).

Authors (Khan, 2020; Prasolov et al., 2020) refer to communicative literacy as a way of individuals to develop social connections and use technology to interact with others. According to (Anisimova, 2020) “A communicatively competent person understands the differences between digital communications and live communication, knows how to use modern means of communication – social networks, instant messengers, and also realizes the existence of a special ethics and communication standards in a digital environment”.

Evidently, (Saputra & Al Siddiq, 2020) advocates that “the availability of internet and digital technology promises the easier connectivity in the community starting from how people communicate, collaborate, create work, solve problems, make decisions, to consume information”. Therefore, it can be concluded that digital literacy could be a set of knowledge and abilities acquired by learners in order to communicate and ethically interact when evaluate and using information. The author also supports that digital literacy “is a life skill that must be owned by citizens so that the order in their lives can lead to a critical-creative mindset and viewpoint so that it has an impact on social and cultural life that is safe and conducive”.

Moving forward (Prasolov et al., 2020) contributes to the ethical aspect “by assesses people's attitudes to follow generally accepted standards when using digital environment tools. For example, an understanding of the need to verify the accuracy of the information and its sources, compliance with communication standards on the network”.

On the whole (Hobbs & Coiro, 2019) supports that “digital literacy embodies Dewey's (1900/2017) dream of learning as focused on real- world problem solving that awakens students to their democratic social responsibilities, learning for which knowledge and deliberative dialogue are used to understand and address problems we find in our neighborhoods, our communities, and in our world, helping to create a more just and equitable world”.

Summing up educators should experience communication and collaboration as a process among learners whenever they are. Critical thinking and problem solving reflects to their ability to “identify, analyses, and evaluate situations, ideas, and information to convey responses and solutions “. In addition, creativity results to new ways of solving problems, answering questions, expressing meanings and adapting to new ways of knowledge and learn to collaborate with others to achieve common goals. (Wayan Widana, 2020).

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### 5.1.3 “Digital Literacy (DiL)” key learning objectives and outcomes integrated in distinct thematic units

#### 1. Introduction to Digital Literacy (DiL)

This Unit aims to introduce trainees, namely educators and librarians, to the main theoretical concepts of “DiL”.

**This Unit learning objectives are to:**

- **describe** DiL key definitions
- **identify** DiL key skills
- **reflect** on DiL current trends
- **estimate** when and how technology must be used so that it is effective in achieving the intended goals
- **support** new teaching methods which respond to the new pedagogical reality, in order to enhance their knowledge and experiences, narrow their weaknesses and achieve their learning goals in the technology age

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **recognize** DiL in-depth definitions/concepts such as “Digital Literacy”, “Information”, “Information Literacy”, “Education”, “Training the Trainers”, “Digitalization”, “Technology”, “Digital Information Literacy”
- **classify** the skills and competences that derive from “Technical”, “Cognitive”, “Socio-emotional” concepts of Digital Literacy; they need to directly experience collaboration and inquiry to best support their own students
- **relate** DiL key skills to various scientific subjects, **clarify** how they are using technology and why
- **infer** on DiL current trends to use as a background and why this is important for successful and independent lifelong learners
- **recognize** the need to keep up with changes and dynamics that prominently relate to technology
- **train** the trainees how to encourage the individuals of the communities they serve to **develop/create** knowledge and skills in using new technologies in a responsible, ethical and safe use and dissemination of information for learning, work and everyday life societal participation to fulfil personal, social or commercial goals; train the trainees on how to integrate DiL concepts into their curriculum; provide guidance in **applying** the DiL framework into pre-existing coursework and provide examples of appropriate pedagogy

#### 2. Technical- operational abilities and basic ICT skills in a digital environment

This Unit aims to offer trainees, namely educators and librarians, a deeper understanding of the technical competencies and skills of DiL.

**This Unit learning objectives are to:**

- **construct** knowledge on how to use hardware and software for computer

- **operate** digital technologies and their functional features
- **develop** practical digital skills and functional knowledge about the internet
- **develop** basic competencies in ICT in order to become computer literate person

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **operate** digital devices/tools/applications to access and identify resources
- **evaluate** and select appropriate software programs for learning or to carry out a task
- **evaluate** applications for trustworthiness, quality, etc.; **apply** privacy and security settings
- **demonstrate** practical digital skills and functional knowledge about the Internet and what it offers, when evaluating online material
- **comprehend** the networks of the computer to solve the problems of the limitations of various technological devices
- easily **use** digital devices regardless of platform/ interface, and also realize the purpose of the computer and the purpose of its use
- **develop** a critical and responsible approach to digital technology, see opportunities and understand risks

### 3. Critical thinking skills: search, evaluate and retrieve digital information

This unit aims to encourage trainees, namely educators and librarians, to develop best practices and strategies for accessing and using information that reinforces individuals IL skills.

**This Unit learning objectives are:**

- **locate** and use digital resources in a sustainable, safe and ethical way
- **access** information, pursuing effective digital approaches, as well as assess the quantity, quality, and relevance of search results
- **develop** the ability to critically review information, facts, and circumstances
- **verify** authenticity, accuracy, validity and reliability of the information

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **clarify** the role of information, differentiating sources of information to determine where the sources are, and defining the right tools and strategies to track and retrieve information effectively and efficiently
- **use** appropriate digital tools to find and process information and seek a solution to a problem
- quickly **receive** information from different sources and prefer one medium of information to another
- **learn** how to assess the credibility and originality of information
- **define** which information is true and which is not
- **doubt** the quality of information and not take it for granted
- **evaluate** a source's credibility and suitability in the context of information needs
- **filter** the information to consolidate knowledge, identify erroneous, irrelevant or biased information and prevent its penetration into the learner's considerations system

#### 4. Create and edit content in different formats

This unit aims to help trainees, namely educators and librarians, to create or edit content in different formats.

**This Unit learning objectives are to:**

- **create and produce** knowledge which helps individuals to take better advantage of opportunities
- **express** ideas and **respond** more productively to challenges that contributes to the quality of life

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **create** content in a variety of forms, making use of language, images, sound, and new digital tools and technologies
- **use** technology and media to collaborate and construct new knowledge or digital artifacts

#### 5. Problem solving in digital environments

This unit aims to help trainees, namely educators and librarians, to develop appropriate skills in order to identify and solve problems.

**This Unit learning objectives are to:**

- **develop** critical thinking and problem-solving skills
- **apply** the information in a proper way to solve a problem in an individual or social life context
- become able to imagine and **design** innovative new ways to solve problems
- **focus** on real-world problem solving that awakens students to their democratic social responsibilities

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **use** available technologies to solve different kinds of real-world problems
- **identify, analyze, and evaluate** situations, ideas, and information to convey responses and solutions
- **answer** questions, **express** meanings and **adapt** to new ways of knowledge and be able to collaborate with others to achieve common goals
- **develop** the fluency and confidence needed for accomplishing tasks using digital tools in the context of everyday and context specific problem-solving scenarios by teachers, school leaders, and education policy decision-makers, as an integral part of DiL educational programs
- be effectively **involved** with others in overcoming the problem-solving through teamwork and collaboration, for participation in a democratic society
- **work in a group**, to **establish** ties, and to increase involvement and efficiency through various types of technologies

## **6. Ability to communicate and ethically interact with others, engage, collaborate and share information through technologies**

This unit aims to encourage trainees, namely educators and librarians, to develop communication and social skills through technologies.

**This Unit learning objectives are to:**

- **use** the digital environment for learning and communication, both responsibly and morally
- **realize** the existence of a special ethics and communication standards in a digital environment
- **develop** social connections and use technology to communicate and ethically interact with others via social media
- be able to **collaborate, discuss, be creative, comment** and resonate in the social environment and discover new knowledge
- **explore** different ways of taking social action
- **explore** their identities as citizens who can improve their communities and society
- **define** and address problems, helping to create a more just and equitable world

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **identify** how information is socially situated and produced
- **clarify** how each source has its social background and behaving in ethical and moral ways
- creatively **participate** in particular social practices, to assume appropriate social identities, and to form and maintain various social relationships
- **distinguish** the differences between digital communications and live communication
- **recognize** the importance of experience, reflective and thinking skills, as well as democratic and humanitarian ideals
- **use** modern means of communication – social networks, instant messengers
- **write or post** messages responsibly to **avoid** hurt other people, avoid impersonating, shaming or plagiarism
- **manage** digital texts using different ways of reading and writing
- **discuss and share** opinions on social issues
- **debate** meanings within the community in public discussion which takes place in diverse forms
- **participate, collaborate, reflect, create and disseminate** messages and also become members of a broader societal context
- **apply** knowledge and deliberative dialogue, **express** ideas and **create** media creatively

## **7. DiL skills for safety from digital risks, threats and cyber bullying**

This unit aims to raise awareness of trainees, namely educators and librarians, on safety and privacy issues in digital environments.

**This Unit learning objectives are to:**

- be able to **defend** one's own safety and privacy when communicating and socializing digitally
- **highlight** online risks and threats and consider about privacy and security measures
- **get** up-to-date knowledge of the threats brought by the digital world

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **protect** from the theft of personal data and information while using the internet and all its services
- **detect** software and media content piracy
- **practice** on how to secure personal information and computer, level of communication culture in social networks, ethical norms in the placement of digital content, etc.
- **consider** the problems of computer and internet addiction of children and adolescents, cyberbullying, their involvement in dangerous games with calls for suicide and cybersecurity
- **compose** a person's ideas about threats of a socio-psychological nature in the process of using new information and communication technologies

## 8. Tailoring DiL skills at all educational levels

This Unit aim to help trainees, namely educators and librarians better perceive how digital technologies can be used as tools for better performance.

**This Unit learning objectives are to:**

- **develop** educational platform to create learning experiences that support active, motivated learning
- **design** a DiL program so educators design their own lesson plans and instructional units for **inquiry-based** digital learning
- **provide** learners with critical thinking opportunities and increase the level of DiL, **improve** completion, **foster** deeper learning and understanding of high order thinking processes
- **develop** technical skills to use software and operate digital devices, cognitive knowledge and skills to effectively retrieve, evaluate and interact with digital information
- **build** students' meta-technological awareness, or explicit reasoning regarding how they are using technology and why
- **increase** DiL skills of academicians

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **build** digital infrastructure programs focused on training and education, both through formal (e.g., community- or association-based training opportunities) and informal (e.g., peer-based learning, vicarious Learning, informal counseling) settings
- **adopt** strategies for **problem-solving**, collaboration and interaction among students and between students with their teachers for distance education and autonomous learning
- **practice** in retrieving information throughout tutorials, while experiencing an efficient and effective way to use the technology

- **provide** opportunities for ongoing social interaction between teachers and students and between students during face-to-face sessions and online sessions
- **create** interactive learning DiL platforms that learners become interested and motivated, and are supported to persist
- **improve** student interaction in online discussion forums and activities and **provide** greater flexibility for students to get access to learning resources
- **offer** project tasks to master a set of specific programs (interactive didactic games, creating cartoons, keep a blog, create websites, evaluate software products)
- **provide** activities such as continuing education, seminars, workshops and symposia in-service training that should be organized under the leadership of relevant institutions and organizations

### 9. Libraries as pioneering agents of DiL Skills

This Unit aims to help trainees, namely educators and librarians, perceive that libraries play an essential role in developing digital skills.

**This Unit learning objectives are to:**

- **promote** library instruction programs for integrating IL and DiL skills
- information skills and digital literacy as a normative provision
- **develop** university teachers' IL and DiL and pedagogic competence to use digital information resources in teaching and in research as a part of a teacher's and a researcher's professional competence
- **create** more impactful ways of learning for students and build online learning communities

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **learn and practice** in pedagogic theory, online curriculum design and mechanisms to ensure the ongoing personal and professional development
- **learn and practice** basic IL concepts through problem-based interactions among students
- **adopt** innovative techniques in enhancing DiL skills among faculty members, which are significant in the digital age
- **adopt** the Seven Pillars of IL Model developed by SCONUL in order to be able to seek for required information according to the problem and research objective; and also determine the gaps between relevant and irrelevant information

Key Teaching and Evaluation Methods is common for the six information related literacies of EDUCABILITY Program (*see Annex 3 – Key Teaching and Evaluation Methods, common for the six information related literacies of EDUCABILITY Program*)



## 5.2 CUT Delphi Study for Digital Literacy

This chapter refers to the detailed presentation of the results that emerged after the implementation of the DiL survey using the Delphi method.

### 5.2.1 CUT Delphi Study for Digital Information Literacy - Definitions

The 22 experts, who completed the DiL Delphi Study Questionnaire in Round 1, were asked to read 8 definitions concerning “Digital Literacy (DiL)” and to rate them in order of importance, from 1 (least important) to 10 (most important). In particular, according to their point of view as experts, they were asked which of the definitions succeed to refer to the key issues of DiL and should be definitely considered for a course aimed at educators and librarians.

#### Comments on the results of DiL Round 1

According to the results of Round 1 of DiL Delphi study, it appears that all 8 DiL definitions were rated with an average of more than 6 out of 10, leading to the conclusion that their concepts are highly appreciated for inclusion in a curriculum aimed at educators and librarians. However, the majority of the experts seem to believe that definitions which are related to Information Literacy skills, such as knowing when and what information is needed, where and how to obtain this information, how to critically assess and organize it and how to use it ethically, are very important. Despite that most of definitions contain a variety of skills (such as technical, cognitive, social, communication skills), the 1st one has earned a high rating from experts and seems to be the most preferred among experts. Technical- operational skills are included in all definitions, although the one which was strongly correlated to them (5<sup>th</sup> definition) gathered a total sum of 160 points, which placed it in the midDiLe in order of importance.

#### Comments on and conclusions about the results of DiL Round 1 and Round 2

During Round 2, 16 experts completed the DiL Delphi questionnaire. According to the results of Round 2 of DiL Delphi study, it appears that all 8 DiL definitions were rated with an average of more than 6 out of 10, supporting the conclusion of Round 1 that their concepts are highly appreciated for inclusion in a curriculum aimed at educators and librarians. However, the majority of the experts seem to believe that definitions which are related to information literacy skills, such as knowing when and what information is needed, where and how to obtain this information, how to critically assess and organize it and how to use it ethically, are still the most important ones, as in Round 1. The first four definitions have retained their places in Round 2.

The main difference between the results of Round 1 and Round 2 is the fact that the definition which includes a variety of skills (such as technical, cognitive, communication and social), rose in order of importance from place 8 to place 5.

Kendal’s W is a factor which shows the level of consensus between the experts. Moreover, there are three criteria to consider and find if there is a good level of consensus among experts. (i) The 51% responding to the category ‘highly important’, which is between values 8 and 10 on a 10-Likert scale (Hackett, Masson & Phillips, 2006), (ii) the interquartile range below 2.5 (Kittell-Limerick, 2005) and (iii) the standard deviation below 1.5 (Christie & Barela, 2005). According to those criteria, after Round 2 results show improved values for 7 out of 8 definitions and thus, there is a good level of consensus between the experts.



## 5.2.2 CUT Delphi Study for Digital Literacy - Key Concepts

The 22 experts, who completed the DiL Delphi Study Questionnaire, were asked to read 9 key concepts concerning “Digital Literacy-DiL” for virtual adult training and rank them in order of importance, by putting the 1st as most important, reaching gradually the 9th as less important. In particular, according to their point of view as experts, they were asked which of the key concepts they would definitely include in a course aimed at educators and librarians, as core to DiL skills and which of them as less closely-related to DiL skills. In Round 2, the number of experts that completed this section was 20. The Ranking results of Round 1 and 2 are depicted below in **Table 5.3**.

**Table 5.2. DiL KC Legend**

DiL-KC ID	DiL KC Description
<b>DiL-KC1</b>	Introduction to Digital Literacy (DiL)
<b>DiL-KC2</b>	Technical- operational abilities and basic ICT skills in a digital environment
<b>DiL-KC3</b>	Critical thinking skills: search, evaluate and retrieve digital information
<b>DiL-KC4</b>	Create and edit content in different formats
<b>DiL-KC5</b>	Problem solving in digital environments
<b>DiL-KC6</b>	Ability to communicate and ethically interact with others, engage, collaborate and share information through technologies
<b>DiL-KC7</b>	DiL skills for safety from digital risks, threats and cyber bullying
<b>DiL-KC8</b>	Tailoring DiL skills at all educational levels
<b>DiL-KC9</b>	Libraries as pioneering agents of DiL Skills

**Table 5.3. DiL KC Ranking Round 1 & Round 2**

DiL KC Ranking – Round 1			DiL KC Ranking – Round 2		
Rank	Title	Mean Rank	Rank	Title	Mean Rank
1	<b>DiL-KC6</b>	3.32	1	<b>DiL-KC6</b>	2.7
2	<b>DiL-KC2</b>	3.55	2	<b>DiL-KC2</b>	3.4
3	<b>DiL-KC9</b>	4.18	3	<b>DiL-KC9</b>	3.4
4	<b>DiL-KC3</b>	4.36	4	<b>DiL-KC3</b>	4.8
5	<b>DiL-KC1</b>	4.41	5	<b>DiL-KC1</b>	5.1
6	<b>DiL-KC4</b>	5.23	6	<b>DiL-KC4</b>	5.5
7	<b>DiL-KC7</b>	6.27	7	<b>DiL-KC7</b>	5.9
8	<b>DiL-KC8</b>	6.45	8	<b>DiL-KC8</b>	6.65
9	<b>DiL-KC5</b>	7.23	9	<b>DiL-KC5</b>	7.55

## Comments on the results of DiL Round 1 and Round 2

All DiL key concepts hold their rank positions after both Rounds in exactly the same order. According to DiL KC ranking above it is clear that Key Concept entitled “DiL-KC6- Introduction to Digital Literacy (DiL)”, has taken the 1<sup>st</sup> most important place among the nine (9) proposed DiL key concepts, after both Delphi Rounds. This leads to the conclusion that experts indeed identified a significant gap in DiL knowledge of the target audience, namely educators and librarians, that should be definitely filled by offering an introductory chapter in the pertinent curriculum.

Next the “DiL-KC2- Ability to communicate and ethically interact with others, engage, collaborate and share information through technologies”, which showed a minor ranking deference with DiL-KC1 after Round 1, holds the 2<sup>nd</sup> most important position after Round 2. Obviously, experts believe that this concept equates with the most closely related skill to DiL and therefore it should be definitely included in the proposed curriculum.

Finally, it is important to mention that “DiL-KC5- Libraries as pioneering agents of DiL Skills”, have been ranked after both Rounds as less closely related to core DiL skills, by experts.

After completing two Rounds of Delphi study, result show that although Kendal’s W improved from 0.252 to 0.346, there is still a low level of consensus between experts.

## Conclusions about the results of DiL Round 1 and Round 2

Consequently, researchers propose to consider for inclusion in the DiL curriculum addressed to educators and librarians all the key concepts, as they were ranked by experts in the same order of importance in both Rounds.

### 5.2.3 CUT Delphi Study for Digital Literacy Key Learning Objectives and Outcomes

The 22 experts, who completed the DiL Delphi Study Questionnaire, were asked to read 9 sets of learning objectives and outcomes, incorporated into 9 proposed key concepts (KC) of “Digital Literacy-DiL”. Then, they had to rate each set of these learning objectives and outcomes in relation to their appropriateness, from Completely Agree (most appropriate) to Completely Disagree (least appropriate). In particular, according to their expertise, they were asked which of them they would evaluate as the most appropriate to be considered for the development of a virtual course aimed at educators and librarians.

## Comments on the results of DiL Round 1

According to **Table 5.4** there is a total consensus of Completely Agree & Agree among experts for all nine (9) sets of learning objectives and outcomes, rating from 95% the least to 100% the most. This consensus had been reached among 22 experts already after Round 1 and for this reason researchers decided to omit this section from Round 2. It is important that the majority of 9 sets of DiL learning objectives and outcomes reach a consensus of 100%, namely: “**KC6**- Ability to communicate and ethically interact with others, engage, collaborate and share information through technologies”, **KC3**-Critical thinking skills: search, evaluate and retrieve digital information, **KC4**-Create and edit new content in different formats, **KC9**-Libraries as

pioneering agents of DiL Skills, **KC1**-Introduction to Digital Literacy (DiL), **KC5**-Problem solving in digital environments, **KC7**-DiL skills for safety from digital risks, threats and cyber bullying.

Additionally, 2 out of 9 sets of DiL learning objectives and outcomes reach a consensus of 96%, namely: “**KC2**-Technical- operational abilities and basic ICT skills in a digital environment” with 64% of experts stating that they completely agree, 32% of them stating that they agree and 5% of them stating that they disagree; “**KC8**-Tailoring DiL skills at all educational levels” with 59% of experts stating that they completely agree, 36% of them stating that they agree; and 5% of them stating that they disagree.

**Table 5.4. DiL Learning Objectives & Outcomes Rating**

Total Degree of Consensus (Completely Agree & Agree)	Sets of learning objectives and outcomes per KC	Detailed Rating		
		Completely Agree	Agree	Disagree
1 (100%)	KC6- Ability to communicate and ethically interact with others, engage, collaborate and share information through technologies	Completely Agree	Agree	Disagree
		82%	18%	0
2 (100%)	KC3- Critical thinking skills: search, evaluate and retrieve digital information	Completely Agree	Agree	Disagree
		73%	27%	0
3 (100%)	KC4- Create and edit new content in different formats	Completely Agree	Agree	Disagree
		64%	36%	0
3 (100%)	KC9- Libraries as pioneering agents of DiL Skills	Completely Agree	Agree	Disagree
		64%	36%	0
3 (96%)	KC2- Technical- operational abilities and basic ICT skills in a digital environment	Completely Agree	Agree	Disagree
		64%	32%	5%
4 (100%)	KC1- Introduction to Digital Literacy (DiL)	Completely Agree	Agree	Disagree
		59%	41%	0%
4 (100%)	KC5- Problem solving in digital environments	Completely Agree	Agree	Disagree
		59%	41%	0%
4 (100%)	KC7- DiL skills for safety from digital risks, threats and cyber bullying	Completely Agree	Agree	Completely Disagree
		59%	41%	0%
4 (95%)	KC8- Tailoring DiL skills at all educational levels	Completely Agree	Agree	Completely Disagree
		59%	36%	5%

### Conclusions about the results of DiL Round 1

Consequently, researchers propose to consider for inclusion in the DiL curriculum addressed to educators and librarians all the sets of learning objectives and outcomes that relate to 9 aforementioned DiL key concepts.

## 5.2.4 CUT Delphi Study for Digital Literacy Key Teaching and Evaluation Methods

The 22 experts, who completed the DiL Delphi Study Questionnaire, were asked to read nine (9) teaching and evaluation approaches concerning “Digital Literacy-DiL” for virtual adult training, namely educators and librarians and to rank them in order of importance, by putting the 1st as most important and the last as the least important. In particular, according to their point of view as experts, they were asked which of them facilitate the development of Information Literacy Skills (e.g., searching, critically evaluating, ethically using and sharing information for a topic) and additionally facilitate critical thinking, cooperative learning and enhance the will to attend an asynchronous course in a virtual learning environment. In Round 2, the number of experts who completed this section was 20. The Ranking results of Round 1 and 2 are depicted below in *Table 5.6*.

**Table 5.5. DiL Key Teaching and Evaluation Methods Legend**

TEM ID	Teaching and Evaluation Methods Description
TEM1	In each Unit, trainees will be asked to <b>watch an introductory video</b> . After this, they will be asked to submit a short answer to the VLE’s Course Forum, regarding a question, relevant to the introductory video. All trainees’ answers will be visible to every participant in the VLE’s Course Forum for review and discussion among them [Level of mastery: Understanding via peer learning – constructivism approach–IL SKILL: E-Social engagement].
TEM2	In each Unit, trainees will be asked to <b>think of keywords</b> that will help them find useful information on how to answer a question. In order to help them think of the appropriate terms they will be given a list of pertinent key words and they will be asked to complete an e-crossword of broader, synonym, narrower terms, etc. [Level of mastery: Understanding via computer interactive learning – cognitivism approach –IL SKILL: Analysis of a topic].
TEM3	In each unit, trainees will be visually (video) presented with at least two or three distinct ways of <b>searching for information</b> on a specific topic, in the Internet, in a library catalog and in scientific data bases. Furthermore, a method will be displayed on how to evaluate retrieved information, in terms of relevance and validity. After this, trainees will be asked to perform their own searches for specific information regarding a question and to evaluate their results, in terms of relevance and validity. [Level of mastery: Understanding & Application via computer interactive learning – behaviorism approach –IL SKILL: Searching & Evaluating information for a topic]. Finally, trainees will submit the list of their retrieved and evaluated results to the VLE’s Course Forum for review and discussion. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILL: Social engagement].
TEM4	In each Unit, trainees will be asked to study their retrieved information and to <b>write a properly cited short answer</b> to a question. After this, they will be asked to submit their answer to the VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her answer and will submit one review to three other participants’

TEM ID	Teaching and Evaluation Methods Description
TEM5	<p>answers. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILLS: Analysis, Synthesis, Ethical use &amp; Sharing of information for a topic, E-Social engagement].</p> <p>In each Unit, after a short video-lecture, trainees will be asked to <b>answer a reflection E-quiz</b>. Automatic feedback will be given per answer. Each trainee will be able to take the reflection E-quiz as many times as he/she wishes. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic]</p>
TEM6	<p>In each Unit, trainees will be presented with a <b>video- lecture</b>. The video-lecture will be automatically paused every time a sub-topic will have been completed and a pop-up, true or false or three-four choice questions, will appear on the screen. Each trainee will have to answer it in order for the video-lecture to continue. After an answer has been completed the learner will get immediate feedback and the video-lecture will be allowed to continue. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic]</p>
TEM7	<p>In each Unit, trainees will be asked to read at least one of the proposed references linked to the VLE’s Course and <b>to write a summary</b> that they will have to submit to the VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way, every trainee will receive three reviews for his/her abstract and will submit one review to three other participants’ abstracts. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILLS: Analysis, Synthesis, Ethical use &amp; Sharing of information for a topic, E-Social engagement].</p>
TEM8	<p>Towards the end of each Unit, trainees will be asked to <b>choose a topic</b> of their preference. Then they will be asked to search for specific information regarding their topic, to read them and to evaluate them in terms of relevance and validity and to submit a short, properly cited essay or ppt to the VLE’s Course. Their essay or ppt will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her essay or ppt and will submit one review to three other participants’ essay or ppt. [Level of mastery: Knowledge and application via peer learning – constructivism approach–IL SKILLS: Searching, Evaluating, Analysis, Synthesis, Ethical use &amp; Sharing of information for a topic, E-Social engagement].</p>
TEM9	<p>Trainees who will have <b>acquired a total of 60%</b> or more to the various interactive sub-tasks of each Unit will be allowed to continue to the next Unit. If not, they will have to repeat it. Upon successful completion of the whole E-course (at least 60% or more) trainees will be able to download a certificate of attendance in for educators and librarians.</p>

**Table 5.6. DiL Key Teaching and Evaluation Methods Ranking – Round 1 and Round 2**

DiL Key Teaching and Evaluation Methods Ranking – Round 1			DiL Key Teaching and Evaluation Methods Ranking –Round 2		
Rank	Title	Mean Rank	Rank	Title	Mean Rank
1	DiL-TEM3	2.32	1	DiL-TEM3	1.85
2	DiL-TEM1	3.5	2	DiL-TEM1	3.3
3	DiL-TEM4	4.09	3	DiL-TEM4	3.6
4	DiL-TEM2	4.41	4	DiL-TEM2	4.6
5	DiL-TEM8	5.18	5 (7)	DiL-TEM5	5.15
6	DiL-TEM5	5.41	6 (5)	DiL-TEM6	5.3
7	DiL-TEM6	5.64	7 (6)	DiL-TEM8	5.95
8	DiL-TEM7	6.41	8	DiL-TEM7	6.7
9	DiL-TEM9	8.05	9	DiL-TEM9	8.55

### **Comments on and conclusions about the results of DiL Round 1 and Round 2**

Comparative results of Round 1 and Round 2 show that experts ranked the proposed teaching and evaluation method entitled DiL-TEM3, as the most important. This approach relates closely to the development of two core Information Literacy skills, namely searching effectively for sources that respond to specific information needs and evaluating them critically. Moreover, experts seem to find very important for an asynchronous course in a virtual learning environment, the combination of the proposed teaching and evaluation methods which derive from two learning theories, behaviorism and constructivism. In particular, behaviorism approach will allow understanding of a learning objective and application of the acquired knowledge related to this objective via computer interactive learning. Constructivism approach will prompt trainees to review and discuss their acquired knowledge with other peers, leading to an “indirect” evaluation of the specific learning outcome and enhancing the skill of online social engagement.

The second most important proposed teaching and evaluation method is the one entitled DiL-TEM 1, which uses video as a virtual leaning object to introduce trainees to certain concepts of DiL. In addition, it enhances both understanding via peer learning, a constructivism approach, and online social engagement.

Teaching and evaluation methods entitled DiL-TEM3, DiL-TEM1, DiL-TEM4 and DiL-TEM2 were ranked respectively in positions 1, 2, 3 and 4 after both Rounds. In addition, DiL-TEM 5 and DiL-TEM 6 which propose a behaviorism approach, namely understanding via computer interactive learning, went up from 6 and 7 after Round 1 to 5 and 6 after Round 2.

DiL-TEM 8 relates to knowledge and application of all core Information Literacy skills, namely searching, evaluating, analysis, synthesis, ethical use and sharing of information for a topic via the teaching and evaluation method of peer learning that derives from constructivism. That method was had been ranked fifth after Round 1, and seventh after Round 2.

Finally, DiL-TEM7 and DiL-TEM9 were ranked in last positions 8 and 9 after both Rounds. After completed two rounds of Delphi study, result shows that Kendal’s W goes from 0.375 to 0.524, and indicates that the level of consensus among experts was medium.

# 6 Mobile Literacy

by CUT



## 6.1 CUT Source mapping for Mobile Literacy

Summary of Key findings of Task 1: Mapping of the state of research in Information Literacy and in Emerging Literacies: “Mobile Literacy (MobL)” by the partner CUT-Cyprus - <https://library.cut.ac.cy/el>

### 6.1.1 “Mobile Literacy (MobL)” Definitions

The following definitions concerning “Mobile Literacy- MobL” emerged after an extensive and systematic review on the subject. In particular, the definitions below refer to the key issues of MobL and have been selected to be evaluated by experts in the field. Moreover, MIL definitions have been semantically analyzed and classified in the conceptual categories, as they are depicted in **Table 6.1** below.

**Table 6.1. MoL Definitions Conceptual Categories**

Conceptual Categories	Meaning
<b>Strongly IL related</b>	The definition underlines the core information literacy skills, such as knowing when and what information is needed, where and how to obtain this information, how to critically assess and organize it and how to use it ethically
<b>IL related</b>	The definition stresses the core information literacy skills but it also includes other concepts of mobile literacy
<b>Technical – operational skills (unique characteristics)</b>	The definition refers to the core mobile skills and reflects the ability to technically use mobile technologies and their functional features
<b>Safety</b>	The definition stresses the core safety and privacy skills when communicating and socializing digitally



Conceptual Categories	Meaning
<b>Mobile skills related to Education</b>	The definition refers to core mobile skills relating them to education
<b>Social Communication skills</b>	The definition refers to core communication skills on how to communicate information or material to various audiences.
<b>Content creation</b>	The definition stresses core skills to create content in a variety of forms, making use of language, images, sound, and mobile technologies, and construct new knowledge or digital sources

**Definition 1.** Utilizing information, creating content, communicating with others, and learning via mobile devices are able to happen anytime, anywhere, as well as contextually like just-in-time and location-based. Mobile literacy skills, such as using the operation system and apps effectively and comprehending the capabilities of the device at both the hardware and software levels, are essential for benefiting the most from these features. (Technical operational skills & IL related & Communication skills & Content creation & Mobile skills related to Education)

**Definition 2.** Mobile information literacy as a theoretical concept is based on information literacy competencies in the mobile environment. Mobile devices users connect to the internet on their devices to accomplish different information tasks based on their information needs as checking e-mails, communicating with co-workers or friends, seeking information, relaxing and having fun, reading news, visiting catalogues, searching databases and more. (Technical operational skills & Strongly IL related)

**Definition 3.** Mobile Information Literacy is a combination of digital, internet, and information literacies for smartphone-first and smartphone-centric populations, that fills a critical gap between access alone and realization of the benefits mobile technologies and applications can have. (Technical operational skills & Strongly IL related)

**Definition 4.** Mobile learning is known as the ability to provide educational content on personal pocket devices, or personal digital assistants (PDAs). The term ‘m-learning’ emerges as a read application for the 21st century technologies in education and training. Though mobile phones are no longer new, its utilization in education increases day by day. (Technical operational skills & Mobile skills related to Education)

**Definition 5.** Mobile learning is a form of e-learning using mobile devices. It consists of the provision of educational content anywhere, anytime. Mobile learning is expressed in the use of mobile devices to work together, share learning content, and assessment. (Technical operational skills & Mobile skills related to Education & Communication skills)

**Definition 6.** Mobile literacies can be defined as the use and interpretation of written or symbolic representation in texts and practices mediated by mobile digital technologies. Mobile literacies are characterized by interactivity, autonomy, spontaneity and creativity when working to make meaning on the move. (Technical operational skills)



**Definition 7.** Mobile information literacy is necessary to help people learn how to find and evaluate the quality and credibility of information obtained online, understand how to create and share online information effectively, and participate safely and securely (Technical operational skills & Strongly IL related & Communication skills & Content creation & Safety)

**Definition 8.** Mobile information literacy is critical to help people better consume, generate, and disseminate trustworthy information through both digital and traditional media. (Strongly IL related)

### 6.1.2 “Mobile Literacy (MobL)” key concepts and content

The huge amount of information and growing trend of mobile information and mobile technologies usage on a daily basis in personal and professional life, are forcing people to develop competences in order to seek, evaluate, save, share and deliver information through mobile devices anywhere and anytime (Matula, 2019). Mobility allows individuals to access information from distant places whenever they want, quick and easy. According to Encheva et al (2017), the majority of respondents use their devices more often for social networks (chat), browsing, calls, listening to music, and taking photos, rather than reading, access to databases, and self-education. Walsh, also mentioned the growing trend to delegate information to mobile devices (2012). According to Palalas & Wark (2017) perspective, in order to enable seamless learning across all dimensions of mobility, the learning design should ensure that the learning content and activities would be designed in a way that learners can “come and go without deterring the learning process or [...] having to deal with technological hurdles”. Accordingly, learners must first be aware of the ‘environmental affordance and process this awareness emotionally, cognitively, socially, and spiritually before they can react to this affordance by either acting upon it or ignoring it’. Interestingly, those strategies could result into the m-learning design to balance a learner’s interaction with the context affordances, and also support learning enhanced by the dynamically changing context.

Based on data (Pinto, Fernández-Pascual, et al., 2020c), new Mobile Information Literacy domain (MoIL), is subtly introduced into the new information environments. This domain is based above all on the continuous evolution of IL and mobile learning (ML). The convergence of the two disciplines is a new reality of which there is an increasing amount of evidence.

Within this concept Walsh (2012) explore “how information use and IL can vary in an environment where mobile devices provide quick and easy access to information on the move”. Jere-Folotiya et al. (2014) contributes to this by referring to mobile devices as a primary cultural resource where learners communicate effectively and use their skills to prosper in modern society.

Thus, having in mind the amount of information that grows and expands day by day, there is a need to use new technology in order to assist individuals to become aware of increasing fundamental skills to effectively locate, evaluate, and use information in all aspects of their lives. Having in mind the increasing mobile devices usage, it is essential to help learners develop 21st century skills including information literacy and digital literacy skills to survive in a complex and demanding society. Modern society needs people who are ready to progress and whose lifelong learning skills are high and mobile technologies have great potential to support lifelong learning

(Vatansever & Keskin, 2016). Individuals need to have the knowledge and skills in order to benefit from information and mobile technologies aimed at learning independency.

The growth usage of mobile technologies and the ubiquitous wireless communication leads to the development of new systems and applications in many fields including education (Ennouamani et al., 2020). Review of the literature denote that mobile technology promotes educational access and supports teaching and learning. It is believed to be a proper tool for advancing education in the digital era. Mobile phones and tablets seem to be educational tool of choice in the future that permit access to knowledge from anywhere and anytime. Mobile Learning has improved and become essential in the field of distance learning. Alanezi & AlAZwani (2020) note that “mobile learning is known as the ability to provide educational content on personal pocket devices, or personal digital assistants (PDAs), which is taking away the barriers of time and geography by opening up opportunities for learning right at the learners’ fingertips”. Encheva et al. (2017) determine the Mobile learning as a form of e-learning using mobile devices. It consists of the provision of educational content anywhere, anytime; it is expressed in the use of mobile devices to work together, share learning content, and assessment.

Additionally, Cahyana et al. (2020) strongly believe that mobile learning ‘becomes more meaningful because it can connect material with everyday life’. It refers to the advantages of the mobile learning socio-technological approach, because when compared to other mobile learning approaches, learning becomes more meaningful because not only knowledge is highlighted but this approach also puts forward the role social in technology so students care about their environment.

In mobile literacy, there is a greater importance of digital competencies. Students consider digital competencies necessary. Most of them believe they are sufficiently equipped to find information online, just knowing how to use the device. They tend to neglect research strategies and underestimate the management of data. When analyzing the students' answers on their concept of information literacy, mobile literacy, and fake news, there is an overlap between information literacy and digital competencies. There is confusion among students on how to use the device to search for information and on how to search for information (Encheva et al., 2020).

A glance at the status of mobile phones and devices seems to be ‘spreading and influencing people all over the world, simultaneously, regardless of a nation’s economic status. Consequently, ‘mobile technologies, and hence mobile literacies, are classified as forms of digital literacy; they are obviously multi-dimensional as well as multivariate and complex, and especially known to embrace educational, social, and economic dimensions.’ Due to the high rate of mobile ownership among learners, the development of mobile literacies could lead to ‘social and economic improvements’ by elaborating access to information, data, and knowledge and improving welfare (Semali & Asino, 2014).

Nonetheless, as Velghe (2013) points out, mobile phone ‘has made certain forms of literacy and the possibility of practicing (newly) acquired literacy skills more accessible and appealing to a vast amount of poor and marginalized people’ and has also opened ‘doors to educational and informational programs for both institutional and out-of-school’. Therefore, learning could be seen ‘as a social activity in which anyone with any knowledge on mobile phones and mobile phone literacies becomes a potential tutor’. The author also noted that ‘the informal (language) learning processes “semi-literate” and “illiterate” people engage in, in order and in an attempt

to get as much out of their technological device as possible. In other words: the informal learning processes people engage in when they learn – by themselves or with the help from others – how to “read” and “use” their handsets.

In this new changing environment, the need to help and educate learners with key capabilities in order to be able to work, search, locate information is essential. Information literacy can be considered as one of this key capability. Information literacy and e-learning are in a way connected by also distinguished since the model of information literacy represents an actively literate person as someone who is able to search, locate and critically use information on his personal and professional life and as a member of the society). In addition, Srisuwan (2020) supports that literacy has served as “a pivotal skill to prompt students in higher education to develop information awareness and assist them in to living and working successfully in the present informative world”.

E-learning in general supports all kind of learners and trainees, to enhance their knowledge and experiences, to narrow their weaknesses and to achieve their learning goals (Ennouamani et al., 2020). After a bibliometric analysis on international scientific production on Mobile Information Literacy, Pinto et al. (2019) find a strong link between terms education and mobile, which proves that both in Mobile Learning and Information Literacy, mobile devices are becoming more widespread at all educational levels. M-learning it is essential for individuals in developing information competencies (Pinto, Fernández-Pascual, et al., 2020a).

Embodying mobile learning with education successfully, attention needs to be given of the factors of both student and educator adoption (Alanezi & AlAzwani, 2020). Learners are learning through mobile devices, giving them direct accessibility, ubiquity, and intercommunication possibilities. Moreover, it contributes to linking different aspects of daily life, such as social and academic networks. By introducing smartphones into education and the ubiquity deriving from there, it constitutes a growing and unstoppable (Guo & Huang, 2020).

Nowadays, students integrate social networks, mobile resources and applications in their everyday lives, thus, the integration of mobile technologies has become also a common part of the classroom (Pinto, Fernández-Pascual, et al., 2020b). The portable nature, the unique operating systems and interfaces of mobile devices, wireless connectivity and the ubiquitous way to access and share information offer many opportunities, and allow individuals to communicate and consume information (almost) anywhere and anytime, as well as contexts such as just-in-time and location-based (Encheva et al., 2017; Matula, 2019). Pinto et al. (2020c) enhance mobile and ubiquitous learning by “linking the current training process in regulated education mainly to learning through mobile devices, given the possibilities they offer regarding direct accessibility, ubiquity, and intercommunication. Likewise, it also contributes to establish a relationship among the different aspects of daily life, such as the use of social and academic networks”. Barden (2019) referred also to the ubiquity of mobile devices which suggests that people are using an array of literacy practices in order to navigate the online world and manage their lives and learning. Mobile devices are reachable ubiquitously, and that opens up new learning possibilities for their users. In line with the general mood of modern era, having access to information or educational content at any time and from any place has created a new technology and learning culture (Vatansever & Keskin, 2016).

“Ubiquity and the new learning scenarios are bringing about a transformation in the way to access, manage, and use information in both daily and academic life. Due to the use of mobile

technology in teaching–learning methodologies, there seems to be an increase in students’ motivation” (Pinto et al., 2019).

Mobile technology offers the opportunity for educators to transform classrooms into collaborative and active learning environments and the individuals to develop learning competencies through activities and interaction. Barden (2019) mentioned that educators would welcome mobile devices into their classrooms, offering learners the option to access, record and share information, interact and express themselves. When designing courses, educators should focus on pedagogical transformation, determine how to develop the learning material and how to integrate mobile technology in their physical and virtual classes (Alanezi & AlAzwani, 2020). Pinto et al. (2020b) point out that using mobile devices in the teaching-learning process and the development of information competencies is an unstoppable reality and they are used in the classroom for everyday tasks, such as finding information (Pinto, Fernández-Pascual, et al., 2020a). Therefore, mobile devices are useful educational tool that offers many possibilities.

Another interesting approach to mobile information literacy is supporting students to use mobile devices to connect to information resources provided by academic library (Matula, 2019). Libraries are places where literacies of all kinds are promoted and taught. People go there to learn and seek information (Clark et al., 2017), and however they are serving their communities through a mobile environment, for example mobile catalogs, e-collections, mobile databases, texting with reference librarians and much more (Havelka, 2013). They are considered as natural partners in developing and implementing mobile information literacy curriculum and training. When training library staff on mobile information literacy and teaching them how to adapt and implement the training back in their community libraries, thousands of people learn how to benefit from mobile devices and the mobile internet (Clark et al., 2017).

Libraries provide a range of services such as database searching, library tour, content alerts, overdue reminder and information. However, in the new mobile era users’ needs have increased and therefore librarians need to find new tools to reach out to their patrons. They have been part of the information world for centuries by functioning as a medium between learners, students, faculty, academics, communities, by preserving, managing and by acquiring and securing digital content (usually by licenses) and arrange for the content to be accessible by its member. Moreover, they are important places which offer technology access and education as services that are available consistently to the public, including refugee communities. Library programs range from general technology classes open to everyone to partnerships with local community organizations and nonprofits that allow for digital literacy classes tailored to specific community needs taught in community spaces and in languages other than English (Dahya et al., 2020).

Libraries use a diverse set of ICT tools to communicate with their users and disseminate information. In some contexts, ICT has become essential for teaching and learning. As Andreev (2020) refers to ICT, ‘includes all devices and technologies that provide access to information network resources and all necessary actions with information and data in networks (for example, the Internet). Accordingly, Gomez (2011) has defined mobile ICT literacy ‘as the ability of individuals to participate effectively in transactions that invoke illocutionary action (actionable response). Mobile ICT literacy is an important aspect of effective communication with the ongoing deployments of social media and mobile technologies and should include

training on connectivity for environmental sustainability and communication best practices. However, there are various factors that affect the adoption of Information communication technology (ICT) followed by the 'perceived ease of use and usefulness of the technology, ICT anxiety about using technology and ICT literacy'. Mac Callum et al., (2014) refer to the Technology Adoption Model (TAM) to regulate how instructional technology could be adopted by educators and students. Authors present how the perceived ease of use and usefulness of mobile technology could reflect the relation among ICT anxiety and ICT literacy and how students and educators could use mobile learning in the future. They also stress out the effort needed for technology to operate based on user's needs. Students and educators need to know they have the freedom to explore mobile learning and be supported when they study. Finally, the libraries will not only consider the way mobile phones and their services will interact but also be aware how mobile phones will help them in their social networks. It is important to educate the users through the mobile devices but also to promote the library services through this new trend.

In addition, many universities provide a variety of delivery options, such as visual classrooms, e-learning portals, e-portfolio systems, and interactive books, and learners are encouraged to use technology and work cooperatively in the learning process (Encheva et al., 2017). Havelka (2013) also agreed that many universities provide their services via mobile websites or mobile applications (apps), for example allow students to use library services, register for a course, access learning management etc. It is worth mentioning that due to the Coronavirus pandemic situation, universities, colleges, and education institutes around the world have change their teaching approach and move to online learning based specifically on mobile devices (Alanezi & AlAzwani, 2020). Many education sectors integrate information and communication technologies (ICT) into classes, and implement innovative technologies especially mobile devices for teaching and learning.

In many academic libraries, mobile technology is used to support Information literacy. Specifically, 985 university libraries in China aim at the objective "wherever users are, wherever library services are.". These libraries try to provide services which will follow the changes of users' information searching behavior and focus more on mobile aspect. All 39,985 university libraries have mobile library apps and opened library's WeChat public accounts now (Guo & Huang, 2020).

Academic librarians seem to play a fundamental part in mobile learning and teaching. They have been actively involved in integrating teaching practices via mobile devices into library

instruction classes, specifically in information literacy curriculum (Havelka, 2013). It is worth mentioning that pedagogical collaborations between faculty and librarians reinforce incorporation information literacy into higher education curriculum (Hanbidge et al., 2016). Both learners and educators need to develop a range of information literacy skills and be provided supportive materials to take full advantage of and make the best use of the emerging technologies. With emergence of new technology, ways to interact mobile information literacy education with the curriculum offers exciting possibilities (Hanbidge et al., 2016). In this way students learn how to use mobile devices to search, locate, access and use information effectively. Students be able to understand and use both the information and technology to become successful and independent lifelong learners.



Digital and information literacy skills are critical to fully realize the potential of technologies (Clark et al., 2017). However, it is important to develop best practices and strategies for accessing and using information that reinforces individuals IL skills through mobile technology. It is considered necessary to become digital literate persons and develop appropriate skills and abilities so that seek, access, process, evaluate and share information in an ethical and effective manner. Those skills and competencies are based on IL models (Matula, 2019).

Information literacy has always had a leading role in educational organizations. It changed over the years and has adapted to the needs of the times undergone continuous development. The main goal of academic libraries is to offer information literacy classes in a modern and innovative way. In recent years there is a great need for coexistence and convergence of information literacy and e-learning. One possible way for these two to coexistence is by the embedded instruction which is considered an educational form where colleges and universities incorporate information literacy instructions into their courses to improve student's skills using pre-set targets. Therefore, collaboration among different departments and the administration of the universities is essential. As Guo & Zhu (2019) points out “for all the information literacy instruction embedded courses, either led by university teachers or by librarians, meticulous pre-class preparation is the key to success” as well as the cooperation between faculty members and librarians.

Within the years the role of librarians has been elaborated and as Encheva et al. (2020) present “librarians indeed have used the fake news phenomenon to highlight their traditional role of training for critical thinking skills and for evaluating information. They can actually collaborate with all the other stakeholders, because the problem is more complex”. As a way of evolving in the new digital era they have taken the role of instructor’s librarians and have shown that they can become leading practitioners when implementing games and knowledge in higher education and have also shown the importance of the library profession. The researcher has also pointed out that ‘the most effective ways to ensure that students become skilled in handling good information is to include information skills in the curriculum, with autonomous courses centered on the library, but also with embedded courses integrated in the classes and adapted to the different subjects. Librarians fully understand that collaborating with teachers is essential to stimulate better information literacy. Hanbidge et al. (2016) also support that in the knowledge society, “librarians play a prominent role in assisting in the collection building, organization of information, and thereafter its dissemination”. Librarians are more than a teacher, a mentor, as path enlightening personality, and they can teach clientele the skills to independently retrieve information in terms of information literacy. So, it is essential to have “a collaborative effort between faculty and the Library” when they proceed with the development, design and implementation of the mobile lessons and its applications.

Librarians teach IL in the mobile environment and provides students the flexibility to learn IL at any time and in any place. It also creates challenges for librarians who need to verify online information and choose the most appropriate and authoritative information for IL courses so that students can learn the most useful IL knowledge and do not get overwhelmed and lose their interests. The main purpose is to help students to learn how to better use their mobile devices to search for the information that meets their needs and to master an easier way to acquire and share information (Guo & Huang, 2020).

A new trend is the way libraries now operate and as a result, librarians given the needs of their users in mobile learning. All the opportunities given to users through their mobile phones “force” librarians to adapt to the new facts, and be informed how information is displayed on mobile devices, what their capabilities are and how they can use them for the library services. With this increased need for the use of technologies and especially mobile learning during the educational process even in libraries, librarians have to develop their skills in order to be able to meet the demands of the times. Academic librarians and information scientists nowadays often use learning management systems in educating their users, but also in various research on the library, as well as in promoting library services. There are many practices for attracting students through the education provided by librarians. Guo & Zhu (2019) suggested 3 instructional models where the librarians taking the leading role in two of them when educating the user. The first one is when the “Faculty taking the lead: integrating information literacy instruction into department-based specialized courses and liberal education. Usually, librarians take one and a half to three hours to introduce the Library’s resources, databases, etc. relating to the students’ disciplines or majors, and guide them on how to acquire and utilize information.” The second model is when the Librarians taking the lead: In this model, Librarians play an important role in library-department collaboration, spending much of their time or full time in information literacy training. The librarian trains the user in searching through databases and helps him to improve his retrieval ability and literary research skills. Librarians provide help to the student on their information literacy first steps but also guides them for their thesis proposal. Thus, librarians and information professionals should consider the growing trend of mobile phones in everyday life and the parameters in the field of libraries. Vassilakaki (2014) explains the need to include mobile technology in the university library, due to its advantages and adaptation to the new needs of users. It also underlines its usefulness, accessibility and ubiquity.

The fact that mobile technologies are accessible by all segments of society has also made these technologies a very powerful instrument for lifelong learning (Vatansever & Keskin, 2016). Individuals from different cultural and educational background, use mobile technology having equal opportunity to access information. The massive influx of mobile apps leads to the need for improve mobile literacy (Lee et al., 2016). Despite the domination of mobile apps and the rapid adoption of mobile devices, however, certain groups remain technologically illiterate. It is imperative to promote mobile literacy in minorities, as mobile technologies support for example, migrant’s well-being and acquire other skills relevant to daily life and work in the new country. Access to mobile technology also facilitate the refugee resettlement process and opens pathways for their education. Technology education supports refugee communities, especially women, to set up mobile phones and communicate, connect to locals, find a job, access information, improve language skills (Dahya et al., 2020). Mobile learning develops new ways of thinking for women refugee to find further opportunities for professional careers, or rethink how to start a new career in the host country (Bradley et al., 2020).

Certain ethical issues and concerns should always be considered when conducting mobile learning. There are many challenges to the ethical use of mobile phones in various places, especially in schools. One of the concerns, especially from teachers, is the use of mobile phones on school premises. Many professors in previous research have reported concerns about this fact. In particular, they are concerned about the use of mobile phones for copying/ cheating during an examination, or for sending answers, or searching the internet for the answer. But the most serious activity with mobile phones inside the school premises is sexting which leads to



harassment and bullying. “Given these facts, many schools have banned the use of mobile phones in classrooms since they can distract from learning” (Abidin et al., 2016). Therefore, the use of mobile phones in schools should be implemented after studying and managing all the above considerations. Schools should establish regulations for the proper use of mobile phones in the educational process.

Researchers point out to common challenges in mobile learning among educators and learners regarding usability, costs, acceptability, access, security and ethical concerns. Faulkner & Striepe (2012) point out to software issues such as the challenges of syncing apps, while Hanbidge et al. (2016) indicate challenges as the lack of connectivity when opening MIL lesson video links or limited data coverage to lessons access. Moreover, there is a barrier regarding the cost of accessing internet data. The author summarizes with issues which have to do with ‘the eye strain caused by small mobile screens; difficulty inputting data on small keyboards or that the phone lacked a keyboard altogether’. Sometimes websites are regular and not-mobile friendly and keeping up-to-date with mobile apps and websites is also challenging (Havelka, 2013).

The growing amount of research concerned with applying mobile learning refers to the lack of educators training. Romero-Rodriguez et al. and Varanasi et al. (2020; 2020) strongly support educators training in technological matters at universities within the current context; therefore, ‘distraction, change resistance, and uselessness’ can no longer be used as a reason for not using technology efficiently. In addition, Varanasi et al. (2020) stresses out that ‘between organizations’ expectations regarding teachers’ knowledge of how to use their smart- phones and teachers’ actual knowledge, with support programs often focusing heavily on the pedagogical aspects of their programs and not on training teachers how to troubleshoot common technical problems’. Furthermore, Nikou & Economides (2019) pinpoint that educators are the primary agents that introduce mobile technology to individuals and can determine learners’ perceptions of using these technologies. In contrast, the anxiety of an educator can influence the way technology is used in the learning environment and could, both directly and indirectly, affect the adoption of mobile learning. The author also refers to ‘computer anxiety as an emotional response usually resulting from a fear that using the computer may have a negative outcome, such as damaging the equipment or looking foolish’ (Mac Callum et al., 2014).

Scholars who have studied mobile learning in classrooms, are concerned with students thinking abilities, primarily because, as a rule in universities, educators try to give their students as much guidance as possible. At the same time, they ‘require a minimum of cognitive and creative activity’. However, students ‘develop negative qualities, loses faith in himself, the direction of his efforts is shifted from the production of knowledge to the production of assessment. As a result, society gets a passive specialist, a performer who does not have the skills to make decisions in the professional sphere’ (Murotova & Kavirova, 2020). There is a need to study whether technology has influenced analytical-critical skills, and potentially created distractions in the classroom (Pinto, Fernández-Pascual, et al., 2020a). So another challenge they face according to Encheva et al. (2020) is that “students overestimate their ability to find quality information and they lack motivation to learn information literacy’ while Palalas & Wark (2017) support that ‘individual typically struggles with other learning barriers, such as a busy, complicated lifestyle (for example, re-entering the formal education system), emotional barriers (such as negative feelings about education, or a sense of inferiority due to lack of literacy skills and socio-economic status), and a range of learning disabilities’.

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### 6.1.3 “Mobile Literacy (MobL)” key learning objectives and outcomes integrated in distinct thematic units

#### 1. Introduction to Mobile Literacy (MoL)

This Unit aims to introduce trainees, namely educators and librarians, to the main theoretical concepts of “Mobile Literacy”.

**This Unit learning objectives are to:**

- **describe** MoL key definitions
- **identify** MoL key skills
- **relate** MoL key skills to various scientific subjects
- **reflect** on MoL current trends
- **identify** why it is important for successful and independent lifelong learners

This Unit expected learning outcomes are that trainees will have obtained the ability to:

- **recognize** MoL in-depth definitions/concepts such as “Mobile Literacy”, “Information”, “Information Literacy”, “Technical Competency”, “Mobility”, “Mobile technology”, “Mobile Learning”, “E-learning”, “Educational Technology”, “Librarian”
- **introduce** trainees to the concepts **explaining** the skills and competences that derive from the inter-dependent fields of MoL, MoLL, IL, Mobile learning, Mobile Technology
- **identify** MoL key skills as important for daily life
- **discuss** how MoL can better equip learners to use technology and navigate educational environments; to access educational platforms via mobile devices
- **use** both the information and technology to become successful and independent lifelong learners

#### 2. Understand the unique characteristics of Mobile technology

This Unit aims to offer trainees, namely educators and librarians, a deeper understanding of the characteristics of mobile technologies.

**This Unit learning objectives are to:**

- **realize** that ubiquity, accessibility, immediacy, are important for individuals to access, manage, and use information in both daily and academic life
- **comprehend** the unique operating systems and interfaces of mobile devices, wireless connectivity and the ubiquitous way to access and share information, and allow individuals to communicate and consume information (almost) anywhere and anytime

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **use** mobile devices for direct accessibility, ubiquity, and intercommunication possibilities
- **apply** mobile internet and smartphones in everyday lives to solve problems and improve livelihoods
- **build up** on mobility and flexibility in learning and enable individuals to be “spontaneous, personal, informal, contextual, portable, ubiquitous, and pervasive



- **explore** how mobile devices as a primary cultural resource allows individuals to communicate effectively and use their skills to prosper in modern society
- **explore** how mobile devices provide quick and easy access to information on the move
- **provide** educational content on personal pocket devices, or personal digital assistants (PDAs), which is taking away the barriers of time and geography by opening up opportunities for learning right at the learners' fingertips
- **practice** in transitioning between devices in search for information
- **practice** on how to access social media platforms (Facebook, Twitter, Instagram, Periscope, Snapchat etc.) via mobile applications or browsers
- **consider** the device operation system, network status and display limitations

### 3. Critical information skills and competencies through mobile devices

This unit aims to encourage trainees, namely educators and librarians, to develop best practices and strategies for accessing and using information that reinforces individuals IL skills through mobile technology.

**This Unit learning objectives are to:**

- **improve** literacy skills and access, retrieval and evaluation skills
- **comprehend** reliable and credible academic information
- **think** critically and make balanced judgements about any information founded

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **create** a foundational MoL curriculum, which addresses critical information literacy skills in the mobile environment
- **provide** supportive materials to take full advantage of and make the best use of the emerging technologies
- **locate** sources and information related to their topic via mobile devices
- **develop** appropriate skills and abilities to seek, access, process, evaluate and share information effectively and ethically
- **adopt** more diverse information-seeking habits, by providing strategies and skills on how to seek and interpret more diverse content (wikis, scientific studies, forums, or social media) and whether the information obtained is reliable, valid and useful

### 4. Communicate, interact and socially engage through mobile devices

This unit aims to encourage trainees, namely educators and librarians, to develop communication and social skills using mobile technologies.

**This Unit learning objectives are to:**

- **interact** through mobile devices and share data, information and digital content with others

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **use** mobile devices and innovative technologies (Facetime, Facebook, mobile phone photo taking, video shooting and Augmented Reality, etc.) to process the interaction and communication
- **use** the transmission function of mobile devices, and effectively share result with others
- **manage, communicate and share** information through various devices
- **be able to reach and express** informed views and to engage fully with society
- **use** mobile devices to discuss and analyze information material
- **interact and cooperate** online and work together, sharing expertise and knowledge in communities

## **5. Understand and discuss the safety and privacy issues**

This unit aims to raise awareness of trainees, namely educators and librarians, on safety and privacy issues of the mobile phone environment

**This Unit learning objectives are to:**

- **be aware of** privacy and security settings on applications
- **acknowledge** the safety and privacy issues of the mobile phone environment
- **identify** related topics of mobile phone intellectual property and copyrights
- **protect** information from unauthorized access and use

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **install, delete, update, and manage** applications
- **distinguish** the difference between browsers and applications
- **keep up-to-date** with mobile apps and websites
- **evaluate** applications for trustworthiness, quality, etc.
- **inform** individuals about the limitations of certain applications and make them aware of the internet beyond Facebook
- **ensure** how to secure mobile devices, download apps and install apps

## **6. Develop problem-solving skills**

This Unit aims to help trainees, namely educators and librarians, apply knowledge and use mobile devices to solve complex problems in the real world.

**This Unit learning objectives are to:**

- become able to use mobile devices to solve relevant, real-world problems

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **develop** skills, such as teamwork, critical thinking, interactive learning, communication, problem solving, that are characterized by the qualities of fluidity, malleability, and adaptability
- **work** together in small groups and collaborate to identify a problem, learn about it, conduct research, find a solution and act

## 7. Tailoring MoL skills at all educational levels

This Unit aims to help trainees, namely educators and librarians better perceive how mobile phones can be used as tools for better performance.

**This Unit learning objectives are to:**

- **support** all kind of learners and trainees, to enhance their knowledge and experiences, to narrow their weaknesses and to achieve their learning goals
- **integrate** teaching practices via mobile devices into existing core content and curriculums
- **motivate** students' learning and reduce the fears of adopting mobile technology within the curriculum

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **use** mobile devices to work together, share learning content, and assessment
- **provide** a variety of delivery options, such as visual classrooms, e-learning portals, e-portfolio systems, and interactive books

## 8. Incorporate mobile technologies in class

This Unit aims to help trainees, namely educators and librarians, on how to integrate information and communication technologies (ICT) into classes, and implement innovative technologies especially mobile devices for teaching and learning

**This Unit learning objectives are to:**

- **encourage** educators to change the philosophy of teaching and learning
- **focus** on pedagogical transformation, determine how to develop the learning material and how to integrate mobile technology in their physical and virtual classes
- **apply** u-learning, or ubiquitous learning to de-emphasize the idea of mobility and contextual independence, and instead stress the situated, contextualized learning that mobile devices enable
- **develop** personalized learning content and format taking into consideration the learner's knowledge level and learning styles making them able to reach a high level of learning independency

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **transform** classrooms into collaborative and active learning environments to develop learning competencies through activities and interaction
- **apply** learning in informal environments and synthesize reliable and credible academic learning resources
- **involve** collaborative learning experiences in different contexts
- **design** an IL course highly interactive in order to think critically, engage and information share with peers and apply new knowledge in an active-learning environment
- **access and create** multimedia materials (e.g., records of lessons or field trips) to produce digital narratives

- **use** mobile devices to provide opportunities for instant feedback and assessment, qualitatively changing the learning interaction
- **use** mobile devices to deliver electronic learning materials through built in learning strategies to allow access to knowledge from anywhere and at any time
- **adopt** learner-centric activities in which learning is nomadic (it can take place anywhere and anytime out of the traditional classroom), to achieve their satisfaction

## 9. Universities and libraries as pioneering agents of MoL Skills

This Unit aims to help trainees, namely educators and librarians, perceive that mobile devices and mobile apps are the new trend for learners to use library and university services.

**This Unit learning objectives are to:**

- **become able** to reach learning independency and be in line with the advantage of mobile technologies explosion
- **support** libraries and universities to provide services that follow the changes of users' information searching behavior and focus more on mobile aspect
- **stimulate** deepen and widen global partnerships and network to collectively build and make an impact on the current and future education systems

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **train** library staff on MoL and teach them how to adapt and implement the training back in their community libraries
- **encourage** librarians to use new tools for serving their communities through a mobile environment, for example mobile catalogs, e-collections, mobile databases, texting with reference librarians and much more
- **mentor** librarians on how to develop and implement MoL curriculum and training
- **recommend** universities to provide their services via mobile websites or mobile applications (for example allow students to use library services, register for a course, access learning management etc.)
- **provide** international collaboration opportunities for the utilization of e-Learning resources and educational mobile application development
- **design** e-Learning content that is utilizable in the international educational environment

## 10. Academic librarians as pioneering agents of MoL Skills

This Unit aims to assist trainees, namely educators and librarians, to recognize that academic librarians play a fundamental role in integrating teaching practices via mobile devices into Information Literacy instructions.

**This Unit learning objectives are to:**

- **prepare** colleges and universities integrate IL instruction into their specialized courses or general- knowledge courses to improve students' professional IL in a modern and innovative way
- **train** librarians to be actively involved in integrating teaching practices via mobile devices into library instruction classes, specifically in IL curriculum

- **guide** librarians teach IL in the mobile environment and provide students the flexibility to learn IL at any time and in any place

**This Unit expected learning outcomes are that trainees will have obtained the ability to:**

- **adopt** good utilization of Internet-based instruction tools and place emphasis on instruction assessment
- **adapt** to the new facts, and be informed how information is displayed on mobile devices, what their capabilities are and how they can use them for the library services
- actively **encourage** students to use their mobile devices for note-taking; promote mobile library website by instructing students to access it via their mobile devices in the classroom; and search for books via mobile catalog instead of the desktop version
- **apply** mobile devices to search for information and mastering an easier way to acquire and share information
- **demonstrate** step-by-step videos, practical tips, links to online resources, and interactive exercises in library lessons to assist students in writing assignments and research papers
- **adopt** a game-based model for IL learning to elaborate learning materials such as games to be embedded in the curriculum, by using specific game tasks and other game-based learning activities
- **use** flipped-classroom pedagogy for an IL course to create an in and out of the class learning environment
- **select** embedded instruction as an educational form for an IL course

Key Teaching and Evaluation Methods is common for the six information related literacies of EDUCABILITY Program [see *Annex 3 – Key Teaching and Evaluation Methods, common for the six information related literacies of EDUCABILITY Program*].

## 6.2 CUT Delphi Study for Mobile Literacy

This chapter refers to the detailed presentation of the results that emerged after the implementation of the MoL survey using the Delphi method.

### 6.2.1 CUT Delphi Study for Mobile Literacy - Definitions

The 20 experts, who completed the MoL Delphi Study Questionnaire in Round 1, were asked to read 8 definitions concerning “Mobile Literacy (MoL)” and to rate them in order of importance, from 1 (least important) to 10 (most important). In particular, according to their point of view as experts, they were asked which of the definitions succeed to refer to the key issues of MoL and should be definitely considered for a course aimed at educators and librarians.

#### Comments on the results of MoL Round 1

According to the results of Round 1 of MoL Delphi study, it appears that all MoL definitions (except the 8th definition) were rated with an average of more than 6 out of 10, leading to the conclusion that their concepts are highly appreciated for inclusion in a curriculum aimed at educators and librarians. The majority of the experts seem to believe that definitions which are related to Information Literacy skills, such as knowing when and what information is needed,

where and how to obtain this information, how to evaluate and how to use and share it effectively, are very important. Furthermore, Mobile Literacy skills, which refer to using the operation system and apps effectively and comprehending the capabilities of the device (hardware and software), are essential for utilizing information, creating content, communicating with others, and learning via mobile devices, have earned the highest rating from experts. Definitions that are relevant to technical skills and strongly IL related have been also highly appreciated. Finally, definitions related to education have been also rated quite high by experts.

### **Comments on and conclusions about the results of MIL Round 1 and Round 2**

During Round 2, 19 experts completed the MoL Delphi questionnaire. According to the results of Round 2 of MoL Delphi study, it appears that all 8 MoL definitions were rated with an average of more than 7 out of 10, supporting the conclusion of Round 1 that their concepts are highly appreciated for inclusion in a curriculum aimed at educators and librarians. The definition which includes a variety of skills (such as technical, IL related, communication, content creation and education related) was ranked first in order of importance.

To continue, the majority of the experts seem to believe that definitions which are related to information literacy skills, such as knowing when and what information is needed, where and how to obtain this information, how to evaluate and use it effectively, are still important, as in Round 1.

A striking difference between the results of Round 1 and Round 2 is the fact that the definition with a strong orientation to technological skills and information literacy skills, drop from place 2 to place 5. Accordingly, the definition related to technical operational, mobile, communication skills and skills related to education rose in order of importance from place 5 to place 2.

Moreover, the definitions in place 6, 7 and 8 remain the least important in both Rounds (see *Annex2 – UNIWA [Task 2] Trainees’ needs analysis for the creation of a Pool of 60 experts - Intellectual Output 1 [IO1] - Leading partner: UNIWA-Greece*).

According to above criteria, it is important to mention that after Round 2 results show improved values for 7 out of 8 definitions and for this reason we can conclude that there is a good level of consensus between the experts.

### **6.2.2 CUT Delphi Study for Mobile Literacy - Key Concepts**

The 20 experts, who completed the MoL Delphi Study Questionnaire, were asked to read 10 key concepts concerning “Mobile Literacy-MoL” for virtual adult training and rank them in order of importance, by putting the 1st as most important, reaching gradually the 10th as less important. In particular, according to their point of view as experts, they were asked which of the key concepts they would definitely include in a course aimed at educators and librarians, as core to MoL skills and which of them as less closely-related to MoL skills. In Round 2, the number of experts that completed this section was 19. The Ranking results of Round 1 and 2 are depicted below in **Table 6.3**.

**Table 6.2. MoL KC Legend**

MoL-KC ID	MoL KC Description
<b>MoL-KC1</b>	Introduction to Mobile Literacy (MoL)
<b>MoL-KC2</b>	Understand the unique characteristics of Mobile technology
<b>MoL-KC3</b>	Critical information skills and competencies through mobile devices
<b>MoL-KC4</b>	Communicate, interact and socially engage through mobile devices
<b>MoL-KC5</b>	Understand and discuss the safety and privacy issues
<b>MoL-KC6</b>	Develop problem-solving skills
<b>MoL-KC7</b>	Tailoring MoL skills at all educational levels
<b>MoL-KC8</b>	Incorporate mobile technologies in class
<b>MoL-KC9</b>	Universities and libraries as pioneering agents of MoL Skills
<b>MoL-KC10</b>	Academic librarians as pioneering agents of MoL Skills

**Table 6.3. MoL KC Ranking - Round 1 & Round 2**

DiL KC Ranking – Round 1			DiL KC Ranking – Round 2		
Rank	Title	Mean Rank	Rank	Title	Mean Rank
1	<b>MoL-KC5</b>	2.76	1	<b>MoL-KC5</b>	1.89
2	<b>MoL-KC1</b>	3.1	2	<b>MoL-KC1</b>	2.32
3	<b>MoL-KC3</b>	4.1	3	<b>MoL-KC3</b>	4.47
4	<b>MoL-KC8</b>	5.33	4 (5)	<b>MoL-KC6</b>	5.37
5	<b>MoL-KC4</b>	5.48	5 (6)	<b>MoL-KC8</b>	5.53
6	<b>MoL-KC2</b>	5.62	6 (7)	<b>MoL-KC4</b>	5.63
7	<b>MoL-KC6</b>	5.76	7 (4)	<b>MoL-KC2</b>	6
8	<b>MoL-KC810</b>	7.1	8	<b>MoL-KC810</b>	6.95
9	<b>MoL-KC7</b>	7.33	9	<b>MoL-KC7</b>	8
10	<b>MoL-KC9</b>	8.43	10	<b>MoL-KC9</b>	8.84

### **Comments on the results of MoL Round 1 and Round 2**

According to MoL KC ranking above it is clear that Key Concept entitled “MoL-KC5 - Introduction to Mobile Literacy (MoL)”, has taken the 1st most important place among the ten (10) proposed MoL key concepts, after both Delphi Rounds. This leads to the conclusion that experts indeed identified a significant gap in MoL knowledge of the target audience, namely educators and librarians, that should be definitely filled by offering an introductory chapter in the pertinent curriculum.



Next MoL-KC1 and MoL-KC3 hold the 2nd and 3rd position after Round 2. Obviously, experts believe that these concepts equate with the most closely related skill to MoL and therefore they should be definitely included in the proposed curriculum.

After Round 2, experts reranked MoL-KC8, MoL-KC4 and MoL-KC2 in higher positions. These three proposed key concepts rose one position higher from Round 1 to Round 2.

An interesting observation is also that “MoL-KC6 Understand and discuss the safety and privacy issues of the mobile phone environment” rose from the 7th to the 4th position. This could lead to the conclusion that experts seem to acknowledge that the important relation between safety and privacy issues and other MoL concepts may be fostered with an emphasis to designing learning MoL activities tailored to specific fields.

Moreover, MoL-KC10, MoL-KC7, MoL-KC10 have been ranked after both Rounds as less closely related to core MoL skills, by experts.

### **Conclusions about the results of MoL Round 1 and Round 2**

After completing two Rounds of MoL Delphi study, results show that Kendal’s W factor improved from 0.362 to 0.533, and we have a medium level of consensus among the experts. For this reason, researchers suggest to consider for inclusion all the key concepts in MoL curriculum, which is addressed to educators and librarians.

### **6.2.3 CUT Delphi Study for Mobile Literacy - Key Learning Objectives and Outcomes**

The 20 experts, who completed the MoL Delphi Study Questionnaire, were asked to read 10 sets of learning objectives and outcomes, incorporated into 10 proposed key concepts (KC) of “Mobile Literacy-MoL”. Then, they had to rate each set of these learning objectives and outcomes in relation to their appropriateness, from Completely Agree (most appropriate) to Completely Disagree (least appropriate). In particular, according to their expertise, they were asked which of them they would evaluate as the most appropriate to be considered for the development of a virtual course aimed at educators and librarians.

### **Comments on the results of MoL Round 1**

According to **Table 6.4** there is a total consensus of Completely Agree & Agree among experts for all ten (10) sets of learning objectives and outcomes, rating from 90% the least to 100% the most. This consensus had been reached among 20 experts already after Round 1 and for this reason researchers decided to omit this section from Round 2.

The majority of MoL learning objectives and outcomes reach a consensus of 100%, namely: “KC1- Introduction to Mobile Literacy (MoL)”, “KC2 -Understand the unique characteristics of Mobile technology”, “KC3- Critical information skills and competencies through mobile devices”, “KC7-Tailoring MoL skills at all educational levels”.

Additionally, 4 out of 10 sets of MoL learning objectives and outcomes reach a consensus of 95%, namely: “KC4- Communicate, interact and socially engage through mobile devices”, “KC5- Understand and discuss the safety and privacy issues”, “KC9- Universities and libraries as pioneering agents of MoL Skills”, “KC10- Academic librarians as pioneering agents of MoL Skills”.

Furthermore, 2 out of 10 sets of MoL learning objectives and outcomes reach a consensus of 90%, namely: “KC8- Incorporate mobile technologies in class” and “KC6- Develop problem-solving skills”.

**Table 6.4. MoL Learning Objectives & Outcomes Rating**

Total Degree of Consensus (Completely Agree & Agree)	Sets of learning objectives and outcomes per KC	Detailed Rating		
		Completely Agree	Agree	Disagree
1 (100%)	KC1- Introduction to Mobile Literacy (MoL)	Completely Agree	Agree	Disagree
		60%	40%	0
1 (100%)	KC2 -Understand the unique characteristics of Mobile technology	Completely Agree	Agree	Disagree
		60%	40%	0
1(100%)	KC3- Critical information skills and competencies through mobile devices	Completely Agree	Agree	Disagree
		55%	45%	0
2 (95%)	KC4- Communicate, interact and socially engage through mobile devices	Completely Agree	Agree	Disagree
		55%	40%	5%
2 (95%)	KC5- Understand and discuss the safety and privacy issues	Completely Agree	Agree	Disagree
		55%	40%	5%
2 (95%)	KC9- Universities and libraries as pioneering agents of MoL Skills	Completely Agree	Agree	Disagree
		50%	45%	5%
2 (95%)	KC10- Academic librarians as pioneering agents of MoL Skills	Completely Agree	Agree	Disagree
		50%	45%	5%
4 (90%)	KC8- Incorporate mobile technologies in class	Completely Agree	Agree	Completely Disagree
		50%	40%	10%
1 (100%)	KC7-Tailoring MoL skills at all educational levels	Completely Agree	Agree	Completely Disagree
		45%	55%	0%
4 (90%)	KC6- Develop problem-solving skills	Completely Agree	Agree	Completely Disagree
		45%	45%	10%

### Conclusions about the results of MoL Round 1

An interesting outcome yields if we compare the ranking of MoL key concepts in the section 3.2 of this report, with the rating of consensus between experts on MoL learning objectives and outcomes in section 3.3. All six aforementioned key concepts which are the most highly ranked, are exactly the same with the ones that included the most appropriate learning objectives and outcomes according to experts.

### 6.2.4 CUT Delphi Study for Mobile Literacy - Key Teaching and Evaluation Methods

The 20 experts, who completed the MoL Delphi Study Questionnaire, were asked to read nine (9) teaching and evaluation approaches concerning “Mobile Literacy- MoL” for virtual adult

training, namely educators and librarians and to rank them in order of importance, by putting the 1st as most important and the last as the least important. In particular, according to their point of view as experts, they were asked which of them facilitate the development of Information Literacy Skills (e.g., searching, critically evaluating, ethically using and sharing information for a topic) and additionally facilitate critical thinking, cooperative learning and enhance the will to attend an asynchronous course in a virtual learning environment. In Round 2, the number of experts who completed this section was 19. The Ranking results of Round 1 and 2 are depicted below in **Table 6.6**.

**Table 6.5. MoL Key Teaching and Evaluation Methods Legend**

TEM ID	Teaching and Evaluation Methods Description
TEM1	In each Unit, trainees will be asked to <b>watch an introductory video</b> . After this, they will be asked to submit a short answer to the VLE’s Course Forum, regarding a question, relevant to the introductory video. All trainees’ answers will be visible to every participant in the VLE’s Course Forum for review and discussion among them [Level of mastery: Understanding via peer learning – constructivism approach–IL SKILL: E-Social engagement].
TEM2	In each Unit, trainees will be asked to <b>think of keywords</b> that will help them find useful information on how to answer a question. In order to help them think of the appropriate terms they will be given a list of pertinent key words and they will be asked to complete an e-crossword of broader, synonym, narrower terms, etc. [Level of mastery: Understanding via computer interactive learning – cognitivism approach –IL SKILL: Analysis of a topic].
TEM3	In each unit, trainees will be visually (video) presented with at least two or three distinct ways of <b>searching for information</b> on a specific topic, in the Internet, in a library catalog and in scientific data bases. Furthermore, a method will be displayed on how to evaluate retrieved information, in terms of relevance and validity. After this, trainees will be asked to perform their own searches for specific information regarding a question and to evaluate their results, in terms of relevance and validity. [Level of mastery: Understanding & Application via computer interactive learning – behaviorism approach –IL SKILL: Searching & Evaluating information for a topic]. Finally, trainees will submit the list of their retrieved and evaluated results to the VLE’s Course Forum for review and discussion. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILL: Social engagement].
TEM4	In each Unit, trainees will be asked to study their retrieved information and to <b>write a properly cited short answer</b> to a question. After this, they will be asked to submit their answer to the VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her answer and will submit one review to three other participants’ answers. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILLS: Analysis, Synthesis, Ethical use & Sharing of information for a topic, E-Social engagement].
TEMS	In each Unit, after a short video-lecture, trainees will be asked to <b>answer a reflection E-quiz</b> . Automatic feedback will be given per answer. Each trainee will be able to take

TEM ID	Teaching and Evaluation Methods Description
TEM6	<p>the reflection E-quiz as many times as he/she wishes. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic]</p> <p>In each Unit, trainees will be presented with a <b>video- lecture</b>. The video-lecture will be automatically paused every time a sub-topic will have been completed and a pop-up, true or false or three-four choice questions, will appear on the screen. Each trainee will have to answer it in order for the video-lecture to continue. After an answer has been completed the learner will get immediate feedback and the video-lecture will be allowed to continue. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic]</p>
TEM7	<p>In each Unit, trainees will be asked to read at least one of the proposed references linked to the VLE’s Course and <b>to write a summary</b> that they will have to submit to the VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way, every trainee will receive three reviews for his/her abstract and will submit one review to three other participants’ abstracts. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILLS: Analysis, Synthesis, Ethical use &amp; Sharing of information for a topic, E-Social engagement].</p>
TEM8	<p>Towards the end of each Unit, trainees will be asked to <b>choose a topic</b> of their preference. Then they will be asked to search for specific information regarding their topic, to read them and to evaluate them in terms of relevance and validity and to submit a short, properly cited essay or ppt to the VLE’s Course. Their essay or ppt will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her essay or ppt and will submit one review to three other participants’ essay or ppt. [Level of mastery: Knowledge and application via peer learning – constructivism approach–IL SKILLS: Searching, Evaluating, Analysis, Synthesis, Ethical use &amp; Sharing of information for a topic, E-Social engagement].</p>
TEM9	<p>Trainees who will have <b>acquired a total of 60%</b> or more to the various interactive sub-tasks of each Unit will be allowed to continue to the next Unit. If not, they will have to repeat it. Upon successful completion of the whole E-course (at least 60% or more) trainees will be able to download a certificate of attendance in for educators and librarians.</p>

**Table 6.6. MoL Key Teaching and Evaluation Methods – Round 1 and Round 2**

MoL Key Teaching and Evaluation Methods Ranking – Round 1			MoL Key Teaching and Evaluation Methods Ranking – Round 2		
Rank	Title	Mean Rank	Rank	Title	Mean Rank
1	MoL-TEM3	2.7	1	MoL-TEM3	1.89
2	MoL-TEM1	3.15	2 (4)	MoL-TEM1	2.95
3	MoL-TEM4	3.95	3 (2)	MoL-TEM4	3.42

MoL Key Teaching and Evaluation Methods Ranking – Round 1			MoL Key Teaching and Evaluation Methods Ranking – Round 2		
Rank	Title	Mean Rank	Rank	Title	Mean Rank
4	MoL-TEM2	4.4	4 (3)	MoL-TEM2	3.53
5	MoL-TEM5	5.2	5	MoL-TEM5	5.68
6	MoL-TEM6	5.3	6	MoL-TEM6	5.79
7	MoL-TEM8	5.9	7	MoL-TEM8	6.05
8	MoL-TEM7	6.55	8	MoL-TEM7	7.11
9	MoL-TEM9	7.85	9	MoL-TEM9	8.58

### Comments on and conclusions about the results of MoL Round 1 and Round 2

Comparative results of Round 1 and Round 2 show that experts ranked the proposed teaching and evaluation method entitled MoL-TEM 3, as the most important, meaning there was no significant oscillation among them on this issue. This approach relates closely to the development of two core Information Literacy skills, namely searching effectively for sources that respond to specific information needs and evaluating them critically. Moreover, experts seem to find very important for an asynchronous course in a virtual learning environment, the combination of the proposed teaching and evaluation methods which derive from two learning theories, behaviorism and constructivism. In particular, behaviorism approach will allow understanding of a learning objective and application of the acquired knowledge related to this objective via computer interactive learning. Constructivism approach will prompt trainees to review and discuss their acquired knowledge with other peers, leading to an “indirect” evaluation of the specific learning outcome and enhancing the skill of online social engagement.

It has to be noted that MoL-TEM1, which uses video as a virtual leaning object to introduce trainees to certain concepts of MoL and it enhances both understanding via peer learning, a constructivism approach, and online social engagement, after Round 2 dropped from position 2 to 4.

Moreover, MoL-TEM4 went up from position 3 to position 2 after Round 2, which relates to knowledge and application of all core Information Literacy skills, namely searching, evaluating, analysis, synthesis, ethical use and sharing of information for a topic via the teaching and evaluation method of peer learning that derives from constructivism.

The majority of teaching and evaluation methods entitled MoL-TEM5, MoL-TEM6, MoL-TEM8, MoL-TEM7 and MoL-TEM9, were ranked respectively in positions 5 to 9 and hold their rank positions after both Rounds in exactly the same order.

Finally, MoL-TEM 9 which proposes an overall evaluation method for virtual adult training was ranked in the last position after both Rounds.

After completing two rounds of Delphi study, results show that Kendal’s W factor goes from 0.361 to 0,633. In other words, we have an important improvement and experts seems to have a very good level of consensus after Round 2.

# 7 Media & Information Literacy

by UNIWA



## 7.1 UNIWA Source mapping for Media and Information Literacy

Summary of key findings of Task 1: Mapping of the state of research in Information Literacy and in Emerging Literacies: “Media and Information Literacy (MIL)” by the partner UNIWA-GREECE - <https://iml.alis.uniwa.gr/>

### 7.1.1 “Media and Information Literacy (MIL)” Definitions

The following definitions concerning “Media and Information Literacy -MIL” emerged after an extensive and systematic review on the subject. In particular, the definitions below refer to the key issues of MIL and were selected to be evaluated by experts in the field. Moreover, MIL definitions were semantically analyzed and classified in the conceptual categories, as they are depicted in **Table 7.1** below.

**Table 7.1.** MIL Definitions Conceptual Categories

Conceptual Categories	Meaning
<b>Strongly Information Literacy related</b>	The definition underlines the core information literacy skills, such as knowing when and what information is needed, where and how to obtain this information, how to critically assess and organize it and how to use it ethically
<b>Information Literacy related</b>	The definition stresses the core information literacy skills but it also includes other concepts of media and information literacy
<b>Information Literacy related</b>	The definition refers to the core information literacy skills but it also includes other concepts of media and information literacy
<b>Social Skills</b>	The definition stresses the core social skills relating them to information literacy
<b>Social skills</b>	The definition refers to core social skills relating them to information literacy and other MIL concepts



Conceptual Categories	Meaning
Media Literacy related	The definition stresses the core media skills relating them to information literacy
Media Literacy related	The definition refers to core media skills relating them to information literacy and other MIL concepts
Strongly Technological Skills	The definition stresses core technological skills but it also includes other concepts of media and information literacy
Education related	The definition relates education to information literacy and other MIL concepts
Strongly News Literacy related	The definition stresses the core news literacy skills relating them to information literacy and other MIL concepts

**Definition 1.** The area of Information Literacy (IL) can intertwine with knowledge from other areas, like Media, and is closely associated to Education. People who have developed IL skills are also competent learners as well as information producers. “Media and Information Literacy” (MIL), in particular, encompasses the knowledge, attitudes and sum of skills that allow individuals to know when and what information is needed, where and how to obtain this information, how to critically assess and organize it, once found and how to use it ethically. The concept extends beyond Information and Communication Technologies (ICT), including learning, critical thinking and comprehension skills that meet and exceed professional and educational boundaries (Cerigatto, 2020). (Strongly Information Literacy related & Education related & Media Literacy related)

**Definition 2.** “Media and Information Literacy” (MIL) is defined as a combination of knowledge, attitudes, skills and practices required to access, analyze, evaluate, use, produce, and communicate information and knowledge in creative, legal and ethical ways that respect human rights. Media and information literate individuals can use diverse media, information sources and channels in their private, professional and public lives (Gendina, 2016). (Information Literacy related & Social skills & Media Literacy related)

**Definition 3.** Empowerment of people through “Media and Information Literacy “(MIL) is an important prerequisite for fostering equitable access to information and knowledge and promoting free, independent and pluralistic media and information systems. Media and Information Literacy recognizes the primary role of information and media in our everyday lives. It lies at the core of freedom of expression and information – since it empowers citizens to understand the functions of media and other information providers, to critically evaluate their content, and to make informed decisions as users and producers of information and media content. MIL encompasses both traditional and digital media/platforms and addresses all sorts of stakeholders – in ongoing processes of change in cultural, political, social and technological spheres (Carlsson, 2019). (Information Literacy related & Media Literacy related & Social Skills)

**Definition 4.** “Media and Information Literacy” (MIL), in addition to the considered ability in traditional literacy, which was the ability to read and write, develops the ability to analyze and evaluate messages and the power to produce and transmit information to others in different formats and with different tools. By empowering man to understand how media work and how they make sense, the nature and purpose of producing media messages and the effects and techniques of various media, it takes him out of mere consumption and makes him resistant to the effects of media. MIL, in addition to learning to read the appearance of media messages from various media, tries to teach individuals to read the unwritten lines of the print media, watch unscheduled plans, or listen to non-broadcast sounds from electronic media. This literacy provides a framework for accessing, analyzing, evaluating, creating, and collaborating with media messages presented in a variety of formats (written, video, and Internet) that build on cognition, based on the role of the media in society as well as basic research skills for citizens, which always lead to democracy (Nabipoor et al., 2020). (Information Literacy related & Media Literacy related & Social Skills)

**Definition 5.** “Media and Information Literacy “(MIL) is an “empowerment project” because it aims at helping people to understand the media culture that surrounds them, to be well-picked and deal with them and to take part in them effectively. This concept includes a set of competencies that enable individuals to research, critically test, and contribute wisely to information and media content to develop knowledge of individual rights on the Internet; understand how to combat hate speech online, fake information and news and cyberbullying; understand the ethical issues surrounding accessing and using information; know how to participate in media, how to use information and communication technologies as producers of information and media content to promote equality, self-expression, plural media, information and intercultural, interfaith and peace dialogue. Overall, MIL concerns the basic competencies that allow individuals to interact with the media effectively and develop critical thinking and lifelong learning skills for socialization that makes them active citizens (Zou’bi, 2021). (Information Literacy related & Media Literacy related & Social Skills)

**Definition 6.** “Media and Information Literacy “(MIL) is the ability to access the media, to understand and to critically approach different aspects of media contents and institutions, and to create communication in a variety of contexts. It is also the ability to use and understand media, as a mean of self-protection and safe media choices, and partly as the ability to create media and media content, leaning towards the idea of self-empowerment, self-expression, and active citizenship with informed, moral, and legal choices (López-Romero & Aguaded-Gómez, 2015). (Media Literacy related & Social Skills).

**Definition 7.** “Media and Information Literacy “(MIL) encompasses the following: Operational, Information, Social, Creative, Mobile skills and Safety. Operational skills are concerned with accessing, storing, retrieving and managing data, using programming language, solving technical problems, changing privacy settings. Information skills are concerned with understanding and articulating information needs, analyzing, comparing, evaluating and applying data and content, browsing, searching and filtering data and content and identifying personal competence gaps. Social skills are concerned with communicating and collaborating, netiquette, participating in groups, maintain, manage and remove contacts, engaging in citizenship, appropriating identity presentation, knowing when to share/not to share, knowing which information to share/not to share. Creative skills are concerned with creating, re-elaborating, editing, designing,

synthesizing, monitoring and sharing content in an ethical manner, understanding Copyright, licenses and media regulation. Mobile skills are concerned with identifying needs, solving problems, installing apps, tracking up costs, making in – app purchase. Safety is concerned with protecting devices, personal data and privacy, health and well-being as well as the environment (Livingstone et al., 2020). (Information Literacy related & Strongly Technological Skills & Social Skills)

**Definition 8.** “Media and Information Literacy” (MIL) comprises of at least five core competences: 1. Understanding the role of Media and Information in Democracy 2. Understanding of the contents of the Media and their uses 3. Critical evaluation of Information and Information sources 4. Situating the sociocultural context of the Media content 5. Management of required changes (Alcolea-Díaz et al., 2020). (Media Literacy related & Social Skills & Information Literacy related)

**Definition 9.** “Media and Information Literacy” (MIL) is the capability that allows citizens to engage with media and other information providers effectively and develop critical thinking and life-long learning skills for socializing and becoming active citizens. For this reason, MIL curriculum should be incorporated into the formal education system (Steward, 2017). (Social Skills & Education related)

**Definition 10.** “Media and Information Literacy” (MIL) emphasizes the need to critically analyze and engage with news to become more informed and capable of navigating complex media environments. In addition, MIL efforts prompt us to recognize that our personal perspectives also shape our news choices and interpretations. As such, MIL specialists approach bias from multiple perspectives. MIL also emphasizes the development of knowledge, skills, and a personal sense of control about media choices, focusing on the necessary abilities relevant to becoming a critical news consumer. Researchers and educators describe the relationship between journalists, news production, consumers, and democracy as fundamental to democracy (Tully, Vraga, & Smithson, 2020). (Strongly News Literacy related & Media Literacy related & Social Skills)

### 7.1.2 “Media and Information Literacy (MIL)” key concepts and content

A key concept related to MIL is the prevention of the widespread belief in political online disinformation or deliberate falsehood, meaning "the dissemination of deliberately false information", referring specifically to wrong information supplied by governments, and misinformation or accidental falsehood, meaning “wrong or misleading information”<sup>2</sup>.

Researchers have identified the most important reasons and factors that amplify these phenomena’s extensive and increasing occurrence: (a) people worldwide access a constantly growing volume of news and information from social media platforms, which not only **lack traditional editorial** control mechanisms, but they also **permit**, via algorithmic news feeds, political and commercial dissemination of both **disinformation and misinformation**; (b) the

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<sup>2</sup> definitions of the Oxford English Dictionary (<http://www.oed.com/> found in Stahl, B. C. (2006). On the Difference or Equality of Information, Misinformation, and Disinformation: A Critical Research Perspective. *Informing Science*, 9. p. 86.

majority of the global population do not have the media and information literacy skills and competencies, required to navigate the online information environment effectively and efficiently; (c) a **narrow network of like-minded individuals** on social media may be conducive to an increase in polarization and fragmentation, endangering shared understandings that are crucial for a well-functioning democracy (Guess et al., 2020; Tugtekin & Koc, 2020). To extend this point of view even further, researchers have observed that stronger social identification with a group and greater involvement with an issue both increase the strength of the so called “Hostile Media Effect”, meaning that journalists are often confronted with a public seeing bias where little or none may exist; (d) According to researchers, deeper analysis of factor (c) above strongly correlates with another acknowledgment that of an **individual’s ingrained bias**. This means that people prefer and seek out content which supports their beliefs, likely because they see agreeable information as more credible than material that challenges their beliefs. Moreover, partisans who encounter biased news are willing to forgive news that favors their side and see it as relatively unbiased but overcompensate in punishing news that favors the other side by rating it as even more biased (Tully, Vraga, & Smithson, 2020).

Furthermore, MIL is closely interrelated with New Media Literacy (NML), which encompasses both information literacy, with a focus on the development of functional and critical consumption information skills and digital literacy, which underlines the growth of functional consumption and critical prosumption media skills. Further details about the four dimensions of NML - Functional Consuming (FC), Critical Consuming (CC), Functional Prosuming (FP), and Critical Prosuming (CP)- and their corresponding indicators can be found at “Lin T-B, Li J-Y, Deng F, et al. (2013) *Understanding new media literacy: an explorative theoretical framework. Educational Technology & Society 16(4): 160–170.*” Here, we cite an explanation about FC and CC. FC is further represented by two indicators: consuming skill and understanding. The consuming skill refers to the technical skills required for accessing and operating basic hardware and software, while the understanding involves the proficiency of capturing the meaning of media content at a literal level. CC is elaborated by three indicators: analysis, synthesis, and evaluation. These focus on abilities such as deconstructing media messages with the recognition of media construction as a subjective and social process, sampling and remixing media content in a meaningful way, and criticizing media contents and making decisions about the reliability and credibility of media sources, respectively (Tugtekin & Koc, 2020).

According to research **NML, Communication Skills (CS), and Democratic Tendencies (DTs) are also inter-dependable fields**, because as users learn how to operate media tools, along with this experience of the given media, they can also learn how to analyze and criticize their content. In turn, they can develop an ability to produce media content based upon their opinions and ideologies, which in a university, school or library setting, with the scaffolding help of qualified educators and librarians, **could foster Democratic Tendencies** (Syam et al., 2020).

Researchers also underline the significance of developing programs for Social Media Literacy, especially for young adults and university students, who depend heavily on social media for information and news, making them prone to be consumers and deliberate or undeliberate distributors of fake news. To this end it is vital to educate them about the informational functions of the so called “alternative media” (Syam et al., 2020; Klawier et al., 2021). However, it is equally important to address misinformation/disinformation circulating online without leaving out the majority of the population not enrolled in school or in university. News Literacy interventions, like digital advertisements and interactive quizzes, need to consider the fact that

news is often consumed online, increasingly in social media environments by adults also, an audience not typically addressed in media literacy education (Tully, Vraga, & Bode, 2020).

Actually, educators and librarians should become familiar with ways on how to (a) discern the different challenges of building age-friendly media literacy education that meets the needs of people of all ages. In more detail, media literacy education targeted to infancy and childhood, is expected to support well-being, self-expression, play, participation, and needs for safety. ML education for people in middle age, responds to individuals' various roles such as citizen, worker, partner/spouse, homemaker, parent, continuing professional development student, leisure user and even retiree. Lastly, in old age, media literacy education may be especially important for cognitive functioning, social relationships and for obtaining and critically assessing and using health-related information and services (Rasi et al., 2019).

One of the key concepts that media literacy also addresses is awareness about the **meaning of media messages** related to **health issues**, such as substance abuse, violence, and body image as well as unhealthy food consumption. In more detail, it seeks to inform individuals on how to use them in a variety of forms and on how to develop critical skills for evaluating them. Although one could argue that the above are objectives concerning mainly "health literacy" a more lateral study of the subject would absolutely reveal its relation to media literacy, which underlines the importance of analytical skills (procedural knowledge) as key to the development of wise health-related behaviors. Such skills entail understanding the mechanics of messages, analyzing and evaluating their meaning, assigning them value, producing information for specific outcomes and enabling individuals not only to engage with, but also to challenge and change broader social conditions (Truman et al., 2020).

Media researchers and specialists conceive media literacy as the ability to understand and decode all forms of media culture from a critical perspective. To this end, it is vital to reinforce our critical lens and to think of strategies that contextualize and analyze the dominant ideologies going viral across social media platforms and disseminated globally from enormous transnational corporations. In other words, **media and cultural studies combined with critical pedagogy, can help individuals and societies tackle with the increase in fake news**, alternative facts, bots, and trolls, that challenge our abilities to distinguish truth and recognize bias. Drawing from media researchers key concepts, we could propose a specific curriculum aiming at providing an introductory framework for understanding and decoding all forms of media culture from a critical perspective, namely by introducing learners to critical theories and practices which are applicable to all forms of media and which emphasize the underlying similarities and unique qualities of each and also by raising awareness of how media function in everyday life in terms of race, gender, class, sexuality, consumption, fear, morals and the like, which in many cases reflect corporate profit motives and hegemonic ideologies at the expense of social concerns necessary for a healthy democracy and a sustainable planet (Kellner & Share, 2019).

Nevertheless, it is also vital to become able to reflect on our personal bias and on the factors that influence the ways we perceive, use, create and disseminate media content. For example, one of the most usual ways to disseminate messages in media is to publish or to post/share pictures and photographic material, which promote or imply certain concepts, ideas, attitudes, preferences etc. However, these types of materials are not interpreted commonly by all, because each interpretation is closely related to a person's character, habits, customs, experiences and culture. In a world where people move from country to country more than ever



before, educators and librarians should be able to understand how to support their communities in understanding the complexity, heterogeneity and evolutionary character of meaning making and learning, especially with regard to culture. This is about postdigital semiotics that can study online-offline environments as well as socio-material relations and change, concerning postdigital signs (Lacković, 2020).

Moreover, librarians and educators should be able to understand that semiotic approach to media literacy education, in relation to works of art, but also in relation to all types of media content, is based on a fair assertion that an artistic work and even any other media content is not reduced to a scheme or a series of schemes extracted from it, but a semiotic researcher (or a competent media reader/viewer/listener) drives media content into the scheme, in order to understand the mechanisms that provide a wealth of readings and, therefore, the continuous giving meaning to the work of communication (Fedorov, 2019).

Overall, educators and librarians should be able to acknowledge that the many closely interrelated competencies to Media Literacy are described with concepts such as multiliteracy, news literacy, health media literacy, digital literacy, coding literacy, media and information literacy. Moreover, multi- and interdisciplinary approaches that draw on numerous fields and disciplines include education, reading and literacy, public health, literature and the humanities, sociology, human development and psychology, cultural studies, library and information science, journalism, communication and new media studies, social studies of technology, human-computer interaction, and audience studies, adult education, gerontology, and educational gerontology (Rasi et al., 2019).

Researchers also have detected a close relation between media literacy, civic education, digital media, online politics and participatory politics. They especially call for enhancement of youth engagement in digital literacies that (a) increases occupation with participatory politics and applies targeted political pressure to government, corporations, and nonprofits, which are considered significant aspects in today's democracies, (b) eliminates participation gap, meaning that offers the ways to further develop the digital engagement literacies needed to fully leverage the opportunities presented by the digital age and that those engaged in a participatory culture are still likely to confront and, potentially, contribute to common online problems such as the spread of misinformation, echo chambers, and incivility, (C) promotes participatory culture, which is peer-based, interactive, nonhierarchical, independent of elite-driven institutions, and social networks (Kahne & Bowyer, 2019).

Recent research also underlines that today's algorithm-driven media is a powerful tool for profiling people, predicting their actions, and influencing them in different ways for different purposes. It is crucial for all media users to understand that with new technologies the production, dissemination and targeting of misinformation and disinformation, advertisement, political and commercial content, and personal data commodification has become really easy, cheap, and effective. To this end there is an urgent need to foster media literacy education by teaching the tools used in today's media and it is especially important to add a number of powerful ideas from computer science, especially machine learning, as part of media literacy education. Basic knowledge of the computing mechanics would give media users the fundamental skills and knowledge for recognizing and evaluating the impact of new technology in different situations and contexts. Moreover, raising awareness about the practices of media reinforces critical thinking and understanding of different motives, purposes, and uses of media.



This is also important from a societal point of view, to acknowledge how echo chambers are formed, emotions amplified, and behavior engineered, and through them how products are sold, elections swayed, and mass movements born (Valtonen et al., 2019).

Past research suggests that ML can influence information consumption and creation behaviors, but causal evaluative research is lacking. Studies that have been conducted vary widely in how they have defined and measured ML competencies. This makes it difficult to aggregate across studies over time. Past research has identified some evidence that ML increases participant resiliency to disinformation and is able to change the way participants consume, create, and share information. However, there is little causal, evaluative research in the ML field that isolates the effects of ML interventions. More research needs to be done to identify measures that best assess complex ML competencies and how, when, and what types of ML education are most effective. ML resources are comprehensive and varied. Currently available programs are diverse in terms of format, delivery method, and audience. Recommendations Researchers in ML and related fields should strengthen interdisciplinary communication and collaboration. Policymakers and practitioners should increase participation from diverse constituencies in scaling ML efforts." It is important to highlight, that experts argue that ML encompasses a set of critical thinking competencies that can be applicable across subjects and context and that it should be central to education, not on the periphery, meaning that it is not a new subject to teach, it's a new way to teach all subjects (Huguet et al., 2019).

Moreover, literature in recent years discusses *détournement* that concerns a video form in which various media clips are taken from their original contexts and juxtaposed against other media clips that point viewers to a critique of the messages contained within the original contexts. Therefore, it is vital for media users to be equipped with the skills needed to both decipher between conflicting truth claims and insert their own voice into such kind of conversations. Creating *détournement* may well equip them to do both—to act as critical consumers of media as well as critical media producers. Teachers and librarians should be able to provide their communities with practical guidance on how to choose claims, how to juxtapose sources, and how to decipher stances during the creation of a *Détournement* (French & Campbell, 2019) .

Furthermore, it should be highlighted that the main directions of media literacy are: media education for future professionals in mass media industry; for future teachers; for school and university students (which can be integrated with traditional subjects or autonomous); at supplementary educational establishments and leisure centers; distance media education for various groups and independent lifelong media education (Fedorov & Levitskaya, 2018).

However, MIL is conceived of as a right of all citizens and as a challenge to contemporary society, where the world's educational systems have to constitute themselves an authority that will write the guidelines needed to obtain media-knowledgeable citizens. Therefore, the use of MIL is as an excellent tool for actively participating in the social fabric and for recognizing in them a fundamental role in processes of creation and diffusion of social values (García-Ruiz et al., 2014). MIL related social values focus on deconstructing stereotypes, unmasking industry interests and exclusions, demystifying ideological notions of race, gender, age, and class, analyzing the bias in news and understanding representation and reality in the face of Mass Media (RobbGrieco, 2014).

Finally, MIL curricula should foster abilities in relation to concepts that experienced librarians and information professional would easily acknowledge as of high relevance to information literacy skills and could render libraries as pioneering agents of MIL: the functions of media and other information providers, how they operate, and what optimal conditions are needed to effectively perform these functions; how information should be critically evaluated within the specific and broad context of its production; editorial independence and journalism as a discipline of verification; how media and other information providers could contribute rationally to promote fundamental freedoms and lifelong learning, especially as they relate to how and why young people are accessing and using media and information today, and how they select and evaluate them; media ethics and info-ethics; capacities, rights and responsibilities of individuals in relation to media and information; international standards (Universal Declaration of Human Rights), freedom of information, constitutional guarantees on freedom of expression, limitations needed to prevent infringements of other people’s rights (such as hate speech, defamation and privacy); what is expected from media and other information providers (pluralism and diversity as a norm); information sources and systems of storage and organization; processes of access, enquiry, determination of information needs; location and retrieval tools; how to understand, organize, and assess information, including source reliability; creation and presentation of information in variety of formats; preservation, storage, reuse, recording, archiving and presentation of information in usable formats; use of information for problem-solving or decision-making in personal, economic, social and political life (Grizzle, 2011).

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### 7.1.3 “Media and Information Literacy (MIL)” key learning objectives and outcomes integrated in distinct thematic units

#### 1-Introduction to Media and Information Literacy-MIL

This Unit aims to introduce trainees, namely educators and librarians, to the main theoretical concepts of “Media and Information Literacy”.

**This Unit learning objectives are:**

- To **discuss** MIL key definitions
- To **understand** MIL key skills
- To **explain** how MIL key skills can be useful in various scientific subjects, e.g., social sciences, language, natural sciences and mathematics, technology, the arts, history, etc.
- To **inform** briefly about MIL history and background
- To **reflect** on MIL current trends

**This Unit expected learning outcomes are that trainees will have:**

- become familiar with MIL basic concepts, to use as a backbone when being active in MIL
- acknowledged that MIL key skills are important in all life settings
- recognized the transferability of MIL key skills to various scientific subjects
- been informed briefly about MIL history and current trends, to use as a background when being active in MIL

#### 2-Libraries as pioneering agents of IL and MIL Skills

This Unit aims to raise trainees’, namely educators and librarians, awareness about the pioneering role of libraries in fostering Information Literacy and Media Skills.

**This Unit learning objectives are:**

- To understand the key skills suggested by the prevalent Information Literacy (IL) models, such as ACRL, CILIP, SCOUNL, ANCIL, etc.
- To study examples/practices of how libraries foster IL skills
- To discuss MIL in the broader context of Information Literacy (IL), reflecting on the interrelation of MIL and IL key skills
- To learn how to use the library in order to develop MIL skills to various settings (e.g., school, university, local communities)
- To reflect on various cases of MIL Social Interventions in specific age groups (e.g., children & adolescents, youth & university students, citizens & the elderly)

**This Unit expected learning outcomes are that trainees will have:**

- comprehended the key skills suggested by the prevalent Information Literacy (IL) models, such as ACRL, CILIP, SCOUNL, ANCIL, etc.
- reflected on the methods used by various types of libraries to promote IL skills
- understand the interrelation of MIL and IL key skills
- learnt how to use the library in order to develop MIL skills to various settings (e.g., school, university, local communities)



- reflected on various cases of MIL Social Interventions in specific age groups (e.g., children & adolescents, youth & university students, citizens & the elderly)

### **3-Critical Consumption of Information and Media Content**

This Unit aims to offer trainees, namely educators and librarians, a deepening understanding of how to sharpen their communities' critical consumption of information and media.

**This Unit learning objectives are:**

- To discuss the core criteria of scientific information evaluation
- To reflect on the criteria of news credibility
- To be informed about fact-checking tools and techniques for the detection of fake news/images/videos
- To learn how to raise their students, users, communities' awareness of the information and news assessment in terms of authority, credibility, current purpose and potential risks (e.g., malicious bots, deep fakes, etc.)

**This Unit expected learning outcomes are that trainees will have:**

- comprehended the core criteria of scientific information evaluation
- reflected on the criteria of news credibility
- experimented with tools and techniques for the detection of fake news, images and videos
- learnt how to inform/teach their communities about the information and news assessment, in terms of authority, credibility, current purpose and potential risks

### **4-Ethical Use & Production of Information and Media Content**

This Unit aims to familiarize trainees, namely educators and librarians, with ethical, copyright and legal issues concerning the use and production of information and media content.

**This Unit learning objectives are:**

- To discuss the basic ethical, copyright and legal issues of information and media content (e.g., plagiarism, distribution licenses, etc.)
- To reflect on specific examples of information and media content ethical, copyright and legal issues
- To learn how to teach their students, users, communities the basic ethical, copyright and legal issues when using and/or producing information and media content

**This Unit expected learning outcomes are that trainees will have:**

- comprehended basic ethical, copyright and legal issues of information and media content
- reflected on specific examples of information and media content ethical, copyright and legal issues
- learnt how to teach/inform their students, users, communities the basic ethical, copyright and legal issues when using and/or producing information and media content

## **5-Tailoring MIL skills to teaching specific fields**

This Unit aims to inform trainees, namely educators and librarians, how to use a MIL cross-curriculum, in order to deliver their specific field's lessons to students in all levels of education.

**This Unit learning objectives are:**

- To learn how to tailor MIL skills to a philosophy, a psychology, a religion, a social sciences', a language, natural sciences and mathematics, a technology, an art, a literature, a history and a geography lesson's learning objectives and outcomes. Trainees will be able to choose the lesson of their preference

**This Unit expected learning outcomes are that trainees will have:**

- learnt how to tailor MIL skills to specific lessons' objectives and outcomes, in the fields of philosophy, psychology, religion, social sciences, language, natural sciences and mathematics, technology, the arts, literature, history and geography, according to their preference
- reflected on various teaching approaches to MIL in primary, secondary and tertiary education

## **6-Understanding Mainstream (Traditional & Digital) Media as Information Providers**

This Unit aims to inform trainees, namely educators and librarians, about the purpose and the functions of Mainstream (Traditional & Digital) Media, such as TV/Web TV, radio/Web radio, newspapers, News websites, etc.

**This Unit learning objectives are:**

- To inform briefly about Mainstream (Traditional & Digital) Media history (TV, radio, newspapers, etc.)
- To raise awareness of the purpose and functions of news in print, audio and audio-visual form (e.g., informing, interpreting, guiding in the correct direction, building objective opinions, spreading awareness, educating, advertising, etc.)
- To increase understanding of editorial independence vis à vis ownership influence
- To discuss the relationship among journalists, news sources, senior editors and media owners
- To understand the core principles of news verification and combat fake news (e.g., do not add; do not deceive the audience; be transparent as possible about methods and motives; rely on own original reporting; and exercise humility, etc.)
- To discuss the differences and similarities in traditional and in digital Mainstream Media - old wine in new bottles?

**This Unit expected learning outcomes are that trainees will have:**

- been informed briefly about Mainstream Media history to use as a background when being active in MIL
- understand the purpose and functions of news in print, audio and audio-visual form, to use as a set of criteria in assessing news value

- reflected on how editorial independence, ownership of Media, journalists and news sources, may influence the types of news presented to the public, as well as the ways used in the news presentation
- been aware of the core principles of news verification to use in their MIL teaching or other actions, such as MIL events, combating fake news, etc.
- understand the differences and similarities in traditional and in digital Mainstream Media

## **7-Understanding Alternative Media as Information Providers**

This Unit aims to inform trainees, namely educators and librarians, about the purpose and the functions of Alternative Media, in print, broadcast and electronic format

### **This Unit learning objectives are:**

- To briefly trace the history of a country's alternative media (e.g., Greece, Cyprus, Serbia, Spain)
- To discuss alternative media in contrast to mainstream media (e.g., do alternative media persist in being less commercial, producing more critical content and being more committed to social change than their mainstream counterparts; does journalism of alternative media differ from mainstream journalism; do or not alternative and mainstream media use different sources; how relationships between producers and sources in alternative media differ from those in mainstream media; how a major news story is covered by a mainstream local newspaper/ broadcast/ news-site in contrast to an alternative local newspaper/ broadcast/ news-site in the same city/ country, in terms of e.g., transparency, diversity and freedom of expression; etc.?)
- To inform about the purpose and functions of alternative media in democracies and in authoritarian regimes
- To engage in planning, managing and sustaining an alternative medium in different settings, e.g., school, university, local community

### **This Unit expected learning outcomes are that trainees will have:**

- been informed briefly about a country's alternative media (e.g., Greece, Cyprus, Serbia, Spain), to use as a background in their MIL actions
- reflected on alternative media purpose, functions, content and audiences in contrast to those of mainstream media
- understand how news are covered by a mainstream and an alternative media in terms of e.g., transparency, diversity and freedom of expression
- developed the basic skills in planning, managing and sustaining an alternative medium in different settings according to their interest, e.g., school, university, local community

## **8-Understanding the “Free” Internet as Information Provider**

This Unit aims to inform trainees, namely educators and librarians, about the purpose and the functions of widely used Free Web Search Engines and Free Information Platforms such as Google, Google Scholar, Wikipedia, Youtube, etc.

**This Unit learning objectives are:**

- To provide brief information about the history of widely used Free Web Search Engines and Free Information Platforms
- To discuss the purpose and functions of widely used Free Web Search Engines and Free Information Platforms with a focus on potential risks (e.g., commoditization of internet users' digital identities, digital privacy management, cyberbullying, cyber security risks, spreading of fake news, "pseudo-media" with professional presentations and legitimate appearance, concentration of information and advertising in a given market, etc.)
- To apply the main information-related skills of searching efficiently, evaluating properly (e.g., relevance, credibility), using ethically and disseminating/sharing responsibly the content of Free Web Search Engines and Free Information Platforms

**This Unit expected learning outcomes are that trainees will have:**

- been informed briefly about the history of widely used Free Web Search Engines and Free Information Platforms
- have understand the functions of widely used Free Web Search Engines and Free Information Platforms with a focus on potential risks
- applied several ways of searching efficiently, evaluating properly (e.g., relevance, credibility), using ethically and disseminating/sharing responsibly the content of Free Web Search Engines and Free Information Platforms, acquiring a high level of master in the main information-related skills

**9-Understanding and Evaluating Advertisements**

This Unit aims to inform trainees, namely educators and librarians, about the purpose and the functions of advertisements, in all types of media.

**This Unit learning objectives are:**

- To provide brief information about the history of advertisements
- To discuss the purpose and functions of the various types of advertisements (e.g., public service announcements, political and social marketing, commercial brands, etc.)
- To apply the information-related skills of decoding advertisements' messages in print, audio and audiovisual form (e.g., informing vs manipulating, emotional appeal vs truth-fairness-accuracy, etc.)
- To learn how to evaluate the impact of an advertisement to individuals (e.g., gender and cultural diversity vs stereotypes, healthy behaviors vs alcohol-drug-abuse, environmentally friendly consumer behaviors, etc.)

**This Unit expected learning outcomes are that trainees will have:**

- been informed briefly about the history of advertisements
- reflected on the purpose and functions of the various types of advertisements (e.g., public service announcements, political and social marketing, commercial brands, etc.)
- applied the information-related skills of decoding advertisements' messages in print, audio and audiovisual form (e.g., informing vs manipulating, emotional appeal vs truth-fairness-accuracy, etc.)

- understand how to evaluate the impact of an advertisement to individuals (e.g., gender and cultural diversity vs stereotypes, healthy behaviors vs alcohol-drug-abuse, environmentally friendly consumer behaviors, etc.)

### **10- Archives, Museums and Publishers as Information Providers**

This Unit aims to inform trainees, namely educators and librarians, about the mission and the functions of various types of archives, museums and publishers

#### **This Unit learning objectives are:**

- To provide brief information about the history of archives, museums and publishers
- To discuss briefly the mission and functions of various types of archives, museums and publishers (e.g., historical/thematic museums, print/digital/public/personal archives, scholar/fiction publishers, etc.)
- To apply the main information-related skills of searching efficiently, evaluating properly (e.g., relevance, credibility), using ethically, and disseminating/sharing responsibly the content of archives, museums and publishers

#### **This Unit expected learning outcomes are that trainees will have:**

- been informed briefly about the history of archives, museums and publishers
- understand the purpose and functions of the various types of archives, museums and publishers
- applied the main information-related skills of searching efficiently, evaluating properly (e.g., relevance, credibility), using ethically, and disseminating/sharing responsibly the content of archives, museums and publishers

### **11-Freedom of Expression and Intercultural Dialogue in Media and other Information Providers**

This Unit aims to raise trainees', namely educators and librarians, awareness about the ways that MIL skills can help individuals of unique cultures to sustain safely their right to freedom of expression in a multicultural media interconnected world.

#### **This Unit learning objectives are:**

- To inform about the human right to freedom of expression, namely the freedom to exercise their rights to hold opinions without interference, and to seek, receive, and impart information and ideas
- To discuss pluralism and freedom in EU media
- To reflect on real world examples of intercultural dialogue in media and social media with regard to gender and race equality vs discriminations and racism, free self-expression vs polarization, interfaith vs religious intolerance and peace vs hate discourses
- To apply the information-related skills of participating safely in media/social media, evaluating critically, using ethically and disseminating/sharing responsibly knowledge, ideas and feelings that refer to intercultural dialogue issues

**This Unit learning outcomes are that trainees will have:**

- been informed about the human right to freedom of expression, namely the freedom to exercise their rights to hold opinions without interference, and to seek, receive, and impart information and ideas
- discussed pluralism and freedom in EU media
- reflected on real world examples of intercultural dialogue in media and social media with regard to gender and race equality vs discrimination, free self-expression vs polarization, interfaith vs religious intolerance and peace vs hate discourses
- applied the information-related skills of participating safely in media/social media, evaluating critically, using ethically and disseminating/sharing responsibly knowledge, ideas and feelings that refer to intercultural dialogue issues

**12- Citizenship, Democracy and Social Action in Media and other Information**

**Providers**

This Unit aims to raise trainees', namely educators and librarians, awareness about the ways that MIL skills can empower individuals to participate meaningfully in democratic societies by engaging in civic and social actions.

**This Unit learning objectives are:**

- To introduce trainees to the concepts and inter-dependences among MIL skills (MILS), social skills (SS), and democratic tendencies (DTs)
- To understand the value of exercising the following MIL social skills of communicating and collaborating online, participating in online groups, online netiquette, maintaining, managing and removing online contacts, appropriating digital identity presentation, knowing when to share/not to share, knowing which information to share/not to share, engaging in digital citizenship and digital social actions
- To reflect on real world examples of narrow on-line networks of like-minded individuals that may be conducive to an increase in polarization and fragmentation, endangering shared understandings that are crucial for a well-functioning democracy
- To raise awareness of how media function in everyday life in terms of race, gender, class, sexuality, consumption, fear, morals and the like, which in many cases reflect corporate profit motives and hegemonic ideologies at the expense of social concerns necessary for a healthy democracy and a sustainable planet
- To reflect on real world examples of online networks concerned with participatory politics that apply targeted political pressure to governments, organizations, state institutions corporations, and non-profits, allowing the perspectives of democratic sharing and discussion as well as of social action

**This Unit learning outcomes are that trainees will have:**

- reflected on the inter-dependences among MIL skills (MILS), social skills (SS), and democratic tendencies (DTs)
- understand the nuances of exercising the MIL social skills online, of engaging in digital citizenship and digital social actions



- reflected on real world examples that may put healthy democracy and sustainable planet in danger
- reflected on real world examples concerned with participatory politics that apply targeted political pressure to governments, organizations, state institutions corporations, and nonprofits, allowing the perspectives of democratic sharing and discussion as well as of social action

Key Teaching and Evaluation Methods is common for the six information related literacies of EDUCABILITY Program [see **Annex 3 – Key Teaching and Evaluation Methods, common for the six information related literacies of EDUCABILITY Program**].

## 7.2 UNIWA Delphi Study for Media and Information Literacy

This chapter refers to the detailed presentation of the results that emerged after the implementation of the MIL survey using the Delphi method.

### 7.2.1 UNIWA Delphi Study for Media and Information Literacy - Definitions

The sixteen (16) experts, who completed the MIL Delphi Study Questionnaire in Round 1, were asked to read 10 definitions concerning “Media and Information Literacy-MIL” and to rate them in order of importance, from 1 (least important) to 10 (most important). In particular, according to their point of view as experts, they were asked which of the definitions succeed to refer to the key issues of MIL and should be definitely considered for a course aimed at educators and librarians.

MIL definitions had been semantically analyzed and classified in the conceptual categories, as they are depicted in **7.1.1 “Media and Information Literacy (MIL)” Definitions**

#### Comments on the results of MIL Round 1

According to the results of the Round 1 of MIL Delphi study, it appears that all 10 MIL definitions were rated with an average of more than 6 out of 10, leading to the conclusion that their concepts are highly appreciated for inclusion in a curriculum aimed at educators and librarians. However, the majority of the experts seem to believe that definitions which are related to Information Literacy skills, such as knowing when and what information is needed, where and how to obtain this information, how to critically assess and organise it and how to use it ethically, are more important than definitions which relate to technological and news literacy skills. Media literacy skills, which refer to promoting free, independent and pluralistic media and information systems as well as to understanding, evaluating and producing media messages presented in a variety of formats, have earned a high rating from experts, though not the highest. Definitions relevant to social skills have also been highly appreciated, although the one which was strongly correlated to them gathered a total sum of 117 points, which placed it at number 9 in order of importance.

#### Comments the results of MIL Round 2

During Round 2, fourteen (14) experts completed the MIL Delphi questionnaire. According to the results of Round 2 of MIL Delphi study, it appears that all 10 MIL definitions were rated with

an average of more than 6 out of 10, supporting the conclusion of Round 1 that their concepts are highly appreciated for inclusion in a curriculum aimed at educators and librarians. However, the majority of the experts seem to believe that definitions which are related to information literacy skills, such as knowing when and what information is needed, where and how to obtain this information, how to critically assess and organise it and how to use it ethically, are still the most important ones, as in Round 1. Moreover, the definition related to news literacy skills remains the least important in place 10.

### **Conclusions about the results of MIL Round 1 and Round 2**

A striking difference between the results of Round 1 and Round 2 is the fact that the definition with a strong orientation to technological skills, which also includes other concepts of media and information literacy such as social skills, rose in order of importance from place 7 to place 3. Additionally, definitions relevant to social skills have also been highly appreciated, and although the one which was strongly correlated to them was placed 9th in order of importance after Round 1, it rose in place 7 after Round 2.

Media literacy skills, which refer to promoting free, independent and pluralistic media and information systems as well as to understanding, evaluating and producing media messages presented in a variety of formats, have earned a high rating from experts, though not the highest and have retained their places more or less after Round 2.

### **7.2.2 UNIWA Delphi Study for Media and Information Literacy - Key Concepts**

The 16 experts, who completed the MIL Delphi Study Questionnaire, were asked to read 12 key concepts concerning “Media and Information Literacy-MIL” for virtual adult training and rank them in order of importance, by putting the 1st as most important, reaching gradually the 12th as less important. In particular, according to their point of view as experts, they were asked which of the key concepts they would definitely include in a course aimed at educators and librarians, as core to MIL skills and which of them as less closely-related to MIL skills. In Round 2, the number of experts that completed this section was 14. The Ranking results of Round 1 and 2 are depicted below in **Table 7.3**.

**Table 7.2. MIL KC Legend**

MIL-KC ID	MIL KC Description
<b>MIL-KC1</b>	Introduction to Media and Information Literacy-MIL
<b>MIL-KC2</b>	Libraries as pioneering agents of IL and MIL Skills
<b>MIL-KC3</b>	Critical Consumption of Information and Media Content
<b>MIL-KC4</b>	Ethical Use & Production of Information and Media Content
<b>MIL-KC5</b>	Tailoring MIL skills to teaching specific fields
<b>MIL-KC6</b>	Understanding Mainstream (Traditional & Digital) Media as Information Providers
<b>MIL-KC7</b>	Understanding Alternative Media as Information Providers
<b>MIL-KC8</b>	Understanding the “Free” Internet as Information Provider
<b>MIL-KC9</b>	Understanding and Evaluating Advertisements

MIL-KC ID	MIL KC Description
<b>MIL-KC10</b>	Archives, Museums and Publishers as Information Providers
<b>MIL-KC11</b>	Freedom of Expression and Intercultural Dialogue in Media and other Information Providers
<b>MIL-KC12</b>	Citizenship, Democracy and Social Action in Media and other Information Providers

**Table 7.3. MIL KC Ranking - Round 1 & Round 2**

MIL KC Ranking - Round 1			MIL KC Ranking – Round 2		
Rank	Title	Mean Rank	Rank	Title	Mean Rank
1	<b>MIL-KC1</b>	2,81	1	<b>MIL-KC1</b>	2,57
2	<b>MIL-KC3</b>	2,81*	2	<b>MIL-KC3</b>	2,64
3	<b>MIL-KC4</b>	4,25	3	<b>MIL-KC4</b>	3,79
4	<b>MIL-KC6</b>	5,38	4	<b>MIL-KC6</b>	5,50
5	<b>MIL-KC2</b>	6,50	5	<b>MIL-KC2</b>	5,57
6	<b>MIL-KC7</b>	7,00	6 (7)	<b>MIL-KC8</b>	6,50
7	<b>MIL-KC8</b>	7,19	7 (6)	<b>MIL-KC7</b>	7,43
8	<b>MIL-KC12</b>	8,13	8 (10)	<b>MIL-KC5</b>	8,14
9	<b>MIL-KC11</b>	8,31	9 (8)	<b>MIL-KC12</b>	8,36
10	<b>MIL-KC5</b>	8,38	10 (9)	<b>MIL-KC11</b>	8,71
11	<b>MIL-KC10</b>	8,50	11	<b>MIL-KC10</b>	8,86
12	<b>MIL-KC9</b>	8,75	12	<b>MIL-KC9</b>	9,93

### Comments on the results of MIL Round 1 and Round 2

According to MIL KC ranking above it is clear that Key Concept entitled “MIL-KC1 Introduction to Media and Information Literacy-MIL”, has taken the 1<sup>st</sup> most important place among the twelve (12) proposed MIL key concepts, after both Delphi Rounds. This leads to the conclusion that experts indeed identified a significant gap in MIL knowledge of the target audience, namely educators and librarians, that should be definitely filled by offering an introductory chapter in the pertinent curriculum.

Next the “MIL-KC3 Critical Consumption of Information and Media Content”, which showed a minor ranking deference with MIL-KC1 after Round 1, holds the 2<sup>nd</sup> most important position after Round 2. Obviously, experts believe that this concept equates with the most closely related skill to MIL and therefore it should be definitely included in the proposed curriculum.

Following this, “MIL-KC4 Ethical Use & Production of Information and Media Content”, “MIL-KC6 Understanding Mainstream (Traditional & Digital) Media as Information Providers” and “MIL-KC2 Libraries as pioneering agents of IL and MIL Skills”, hold their high rank positions after both Rounds in exactly the same order. In more detail, MIL-KC4 is placed 2<sup>nd</sup> in Round 1 and 3<sup>rd</sup> in Round 2, MIL-KC6 is placed 3<sup>rd</sup> in Round 1 and 4<sup>nd</sup> in Round 2 and MIL-KC2 is placed 4<sup>th</sup> in Round 1 and 5<sup>th</sup> in Round 2. According to the above results these three proposed key concepts relate to the core MIL skills and for this reason they should also be considered for the development of a curriculum addressed to educators and librarians.

After Round 2, “MIL-KC7 Understanding Alternative Media as Information Providers” switched places with “MIL-KC8 Understanding the “Free” Internet as Information Provider” which finally comes 6<sup>th</sup>, leaving the 7<sup>th</sup> position to MIL-KC7. This is an interesting re-ranking that also correlates with the striking re-ranking from the 7<sup>th</sup> to the 3<sup>rd</sup> place of the strongly related with technological skills MIL definition. Experts seem that after studying “MIL-KC8 Understanding the “Free” Internet as Information Provider” learning objectives, as they are presented in **Chapter 7.1.3**, which are very much in line with the aforementioned definition, decided to rank both the definition and the relevant key concept in higher positions. For this reason, it is proposed that MIL-KC8 should also be considered for inclusion the curriculum.

An interesting observation is also that “MIL-KC5 Tailoring MIL skills to teaching specific fields” climbed from the 9<sup>th</sup> to the 8<sup>th</sup> position, something that correlates with the re-ranking from the 9<sup>th</sup> to the 7<sup>th</sup> place of the related with social and education skills MIL definition. This could lead to the conclusion that experts seem to acknowledge that the important relation between social skills, education, information literacy and other MIL concepts may be fostered with an emphasis to designing learning MIL activities tailored to specific fields. However, MIL-KC5, as well as the previously mentioned MIL-KC7, but also the four key concepts below, namely the “MIL-KC12 Citizenship, Democracy and Social Action in Media and other Information Providers”, the “MIL-KC11 Freedom of Expression and Intercultural Dialogue in Media and other Information Providers”, the “MIL-KC10 Archives, Museums and Publishers as Information Providers” and the “MIL-KC9 Understanding and Evaluating Advertisements” have been ranked after both Rounds as less closely related to core MIL skills, by experts.

### **Conclusions about the results of MIL Round 1 and Round 2**

Consequently, researchers propose to consider for inclusion in the MIL curriculum addressed to educators and librarians at least the first six key concepts, as they were ranked by experts in order of importance after the Round 2: MIL-KC1, MIL-KC3, MIL-KC4, MIL-KC6, MIL-KC2 and MIL-KC8. It has to be mentioned that the six proposed MIL key concepts relate strongly with the MIL definitions 1-6, as they are depicted in **Table 7.3** above, which refer primarily to Information Literacy and to several Media Literacy skills and concepts.

### **7.2.3 UNIWA Delphi Study for Media and Information Literacy - Key Learning Objectives and Outcomes**

The 16 experts, who completed the MIL Delphi Study Questionnaire, were asked to read 12 sets of learning objectives and outcomes, incorporated into 12 proposed key concepts (KC) of “Media and Information Literacy-MIL” (see **Chapter 7.1.3 “Media and Information Literacy (MIL)” key learning objectives and outcomes integrated in distinct thematic units**). Then, they had to rate

each set of these learning objectives and outcomes in relation to their appropriateness, from Completely Agree (most appropriate) to Completely Disagree (least appropriate). In particular, according to their expertise, they were asked which of them they would evaluate as the most appropriate to be considered for the development of a virtual course aimed at educators and librarians.

### **Comments on the results of MIL Round 1**

According to **Table 7.4** there is a total consensus of Completely Agree & Agree among experts for all twelve (12) sets of learning objectives and outcomes, rating from 87% the least to 100% the most. This consensus had been reached among 16 experts already after Round 1 and for this reason researchers decided to omit this section from Round 2. It is important that at least 4 out of 12 sets of MIL learning objectives and outcomes reach a consensus of 100%, namely: “**KC6**-Understanding Mainstream (Traditional & Digital) Media as Information Providers” with 75% of experts stating that they completely agree and 25% of them stating that they agree; “**KC1**-Introduction to Media and Information Literacy-MIL” with 69% of experts stating that they completely agree and 31% of them stating that they agree; “**KC4**-Ethical Use & Production of Information and Media Content” with 63% of experts stating that they completely agree and 37% of them stating that they agree; and “**KC2**-Libraries as pioneering agents of IL and MIL Skills” with 63% of experts stating that they completely agree and 37% of them stating that they agree.

Additionally, 3 out of 12 sets of MIL learning objectives and outcomes reach a consensus of 94%, namely: “**KC3**-Critical Consumption of Information and Media Content” with 69% of experts stating that they completely agree and 25% of them stating that they agree; “**KC8**-Understanding the “Free” Internet as Information Provider” with 50% of experts stating that they completely agree and 44% of them stating that they agree; and “**KC5**-Tailoring MIL skills to teaching specific fields” with 44% of experts stating that they completely agree and 50% of them stating that they agree.

**Table 7.4. MIL Learning Objectives & Outcomes Rating**

Total Degree of Consensus (Completely Agree & Agree)	Sets of learning objectives and outcomes per KC	Detailed Rating		
		Completely Agree	Agree	Disagree
1 (100%)	KC6-Understanding Mainstream (Traditional & Digital) Media as Information Providers	Completely Agree	Agree	Disagree
		75%	25%	0
2 (100%)	KC1-Introduction to Media and Information Literacy-MIL	Completely Agree	Agree	Disagree
		69%	31%	0
3 (94%)	KC3-Critical Consumption of Information and Media Content	Completely Agree	Agree	Disagree
		69%	25%	6%
4 (100%)	KC4-Ethical Use & Production of Information and Media Content	Completely Agree	Agree	Disagree
		63%	37%	0
4 (100%)	KC2-Libraries as pioneering agents of IL and MIL Skills	Completely Agree	Agree	Disagree
		63%	37%	0
5 (87%)	KC7-Understanding Alternative Media as Information Providers	Completely Agree	Agree	Disagree
		56%	31%	13%
6 (87%)		Completely Agree	Agree	Disagree

Total Degree of Consensus (Completely Agree & Agree)	Sets of learning objectives and outcomes per KC	Detailed Rating		
	KC12-Citizenship, Democracy and Social Action in Media and other Information Providers	56%	31%	13%
6 (87%)	KC11-Freedom of Expression and Intercultural Dialogue in Media and other Information Providers	Completely Agree	Agree	Completely Disagree
		56%	31%	13%
7 (94%)	KC8-Understanding the “Free” Internet as Information Provider	Completely Agree	Agree	Completely Disagree
		50%	44%	6%
8 (94%)	KC5-Tailoring MIL skills to teaching specific fields	Completely Agree	Agree	Disagree
		44%	50%	6%
9 (88%)	KC9-Understanding and Evaluating Advertisements	Completely Agree	Agree	Completely Disagree
		38%	50%	13%
10 (87%)	KC10-Archives, Museums and Publishers as Information Providers	Completely Agree	Agree	Disagree
		31%	56%	13%

An interesting outcome yields if we compare the ranking of MIL key concepts with the rating of consensus between experts on MIL learning objectives and outcomes. All six aforementioned key concepts which are the most highly ranked, are exactly the same with the ones that included the most appropriate learning objectives and outcomes according to experts. This comparison is depicted in **Table 7.5** below:

**Table 7.5. Comparison of MIL Key Concepts – Round 2 with MIL Learning Objectives & Outcomes integrated in Key Concepts – Round 1**

MIL Key Concept – Round 2			MIL Learning Objectives & Outcomes integrated in Key Concepts – Round 1
Rank Position	Title	Mean Rank	Completely Agree & Agree %
1	MIL-KC1- Introduction to MIL	2,57	100%
2	MIL-KC3- Critical Consumption of Information and Media Content	2,64	94%
3	MIL-KC4- Ethical Use & Production of Information and Media Content	3,79	100%
4	MIL-KC6- Understanding Mainstream (Traditional & Digital) Media as Information Providers	5,50	100%
5	MIL-KC2- Libraries as pioneering agents of IL and MIL Skills	5,57	100%
6	MIL-KC8- Understanding the “Free” Internet as Information Provider	6,50	94%



## Conclusions about the results of MIL Round 1

Consequently, researchers propose to consider for inclusion in the MIL curriculum addressed to educators and librarians at least the following sets of learning objectives and outcomes that relate to the six aforementioned MIL key concepts:

**KC1**-Introduction to Media and Information Literacy-MIL; **KC6**-Understanding Mainstream (Traditional & Digital) Media as Information Providers; **KC2**-Libraries as pioneering agents of IL and MIL Skills; **KC3**-Critical Consumption of Information and Media Content; **KC4**-Ethical Use & Production of Information and Media Content; **KC8**-Understanding the “Free” Internet as Information Provider.

### 7.2.4 UNIWA Delphi Study for Media and Information Literacy - Key Teaching and Evaluation Methods

The 16 experts, who completed the MIL Delphi Study Questionnaire, were asked to read nine (9) teaching and evaluation approaches concerning “Media and Information Literacy-MIL” for virtual adult training, namely educators and librarians and to rank them in order of importance, by putting the 1st as most important and the last as the least important. In particular, according to their point of view as experts, they were asked which of them facilitate the development of Information Literacy Skills (e.g., searching, critically evaluating, ethically using and sharing information for a topic) and additionally facilitate critical thinking, cooperative learning and enhance the will to attend an asynchronous course in a virtual learning environment. In Round 2, the number of experts who completed this section was 14. The Ranking results of Round 1 and 2 are depicted below in **Table 7.7** [see also **Annex 3 – Key Teaching and Evaluation Methods, common for the six information related literacies of EDUCABILITY Program**].

**Table 7.6. MIL Key Teaching and Evaluation Methods Legend**

TEM ID	Teaching and Evaluation Methods Description
<b>TEM1</b>	In each Unit, trainees will be asked to <b>watch an introductory video</b> . After this, they will be asked to submit a short answer to the VLE’s Course Forum, regarding a question, relevant to the introductory video. All trainees’ answers will be visible to every participant in the VLE’s Course Forum for review and discussion among them [Level of mastery: Understanding via peer learning – constructivism approach–IL SKILL: E-Social engagement].
<b>TEM2</b>	In each Unit, trainees will be asked to <b>think of keywords</b> that will help them find useful information on how to answer a question. In order to help them think of the appropriate terms they will be given a list of pertinent key words and they will be asked to complete an e-crossword of broader, synonym, narrower terms, etc. [Level of mastery: Understanding via computer interactive learning – cognitivism approach –IL SKILL: Analysis of a topic].
<b>TEM3</b>	In each unit, trainees will be visually (video) presented with at least two or three distinct ways of <b>searching for information</b> on a specific topic, in the Internet, in a library catalog and in scientific data bases. Furthermore, a method will be displayed on how to evaluate retrieved information, in terms of relevance and validity. After

TEM ID	Teaching and Evaluation Methods Description
	<p>this, trainees will be asked to perform their own searches for specific information regarding a question and to evaluate their results, in terms of relevance and validity. [Level of mastery: Understanding &amp; Application via computer interactive learning – behaviorism approach –IL SKILL: Searching &amp; Evaluating information for a topic]. Finally, trainees will submit the list of their retrieved and evaluated results to the VLE’s Course Forum for review and discussion. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILL: Social engagement].</p>
TEM4	<p>In each Unit, trainees will be asked to study their retrieved information and to <b>write a properly cited short answer</b> to a question. After this, they will be asked to submit their answer to the VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her answer and will submit one review to three other participants’ answers. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILLS: Analysis, Synthesis, Ethical use &amp; Sharing of information for a topic, E-Social engagement].</p>
TEM5	<p>In each Unit, after a short video-lecture, trainees will be asked to <b>answer a reflection E-quiz</b>. Automatic feedback will be given per answer. Each trainee will be able to take the reflection E-quiz as many times as he/she wishes. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic]</p>
TEM6	<p>In each Unit, trainees will be presented with a <b>video- lecture</b>. The video-lecture will be automatically paused every time a sub-topic will have been completed and a pop-up, true or false or three-four choice questions, will appear on the screen. Each trainee will have to answer it in order for the video-lecture to continue. After an answer has been completed the learner will get immediate feedback and the video-lecture will be allowed to continue. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic]</p>
TEM7	<p>In each Unit, trainees will be asked to read at least one of the proposed references linked to the VLE’s Course and <b>to write a summary</b> that they will have to submit to the VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way, every trainee will receive three reviews for his/her abstract and will submit one review to three other participants’ abstracts. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILLS: Analysis, Synthesis, Ethical use &amp; Sharing of information for a topic, E-Social engagement].</p>
TEM8	<p>Towards the end of each Unit, trainees will be asked to <b>choose a topic</b> of their preference. Then they will be asked to search for specific information regarding their topic, to read them and to evaluate them in terms of relevance and validity and to submit a short, properly cited essay or ppt to the VLE’s Course. Their essay or ppt will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her essay or ppt and will submit one review to three other participants’ essay or ppt. [Level of mastery: Knowledge and application via peer learning – constructivism approach–IL SKILLS: Searching,</p>

TEM ID	Teaching and Evaluation Methods Description
TEM9	Evaluating, Analysis, Synthesis, Ethical use & Sharing of information for a topic, E-Social engagement]. Trainees who will have <b>acquired a total of 60%</b> or more to the various interactive sub-tasks of each Unit will be allowed to continue to the next Unit. If not, they will have to repeat it. Upon successful completion of the whole E-course (at least 60% or more) trainees will be able to download a certificate of attendance in for educators and librarians.

**Table 7.7. MIL Key Teaching and Evaluation Methods Ranking – Round 1 and Round 2**

MIL Key Teaching and Evaluation Methods Ranking – Round 1			MIL Key Teaching and Evaluation Methods Ranking -Round 2		
Rank	Title	Mean Rank	Rank	Title	Mean Rank
1	MIL-TEM3	3.31	1	MIL-TEM 3	2.77
2	MIL-TEM1	3.88	2 (3)	MIL- TEM 8	3.15
3	MIL-TEM8	4.13	3 (2)	MIL- TEM 1	3.46
4	MIL-TEM4	4.19	4	MIL- TEM 4	3.77
5	MIL-TEM2	4.31	5	MIL- TEM 2	4.15
6	MIL-TEM7	5.75	6	MIL- TEM 7	5.38
7	MIL-TEM6	6.00	7 (8)	MIL- TEM 5	6.46
8	MIL-TEM5	6.19	8 (7)	MIL- TEM 6	7.54
9	MIL-TEM9	7.25	9	MIL- TEM 9	8.31

### Comments on and conclusions about MIL results of Round 1 and Round 2

Comparative results of Round 1 and Round 2 show that experts ranked the proposed teaching and evaluation method entitled MIL-TEM 3, as the most important. This approach relates closely to the development of two core Information Literacy skills, namely searching effectively for sources that respond to specific information needs and evaluating them critically. Moreover, experts seem to find very important for an asynchronous course in a virtual learning environment, the combination of the proposed teaching and evaluation methods which derive from two learning theories, behaviorism and constructivism. In particular, behaviorism approach will allow understanding of a learning objective and application of the acquired knowledge related to this objective via computer interactive learning. Constructivism approach will prompt trainees to review and discuss their acquired knowledge with other peers, leading to an “indirect” evaluation of the specific learning outcome and enhancing the skill of online social engagement.

The second most important proposed teaching and evaluation method is the one entitled MIL-TEM 8, which went up from position 3 to position 2 after Round 2. MIL-TEM 8 relates to knowledge and application of all core Information Literacy skills, namely searching, evaluating, analysis, synthesis, ethical use and sharing of information for a topic via the teaching and evaluation method of peer learning that derives from constructivism.

Next, the third most important proposed teaching and evaluation method after Round 2, is the one entitled MIL-TEM1, which uses video as a virtual leaning object to introduce trainees to certain concepts of MIL. In addition, it enhances both understanding via peer learning, a constructivism approach, and online social engagement. It has to be noted that MIL-TEM1 had been ranked second after Round 1, meaning there was no significant oscillation among experts on this issue.

Teaching and evaluation methods entitled MIL-TEM4, MIL-TEM2, MIL-TEM7 and MIL-TEM9 were ranked respectively in positions 4, 5, 6 and 9 after both Rounds. According to this result there is no oscillation among experts, who seem to rank constructivism approaches highly than behaviorism ones. This argument is also supported by the fact that MIL-TEM 5 and MIL-TEM 6 which propose a behaviorism approach, namely understanding via computer interactive learning, remain in the lower rank after Round 2.

Finally, MIL- TEM 9 which proposes an overall evaluation method for virtual adult training was ranked in the last position after both Rounds.

# 8 Critical Information Literacy

by UC3M



## 8.1 UC3M Source mapping for Critical Information Literacy

Summary of Key findings of Task 1: Mapping of the state of research in Information Literacy and in Emerging Literacies: “Critical Information Literacy (CIL)” by the partner UC3M -Spain - <https://www.uc3m.es/Home>

### 8.1.1 “Critical Information Literacy (CIL)” Definitions

The following definitions concerning “Critical Information Literacy–CIL” emerged after an extensive and systematic review on the subject. In particular, the definitions below refer to the key issues of CIL and have been selected to be evaluated by experts in the field. Moreover, MIL definitions have been semantically analyzed and classified in the conceptual categories, as they are depicted in **Table 8.1** below.

**Table 8.1.** *CIL Definitions Conceptual Categories*

Conceptual Categories	Meaning
Information Literacy related	The definition underlines the core information literacy skills
Social and political life	The definition includes the social and political dimensions of information
Social ethics	The definition highlights the ethics in using the information
Education related	This definition focuses on the use of information so that library users may think critically

**Definition 1.** Critical Information Literacy refutes the neutrality of traditional Information Literacy and asks library educators and students to engage with the social and political dimensions of information, including its production, dissemination, and reception (E. Tewell, 2016) (Information Literacy related & Social and political life).

**Definition 2.** Critical Information Literacy is a way of thinking and teaching that examines the social construction and political dimensions of libraries and information, problematizing information’s production and use so that library users may think critically about such forces (E. C. Tewell, 2018). (Education related & Social and political life).

**Definition 3.** Is the ability to understand, find, collect, interpret, visualize and support arguments using quantitative and qualitative data (Deahl, 2014). These include the intersections of critical information literacy and critical approaches in other aspects of education and library and information practice, including critical data literacy (Information Literacy related).

**Definition 4.** Critical Information Literacy is a consistent tool of resistance to Fake News as it allows people not only survive the informational flood but mainly to build a more ethical society in the use of information (Brisola & Doyle, 2019) (Information Literacy related & Social ethics).

**Definition 5.** Critical Information Literacy is the ability to question power and authority in ways that facilitate social justice (Polizzi, 2020). (Social and political life)

### 8.1.2 “Critical Information Literacy (CIL)” key concepts and content

It is commonly based on critiques of Information Literacy standards and the ACRL’s Framework for Information Literacy for Higher Education as they overemphasize tools and skills.

CIL moves away from a skills-based, instrumental teaching approach, i.e., how to use the tools, to an approach that encourages students to develop their own critical responses to information from diverse social and cultural perspectives, refuting the pretension of neutrality, and being aware of the – oppressive - power structures that involve. It puts less emphasis on information seeking skills and more on how information literacy is a situated social construction and knowledge has a cultural authority. It encourages to be aware of the social construction and the political dimensions of information, including the values, politics, and economics that affect the library’s (and academy’s) role in structuring and presenting it. It is an “expanded version of information literacy that places the learner at the center in a more empowered role and focuses on the sociopolitical, economic, and cultural aspects of all types and stages of information and the research process. It is very concerned with the power relationships that impact information production and dissemination and tries to move information literacy beyond the purely mechanical and technical” (Downey, 2016).

It is connected with a wider critique of neoliberalism in academia. (“Opposed to the increasingly corporatized operation of higher education institutions, critical information literacy provides a useful perspective with which to interrogate and contend with this job- and skills-based schooling and argues that education should fulfill a purpose other than that of creating efficient workers.” “Critical IL ultimately helps the profession to question and resist the damaging effects of capital-centered education on learners, teachers, and society, and encourages librarians to develop an information literacy theory and practice that recognizes students’ personal agency and attempts to create positive personal and social change” (Tewell, 2015).

It promotes social justice, social change, equity, activism: it is “an approach to education in library settings that strives to recognize education’s potential for social change and empower learners to identify and act upon oppressive power structures” (Tewell 2018, p.11). It embraces the potential of libraries as catalysts for social change, to lead to transformative action. It also addresses the emancipation/needs of marginalized communities in a wide range of contexts. It



invokes democratic values and the “democratizing” core values of librarianship, to enable people to develop political agency and become informed and actively involved in democracy.

It emphasizes the librarians’ roles as educators, mainly drawing on critical pedagogy. For example, Paulo Freire is discussing, and working with concepts such as the banking education, problematization method, “problem-posing education”, conscientization, critical consciousness, “The Pedagogy of the Oppressed”. “Freire’s critical pedagogy has helped librarians to transition from resource-based bibliographic instruction to user-centred information literacy” (Scott, 2016). It also draws on critical literacy, constructivism. It often goes together with concepts from feminism/feminist pedagogy, antiracism/antiracist pedagogy, antihomophobia, hip hop in the classroom.

Theoretically, in addition to the major influence of Paulo Freire and critical pedagogy, it also draws on critical and poststructural theories, the Frankfurt School, neo-Marxism, Michel Foucault, queer theory, critical race theory, authors such as Henry Giroux, bell hooks and John Dewey.

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### 8.1.3 “Critical Information Literacy (CIL)” key learning objectives and outcomes integrated in distinct thematic units

#### 1-Introduction to Critical Information Literacy (CIL)

This Unit aims to introduce trainees, namely educators and librarians, to the main theoretical concepts of “Critical Information Literacy”.

**This Unit learning objectives are:**

- to **describe** CIL key definitions
- to **identify** CIL key skills
- to **relate** CIL key skills to various scientific subjects
- to **reflect** on CIL current trends
- to **estimate** when and how technology must be used so that it is effective in achieving the intended goals
- to **understand** the challenges presented by information systems

**This Unit expected learning outcomes are that trainees will have learned to:**

- **recognize** CIL in-depth definitions/concepts such as “Critical Literacy”, “Critical Information Literacy”, “Education”, “Social justice”, “Economic justice”
- **identify** skills and competencies that trainees need to be competent in CIL
- **identify** current trends in CIL
- **train** the trainees on how to integrate CIL concepts into their curriculum

#### 2- Gender equality. Feminism and LGTBQ

**This Unit learning objectives are to:**

- be able to not tolerate, but to accept different ways of living and feeling sexual orientations
- be able to understand the social character of the stereotypes of the behavioral image by gender
- be able to understand the difference in personal and professional progress of people attending to gender stereotypes
- be able to understand the different nature of women without implying a different social, professional and personal role
- be able to understand the critical importance of developing an inclusive mindset in all areas of life
- be able to understand the reprehensible nature of all types of gender violence

**This Unit expected learning outcomes are that trainees will have learned to:**

- **use** tools and search techniques to address information needs
- **see** the conversation created around a research topic through the information they find
- **understand** that the discourse on a topic includes a variety of backgrounds and perspectives, as well as formats of information including, but not limited to, written work and images

- **evaluate** critically information and its sources

### **3- Social and economic justice**

**This Unit learning objectives are to:**

- be able to understand the principles of eEconomy and its effects on the development of economic inequality
- be able to understand the laws of Infonomy and their effects on inequality and the digital divide
- be able to understand the principles of Sustainable Development and the social effects of the SDGs
- be able to understand the direct effect of the quality of education on excellence for work and personal progress

**This Unit expected learning outcomes are that trainees will have learned to:**

- **define** the content, context, and structure of an archival record, so that they can utilize these elements to analyze
- **develop** not only with the ability to succeed in the world, but also with an ability to better understand their world's origins, structures, and functions, and with a clearer idea of how those structures are contingent and open to challenge
- **believe** that they have the ability to change their world

### **4- Antiracist pedagogy**

**This Unit learning objectives are to:**

- vision the world
- be able to design an educational model that prioritizes natural capacities over acquired rights
- be able to design transversal educational models whose axes of learning are respect for ethnic diversity

**This Unit expected learning outcomes are that trainees will have learned to:**

- examine critically the social, political, economic, and corporate systems that have power and influence over information production, dissemination, access, and consumption
- combine both fine-tuned skills for finding and evaluating literature as well as an understanding of the cultural forces of oppression and domination that structure the availability of information
- understand the complex workings of information so that we may identify and act upon the power structures that shape our lives

### **5- Disabilities and Special abilities**

**This Unit learning objectives are:**

- be able to understand the nature of special abilities versus disabilities



- be able to promote content design that promote usability and, especially, accessibility
- be able to design activities that promote the employment and professional incorporation of people with special abilities
- be able to design instruments to promote the complete training of people with special abilities

**This Unit expected learning outcomes are that trainees will have learned to:**

- **understand** that the increasing access to information relates to form as well as content
- **understand** that the implications for literacy are profound when people are denied access to information in ways they can be used

## **6- Cultural diversity, interculturality, multiculturalism**

**This Unit learning objectives are to:**

- be able to understand the concept and differences between cultural diversity, interculturality and multiculturalism to effectively apply relevant actions
- be able to respect otherness as a value of the human being
- be able to design integration plans for immigrant populations
- be able to avoid integration plans that do not consist of the “acculturation” of immigrants, but the generation of a common political community

**This Unit expected learning outcomes are that trainees will have learned to:**

- **encourage** to go beyond traditional criteria for evaluating information and to examine it from diverse social and cultural perspectives in order to arrive at an astute and nuanced assessment of its value
- **difference** critical literacy from critical thinking, noting that the former focuses on power structures whereas the latter focuses on reasoning and thinking
- **support** refugee and migrant communities to access information

## **7- Misinformation, fake news and algorithmic bias**

**This Unit learning objectives are to:**

- be able to understand the reasons and causes of infoxication
- be able to build principles and instruments to evaluate the content of the messages, by competence in information literacy, to avoid fake news
- be able to teach existing tools to detect harmful or false content
- be able to know the operation of algorithms on the web, which skew the retrieval of information and strengthen prejudices
- be able to detect the main social actors interested in fake news

**This Unit expected learning outcomes are that trainees will have learned to:**

- **understand** that this literacy prepares people to critically analyze information and allows them to distinguish relevant from irrelevant information

- **seek** reliable sources and use them to produce new information in a creative and contextualized way
- **believe** that critical information literacy is a consistent tool to resist fake news and misinformation
- **understand** what algorithms do when they are used in search engines, and the importance of how news and information are sourced in the digital online world

## 8- Promotion of equality

**This Unit learning objectives are to:**

- be able to know the principles, planning and instruments of information policies that promote equality
- be able to know how the excellence rankings work and how to interpret them to create an egalitarian development dynamic
- be able to know the stockholders and shareholders who are decisive in the design of plans in the information policies for the promotion of equality
- be able to understand and propose Digital Educational Objects that instill in all educational centers the principles of equality
- be able to know the principles, planning and instruments of information policies that promote equality
- be able to know how the excellence rankings work and how to interpret them to create an egalitarian development dynamic
- be able to know the stockholders and shareholders who are decisive in the design of plans in the information policies for the promotion of equality
- be able to understand and propose Digital Educational Objects that instill in all educational centers the principles of equality

**This Unit expected learning outcomes are that trainees will have learned to:**

- **seek** to anchor information literacy practice and librarianship as a whole to a commitment to both principles of social justice and a systematic critique of the power relations
- **question and critique** the social, economic, and political forces that shape information literacy is a consistent tool to resist fake news and misinformation
- **confront** issues such as power, oppression, and inequality precisely the thinking that helps students develop a social justice consciousness.

## 9- Activism, information policies and information professionals

**This Unit learning objectives are:**

- be able to analyze the nature, characters and sufficient actions of activism from Information and Documentation
- be able to understand and analyze the modes of operation of the evaluation of the Web (1.0, 2.0, 3.0, 4.0, Semantic and Knowledge Web, Web of Things, the Metaverse), as a natural space for activism, actions of information professionals and their policies

- be able to know and analyze the new professions that the EU contemplates, with a direct projection on information professionals, analyzing their competences and spaces for action
- be able to understand the new readings that are foreseen and that should be the space of educational action of information professionals, subject to a solid information policy

**This Unit expected learning outcomes are that trainees will have learned to:**

- **achieve** a higher degree of meaningfulness and engagement
- **connect** with faculty and develop a stronger sense of community inside and outside the classroom.
- **contribute** to the well-being of communities through a commitment to social responsibility

## **10- Ethical and socially responsible behavior**

**This Unit learning objectives are:**

- be able to know and effectively apply respectful instruments with an ethical use of information and its contents

**This Unit expected learning outcomes are that trainees will have learned to:**

- **recognize** the value of human networks in accessing information
- **demonstrate** facility in navigating systems of information to meet information needs
- **critique** the concept of information neutrality
- **recognize** that the distribution of information can be politically motivated
- **discern** when information no longer has value

Key Teaching and Evaluation Methods is common for the six information related literacies of EDUCABILITY Program [see *Annex 3 – Key Teaching and Evaluation Methods, common for the six information related literacies of EDUCABILITY Program*].

## **8.2 UC3M Delphi Study for Critical Information Literacy**

This chapter refers to the detailed presentation of the results that emerged after the implementation of the CIL survey using the Delphi method.

### **8.2.1 UC3M Delphi Study for Critical Information Literacy - Definitions**

The 15 experts, who completed the CIL Delphi Study Questionnaire in a single round for screening criteria, were asked to read 5 definitions concerning “Critical Information Literacy-CIL” and to rate them in order of importance, from 1 (least important) to 10 (most important). In particular, according to their point of view as experts, they were asked which of the definitions succeed to refer to the key issues of CIL and should be definitely considered for a course aimed at educators and librarians.

CIL definitions had been semantically analyzed and classified in the conceptual categories, as they are depicted in *Table 8.1*.

## Comments on the results of CIL Round 1

According to the results of Round 1 of CIL Delphi study, it appears that 4 definitions were rated with an average of more than 7 out of 10, leading to the conclusion that their concepts are highly appreciated for inclusion in a curriculum aimed at educators and librarians.

In spite of Critical Information Literacy, with its emphasis on social justice in the instructional and educational work of librarians, have been part of the scholarly literature for over twenty years (Tewell 2018), the lowest scoring definition achieved 82 points. The main reason may be the absence of the word “information” in this definition (CIL - D1).

The two most valued definitions reinforce the aspects most related to critical information literacy: the social and political dimension of the term and the critical thinking. On the other hand, issues associated with fake news, disinformation or misinformation have been less valued.

Although the experts have given preference to the more classical definitions, they have also positively valued those that have combined them with other information literacies. This fact and the impact of the COVID-19 pandemic pose the idea of introducing new approaches into the curriculum such as critical data literacy, critical health literacy, discourses around disability, mental health, sustainable development, etc.

### 8.2.2 UC3M Delphi Study for Critical Information Literacy - Key Concepts

The 15 experts, who completed the CIL Delphi Study Questionnaire, were asked to read 10 key concepts concerning “Critical Information Literacy-CIL” for virtual adult training and rank them in order of importance, by putting the 1st as most important, reaching gradually the 10th as less important. In particular, according to their point of view as experts, they were asked which of the key concepts they would definitely include in a course aimed at educators and librarians, as core to CIL skills and which of them as less closely-related to CIL skills. The Ranking results of Round 1 are depicted below in **Table 8.2**

**Table 8.2.** CIL KC Ranking - Round 1

Rank	Title	Mean Rank
1	<b>CIL-KC1</b> Introduction to Critical Information Literacy (CIL)	2.67
2	<b>CIL-KC7</b> Misinformation, fake news and algorithmic bias	3.87
3	<b>CIL-KC10</b> Ethical and socially responsible behavior	4.13
4	<b>CIL-KC3</b> Social and economic justice	4.8
5	<b>CIL-KC8</b> Promotion of equality	5.53
6	<b>CIL-KC6</b> Cultural diversity, interculturality, multiculturalism	5.53
7	<b>CIL-KC9</b> Activism, information policies and information professionals	6.53
8	<b>CIL-KC2</b> Gender equality. Feminism and LGBTQ	7.07
9	<b>CIL-KC5</b> Disabilities and special abilities	7.13
10	<b>CIL-KC4</b> Antiracist pedagogy	7.73

## Comments on the results of CIL Round 1

The results of the Delphi Study showed that the consensus among our experts was acceptable and sufficient after the single round. Kendall's W was 0,294.

According to CIL ranking above it is clear that Key Concept entitled "KC1 Introduction to Critical Information Literacy (CIL)", has taken the most important place among the ten proposed CIL key concepts. It was ranked as the first by 69% of experts. This leads to the conclusion that experts indeed identified a significant gap in CIL knowledge of the target audience. Therefore, we agree that it should be included in the pertinent curriculum addressed to educators and librarians.

The following key concept, according to the estimation of experts, should be the "KC 7 Misinformation, fake news and algorithmic bias". "KC 10 Ethical and socially responsible behavior" is ranked as third. Then "KC3 Social and economic justice" and "KC8 Promotion of equality", hold the following positions. On the other hand, the lowest rated concepts with a mean rank higher than the average are:

- Activism, information policies and information professionals
- Gender equality. Feminism and LGBTQ
- Disabilities and special abilities
- Antiracist pedagogy

Also, Key concepts "KC6 Cultural diversity, interculturality, multiculturalism", "KC8 Promotion of equality" and "KC5 Disabilities and special abilities" have the largest proportions of medium ranks. Accordingly, these concepts should be elaborated in later phases of the Critical Information Literacy.

## Conclusions about the results of CIL Round 1

Consequently, UC3M-Spain researchers propose to include in the CIL curriculum the first seven key concepts: KC1, KC7, KC10, KC3, KC8, KC6, KC9. All of them were rated at least once as the first or second most important key concept. Everything related to topics such as gender equality, feminism, LGBTQ, disabilities, or antiracism would be included within the category "CIL-KC8 Promotion of equality".

### **8.2.3 UC3M Delphi Study for Critical Information Literacy - Key Learning Objectives and Outcomes**

The 15 experts, who completed the CIL Delphi Study Questionnaire, were asked to read 10 sets of learning objectives and outcomes, incorporated into 10 proposed key concepts (KC) of "Critical Information Literacy-CIL". Then, they had to rate each set of these learning objectives and outcomes in relation to their appropriateness, from Completely Agree (most appropriate) to Completely Disagree (least appropriate). In particular, according to their expertise, they were asked which of them they would evaluate as the most appropriate to be considered for the development of a virtual course aimed at educators and librarians.

According to **Table 8.2** below there is a high level of consensus among experts for all ten sets of learning objectives and outcomes, rating from 67% the least to 93% the most. The answers with Complete disagree did not exceed 7%.

The results show four different blocks depending on the level of compliance. The first, with two categories, has a 93% of the total Degree of Consensus (Completely Agree & Agree). The second has 87%, with three KC represented. The third has 80% with four KC. Finally, the last one has a percentage of 67%.

The two categories that reach a 93% consensus are “KC7 Misinformation, fake news and algorithmic bias” and “KC9 Activism, information policies and information professionals”. Furthermore, another three of the ten sets of CIL learning objectives and outcomes reach a consensus of 87%: “KC1 Introduction to Critical Information Literacy”, “KC10 Ethical and socially responsible behavior” and “KC5 Disabilities and special abilities”. Especially KC1 stands out because it has the highest percentage of Completely Agree option (80%).

The 40% of the total sets of CIL learning objectives and outcomes reach a consensus of 73%, being the following: “KC6 Cultural diversity, interculturality, multiculturalism”, “KC8 Promotion of equality”, “KC4 Antiracist pedagogy” and “KC3 Social and economic justice”. The last category ranked was “KC2 Gender equality. Feminism and LGBTQ”, achieving a consensus of 67%.

**Table 8.3. CIL Learning Objectives & Outcomes Rating**

Total Degree of Consensus (Completely Agree & Agree)	Sets of learning objectives and outcomes per KC	Detailed Rating			
		Completely Agree	Agree	Disagree	Completely Disagree
1 (93%)	KC7-Misinformation, fake news and algorithmic bias	Completely Agree	Agree	Disagree	Completely Disagree
		60%	33%	7%	
1 (93%)	KC9-Activism, information policies and information professionals	Completely Agree	Agree	Disagree	Completely Disagree
		40%	53%	7%	
2 (87%)	KC1-Introduction to Critical Information Literacy	Completely Agree	Agree	Disagree	Completely Disagree
		80%	7%	7%	7%
2 (87%)	KC10-Ethical and socially responsible behavior	Completely Agree	Agree	Disagree	Completely Disagree
		60%	27%	13%	7%
2 (87%)	KC5-Disabilities and special abilities	Completely Agree	Agree	Disagree	Completely Disagree
		40%	47%	7%	7%
3 (73%)	KC6-Cultural diversity, interculturality, multiculturalism	Completely Agree	Agree	Disagree	Completely Disagree
		46%	27%	20%	7%
3(73%)	KC8-Promotion of equality	Completely Agree	Agree	Disagree	Completely Disagree
		33%	40%	20%	7%
3(73%)	KC4-Antiracist pedagogy	Completely Agree	Agree	Disagree	Completely Disagree
		20%	53%	27	
3(73%)	KC3-Social and economic justice	Completely Agree	Agree	Disagree	Completely Disagree
		13%	60%	27%	
4(67%)	KC2-Gender equality. Feminism and LGBTQ	Completely Agree	Agree	Disagree	Completely Disagree
		20%	47%	27%	7%



An interesting outcome yields if we compare the ranking of CIL key concepts in the section 3.3.4.2 of this report, with the rating of consensus between experts on CIL learning objectives and outcomes in section 3.3.4.3 This comparison is depicted in **Table 8.4** below.

**Table 8.4.** Comparison of CIL Key Concepts with CIL Learning Objectives & Outcomes integrated in Key Concepts

CIL Key Concept			CIL Learning Objectives & Outcomes integrated in Key Concepts – Single Round
Rank Position	Title	Mean Rank	Completely Agree & Agree %
1	<b>CIL-KC1</b> Introduction to Critical Information Literacy (CIL)	2.67	87%
2	<b>CIL-KC7</b> Misinformation, fake news and algorithmic bias	3.87	93%
3	<b>CIL-KC10</b> Ethical and socially responsible behavior	4.13	87%
4	<b>CIL-KC3</b> Social and economic justice	4.8	73%
5	<b>CIL-KC8</b> Promotion of equality	5.53	73%
6	<b>CIL-KC6</b> Cultural diversity, interculturality, multiculturalism	5.53	73%
7	<b>CIL-KC9</b> Activism, information policies and information professionals	6.53	93%
8	<b>CIL-KC2</b> Gender equality. Feminism and LGTBQ	7.07	67%
9	<b>CIL-KC5</b> Disabilities and special abilities	7.13	87%
10	<b>CIL-KC4</b> Antiracist pedagogy	7.73	73%

The most highly ranked KC, the number 1 did not achieve the highest consensus. This may be because, being an introductory module, experts have more knowledge or opinions on how it should be structured and the necessary learning objectives. This rich debate can be seen through the comments and suggestions that experts have left in this section. They constitute a guide to redefine these learning objectives and provide a qualitative and phenomenographic approach essential in this work. Phenomenography studies the qualitatively different ways in which people experience a phenomenon. It blends the advantages of phenomenological and hermeneutical interests with a practical focus on uncovering variation in experiences or ways of conceiving phenomena.

The primary interest of the approach is in exploring qualitative variation in people's experience of aspects of the world around them; this focus suggests that such an approach fits well into a domain which attends to the views and perceptions of users of information and information technology (Bruce, 1999).

For this purpose, we include in this section all the open comments and suggestions of the experts associated with each one of the Learning Objectives:

## KC1 Introduction to Critical Information Literacy (CIL)

- *Considero pertinente incluir en esta introducción a la alfabetización en información crítica, un objetivo enfocado a la identificación de los beneficios o ventajas que tiene para las personas contar con este tipo de habilidades. Es estratégico en cualquier acto educativo que los participantes encuentren el valor de lo aprendido y su aplicación en su vida académica, profesional y personal, siendo capaces de transmitir el valor de esos aprendizajes significativos. [I consider it pertinent to include in this introduction to critical information literacy, an objective focused on identifying the benefits or advantages that it has for people to have this type of skills. It is strategic in any educational act that the participants find the value of what they have learned and its application in their academic, professional and personal life, being able to transmit the value of this significant learning]*

## KC2 Gender equality. Feminism and LGBTQ

- *I consider pertinent to include concepts related to the masculine construction: patriarchy and sexism.*
- *This does not have anything to do with CIL. It is part of a political agenda and ideology. Librarians must be inclusive of everyone regardless of any characteristic they have. But this is part of their deontology, it does not have anything to do with CIL. The expected learning outcomes are all appropriate, but these are not related to the learning objectives. There is a serious mismatch here.*
- *For unit learning objective 1, suggest deleting "not tolerate" and say "be able to accept different ways of living and feeling sexual orientations".*
- *For unit learning objective 4, suggest deleting "different" and say "be able to understand the humanity of all people without implying a different social, professional, and personal role for women".*
- *Considero que podría ser un ejercicio práctico sobre CIL en un contexto y edad adecuado, pero no un concepto clave a incorporar en un curso virtual como el que se pretende. Tal vez si está orientado a Biblioteca Pública o estudiantes no universitarios. No creo que sea un tema para formarse un bibliotecario en CIL, al menos si es de Universidad. [I believe that it could be a practical exercise on CIL in an appropriate context and age, but not a key concept to be incorporated into an online course such as the one intended. Maybe if it is oriented to Public Library or non-university students. I don't think it's a topic to train a librarian in CIL, at least if it's from the University.]*
- *I would add gender gap elements in science.*
- *I think the unit's learning objectives are adequate, but I don't see their alignment with the learning outcomes. They seem not to be directly aligned to the content of the unit. The learning outcomes have a more general character of Information Literacy and are more suitable with KC1. I suggest them to be revised and elaborated in accordance to the theme and the objectives of the unit.*

### KC3 Social and economic justice

- *All justice is social. It is a social construct. I do not see the relationship with CIL. The expected learning outcomes are all appropriate, but these are not related to the learning objectives. There is a serious mismatch here.*
- *This unit learning objective 1 mentions principles of the eEconomy. Instead, this learning objective should focus on historical context and development of the modern global economy and its effects on economic inequity.*
- *This unit learning objective 2 mentions the "laws of Infonomy." I am not familiar with the term "infonomy." This learning objective 2 could say something about the development of the digital landscape, and how societal inequities translate to digital inequities and the digital divide. This unit learning objective 3 looks good, but I'm not sure what "SDG" refers to. This unit learning outcome 1 talks about defining aspects of an archival record... I'm not sure how this relates to the eEconomy or other learning objectives as written. However, if the learning objective is revised to focus more on the historical context and development of the global economy, then this could be a valid outcome. This unit learning outcome 2 talks about "developing the the ability to succeed..." and does not seem to relate to the learning objectives very closely.*
- *Al igual que en el tema anterior considero que son temas que pueden servir para realizar prácticas o ejercicios CIL en contextos y edades de alumnos para los cuales podrían ser adecuados, pero no lo veo como módulo de formación en CIL para bibliotecarios, al menos si son de Universidad. Tal vez sea adecuado en la formación de bibliotecarios de Bibliotecas Públicas o estudiantes no universitarios. [As in the previous topic, I consider that they are topics that can be used to carry out CIL practices or exercises in contexts and ages of students for which they could be appropriate, but I do not see it as a CIL training module for librarians, at least if they are of University. It may be suitable for training Public Library librarians or non-university students.]*
- *I understand that the objective bellow is more alined with this unit: "examine critically the social, political, economic, and corporate systems that have power and influence over information production, dissemination, access, and consumption".*

### KC4 Antiracist pedagogy

- *This does not have anything to do with CIL. This is part of the professional deontology and all good pedagogy is free of bias and discrimination. The expected learning outcomes are all appropriate, but these are not related to the learning objectives. There is a serious mismatch here.*
- *I agree with this unit learning objective 1 regarding didactic principles. I also mostly agree the learning objective 3. I strongly disagree with learning objective 2; "natural capacities" versus "acquired rights" is still racist and assumes that some races or ethnicities have lower capacities. Here are some possible alternates:*
  - *Challenge common misconceptions of diversity, equity, and inclusion*
  - *Construct and recognize multiple perspectives of diversity, equity, and inclusion*
  - *Foster an equitable and inclusive learning community*

- Recognize the benefits of diversity, equity, and inclusion for all members of the community
- Cultivate an inclusive and equitable learning environment
- Promote equitable opportunities in pedagogical practices and assessment

*Depending on how the above learning objectives shift, the language can be incorporated into the expected outcomes as well.*

- *Como en los dos puntos anteriores, más que un módulo específico, al menos si va dirigido a los bibliotecarios en general, pero más a los de Bibliotecas Públicas y a estudiantes no universitarios. Es un tema más transversal que consigue cuando se cuenta con formación en CIL, al acceder, interpretar, evaluar críticamente y gestionar la información, que se tengan en cuenta los objetivos propuestos en concreto:*
  - *Evitar el pensamiento único y una visión etnocéntrica del mundo.*
  - *Priorizar las capacidades naturales sobre los derechos adquiridos.*
  - *Respeto a la diversidad étnica.*
  - *Para lograr que nunca sea sesgada la información recuperada y utilizada, gracias a la alfabetización en información crítica. [As in the two previous points, more than a specific module, at least if it is aimed at librarians in general, but more at those of Public Libraries and non-university students. It is a more transversal topic that is achieved when there is training in CIL, when accessing, interpreting, critically evaluating and managing the information, that the proposed objectives are taken into account in particular: Avoid single thinking and an ethnocentric vision of the world. Prioritize natural capacities over acquired rights. Respect for ethnic diversity. To ensure that the information retrieved and used is never biased, thanks to critical information literacy.]*
- *I find learning objectives that go beyond anti-racist pedagogy and they intertwined with objectives that must be explicit in the item called social justice.*
- *"Be able to design didactic principles that prevent single thinking and an ethnocentric vision of the world" - it is strong alinged with the theme*

#### **KC5 Disabilities and special abilities**

- *The expected learning outcomes are all appropriate, but these are not related to the learning objectives. However, the second learning outcome is partially related. Here, it would be important to learn how to cater to people with disabilities and special needs when having to teach them CIL, so this is partially addressed in the learning outcomes.*
- *I'm not sure what "special abilities" refers to, or how it is different than disabilities. Perhaps "special abilities" refers to "special needs," which often refers to learning disabilities such as attention deficit disorder or other neurodivergent characteristics that present challenges to learning.*
  - *I agree with learning objective 2 regarding accessibility.*
  - *I'm not sure about learning objectives 3 and 4, but if my comments are correct above, they could be revised as follows: be able to design activities that promote the training of people with special needs for employment and professional*

settings as appropriate and be able to design instruments to promote the complete training of people with special needs or neurodiverse characteristics.

- *The learning outcomes seem good overall. For learning outcome 1, instead of saying "increasing access to information," it might be appropriate to say something about "providing equitable access to information" relates to both form and content.*
- *The learning objectives are suitable. But learning outcomes are somewhat restricted to just "understand". Maybe they can contemplate some actions related to design of activities and contents about Disabilities and Special abilities.*

#### **KC6 Cultural diversity, interculturality, multiculturalism**

- *Among KC2, KC3, KC4, KC5, this is the first of these modules where learning objectives are related to learning outcomes. Well done.*
- *I agree with learning objectives 1 and 2. For learning objective 3 that talks about immigrant populations, I do not know what an "integration plan" is. Objective 3 could say, "Be able to design educational programming that is accessible for immigrant populations". I disagree with objective 4 as it is written. I think the objective should say, "Be able to design educational programming for immigrant populations that fosters community engagement." I mostly agree with the learning outcomes, but they are not well aligned with the learning objectives. I disagree with learning outcome 2. It says "difference" between critical literacy and critical thinking. Is it possible that what is meant is: "Differentiate" between critical literacy and critical thinking.*
- *Being, like the rest, a cross-cutting and interesting topic, I think that such training could be incorporated for professionals of Public Libraries and students before entering the University, but not for university librarians.*

#### **KC7 Misinformation, fake news and algorithmic bias**

- *This is the cornertone of CIL. Very good.*
- *I mostly agree with the learning objectives and outcomes. I strongly agree with the objective and outcome related to algorithmic bias. This is very important. Learning objective 1 says reasons and causes of "infoxication." Is this correct? Is this referring to the U.S. Fox Entertainment Corp? If so, I think it should be more clear. I don't know the term "infoxication." Learning objective 5 says be able to detect the "main social actors" interested in fake news. I'm not sure what this means. Do you mean media celebrities that create or amplify propaganda and/or fake news? Learning outcome 1 says that this literacy... allows them to distinguish "irrelevant" information, but this learning objective is about distinguishing "false" information, "misleading" information, "misinformation," "disinformation."*
- *The learning outcome: "be able to build principles and instruments to evaluate the content of the messages, by competence in information literacy, to avoid fake news", should be changed to:*
  - *"be able to build principles and instruments to evaluate the content of the messages, notices and etc (or just informations), by information literacy*

statements, to avoid fake news". The learning outcome: "believe that critical information literacy is a consistent tool to resist fake news and misinformation", should be changed to: "acknowledge that critical information literacy is a consistent tool to resist fake news and misinformation".

- The learning outcomes below are very similar: "understand that this literacy prepares people to critically analyze information and allows them to distinguish relevant from irrelevant information" and "believe that critical information literacy is a consistent tool to resist fake news and misinformation. I suggest the inclusion of some objective related to knowing how to differentiate between fake news and the consequences of producing fake news.

#### KC8 Promotion of equality

- These learning objectives and outcomes focus on "equality," which presumes that all of the learners have the same background and are starting from the same understanding and perspectives. So -- this type of approach is contrary to critical information literacy, which focuses more on equity and inclusivity. For the learning objectives that say "stockholders and shareholders," I think you mean to say "stakeholders."
- The learning objectives of this unit are repeated. I'm not sure whether the goal: "be able to know how the excellence rankings work and how to interpret them to create an egalitarian development dynamic" is related to critical informational competence. Shouldn't the learning outcomes: "literacy is a consistent tool to resist fake news and misinformation" be included on KC7? and I suggest the follow change: "Recognize that CIL is a consistent tool to resist fake news and misinformation".

#### KC9 Activism, information policies and information professionals

- I mostly agree with the learning objectives and outcomes. I do not understand the meaning behind learning objective 1 reference to "information and documentation." Learning objective 1 could say, "Be able to analyze the social and political characteristics, understanding that information production and dissemination takes place in a social and political environment, and thus is not neutral."

#### KC10 Ethical and socially responsible behavior

- Some of these learning objective and outcomes seem more applicable to the "Activism, information policies" concept, especially learning outcomes 3 (critique the concept of information neutrality), 4 (distribution of information as politically motivated), and 5 (discern the value of information). Ethical and socially responsible behavior could include objectives related to "responsible digital citizenship" in terms of social, digital networks

### 8.2.4 UC3M Delphi Study for Critical Information Literacy - Key Teaching and Evaluation Methods

The 15 experts, who completed the CIL Delphi Study Questionnaire, were asked to read ten (10) teaching and evaluation approaches concerning "Critical Information Literacy-CIL" for virtual



adult training, namely educators and librarians and to rank them in order of importance, by putting the 1st as most important and the last as the least important. In particular, according to their point of view as experts, they were asked which of them facilitate the development of Information Literacy Skills (e.g., searching, critically evaluating, ethically using and sharing information for a topic) and additionally facilitate critical thinking, cooperative learning and enhance the will to attend an asynchronous course in a virtual learning environment.

Results of the Delphi Study showed that the consensus among our experts is higher than in Section 2 with a Kendal W of 0.38.

**Table 8.5. CIL Key Teaching and Evaluation Methods Ranking**

CIL Key Teaching and Evaluation Methods Ranking –		
Rank	Title	Mean Rank
1	<b>CIL-TEM3</b> In each CIL Unit, trainees will be visually (video) presented with at least two or three distinct ways of searching for information on a specific DiL topic, in the Internet, in a library catalog and in scientific data bases. Furthermore, a method will be displayed on how to evaluate retrieved information, in terms of relevance and validity. After this, trainees will be asked to perform their own searches for specific information regarding a CIL question and to evaluate their results, in terms of relevance and validity. [Level of mastery: Understanding & Application via computer interactive learning – behaviorism approach –IL SKILL: Searching & Evaluating information for a topic]. Finally, trainees will submit the list of their retrieved and evaluated results to the CIL VLE’s Course Forum for review and discussion. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILL: Social engagement].	2.87
2	<b>CIL-TEM4</b> In each CIL Unit, trainees will be asked to study their retrieved information and to write a properly cited short answer to a CIL question. After this, they will be asked to submit their answer to the CIL VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her answer and will submit one review to three other participants’ answers. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILLS: Analysis, Synthesis, Ethical use & Sharing of information for a topic, E-Social engagement].	3.33
3	<b>CIL-TEM2</b> In each CIL Unit, trainees will be asked to think of key words that will help them find useful information on how to answer a question. In order to help them think of the appropriate terms they will be given a list of pertinent key words and they will be asked to complete an e-crossword of broader, synonym, narrower terms, etc. [Level of mastery: Understanding via computer interactive learning – cognitivism approach –IL SKILL: Analysis of a topic].	3.73
4	<b>CIL-TEM1</b> In each CIL Unit, trainees will be asked to watch an introductory video. After this, they will be asked to submit a short answer to the CIL VLE’s Course Forum, regarding a question, relevant to the introductory video. All trainees’ answers will be visible to every participant in the DL VLE’s Course Forum for review and	4.2

CIL Key Teaching and Evaluation Methods Ranking –		
Rank	Title	Mean Rank
	discussion among them [Level of mastery: Understanding via peer learning – constructivism approach–IL SKILL: E-Social engagement].	
5	<b>CIL-TEM8</b> Towards the end of each CIL Unit, trainees will be asked to choose a CIL topic of their preference. Then they will be asked to search for specific information regarding their topic, to read them and to evaluate them in terms of relevance and validity and to submit a short, properly cited essay or ppt to the CIL VLE’s Course. Their essay or ppt will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her essay or ppt and will submit one review to three other participants’ essay or ppt. [Level of mastery: Knowledge and application via peer learning – constructivism approach–IL SKILLS: Searching, Evaluating, Analysis, Synthesis, Ethical use & Sharing of information for a topic, E-Social engagement].	4.87
6	<b>CIL- TEM7</b> In each CIL Unit, trainees will be asked to read at least one of the proposed references linked to the CIL VLE’s Course and to write a summary that they will have to submit to the CIL VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way, every trainee will receive three reviews for his/her abstract and will submit one review to three other participants’ abstracts. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILLS: Analysis, Synthesis, Ethical use & Sharing of information for a topic, E-Social engagement].	5.33
7	<b>CIL-TEM5</b> In each CIL Unit, after a short video-lecture, trainees will be asked to answer a reflection E-quiz. Automatic feedback will be given per answer. Each trainee will be able to take the reflection E-quiz as many times as he/she wishes. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic]	6.13
8	<b>CIL-TEM6</b> In each CIL Unit, trainees will be presented with a video- lecture. The video-lecture will be automatically paused every time a sub-topic will have been completed and a pop-up, true or false or three-four choice questions, will appear on the screen. Each trainee will have to answer it in order for the video-lecture to continue. After an answer has been completed the learner will get immediate feedback and the video-lecture will be allowed to continue. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic]	6.67
9	<b>CIL-TEM9</b> Trainees who will have acquired a total of 60% or more to the various interactive sub-tasks of each CIL Unit will be allowed to continue to the next CIL Unit. If not, they will have to repeat it. Upon successful completion of the whole CIL E-course (at least 60% or more) trainees will be able to download a certificate of attendance in DL for educators and librarians.	8.27

## Comments on and conclusions about CIL results of Round 1

Results from this category show that experts ranked the proposed teaching and evaluation method entitled CIL-TEM3, as the most important. This approach relates closely to the development of two core Information Literacy skills, namely searching effectively for sources that respond to specific information needs and evaluating them critically. Moreover, experts seem to find very important for an asynchronous course in a virtual learning environment, the combination of the proposed teaching and evaluation methods which derive from two learning theories, behaviorism and constructivism. In particular, behaviorism approach will allow understanding of a learning objective and application of the acquired knowledge related to this objective via computer interactive learning. Constructivism approach will prompt trainees to review and discuss their acquired knowledge with other peers, leading to an “indirect” evaluation of the specific learning outcome and enhancing the skill of online social engagement. In addition, it fosters the participation by sharing the results of the searches through the VLE forum, making learning collaborative.

The second most important proposed teaching and evaluation method is the one entitled CIL-TEM4, which is again related to the constructivist approach and particularly values collaboration and peer learning by placing the course forum as an important assessment element.

After that, the third most important proposed teaching and evaluation method is CIL-TEM2. From a cognitivist learning perspective, the experts valued the importance of defining a discipline well through its keywords. Completing an element such as a crossword puzzle is valued to reinforce the concepts learned.

Teaching and evaluation methods entitled CIL-TEM1, CIL-TEM8, CIL-TEM7, CIL-TEM5 and CIL-TEM6 were ranked respectively in positions 4, 5, 6, 7 and 8. Finally, CIL-TEM9 which proposes an overall evaluation method for virtual adult training was ranked in the last position.

# 9 Data Literacy

by UC3M



## 9.1 UC3M Source mapping for Data Literacy

Summary of Key findings of Task 1: Mapping of the state of research in Information Literacy and in Emerging Literacies: “Data Literacy (DL)” by the partner UC3M -Spain - <https://www.uc3m.es/Home>

### 9.1.1 “Data Literacy (DL)” Definitions

The following definitions concerning “Data Literacy -DataIL” emerged after an extensive and systematic review on the subject. In particular, the definitions below refer to the key issues of DataIL and have been selected to be evaluated by experts in the field. Moreover, DL definitions have been semantically analyzed and classified in the conceptual categories, as they are depicted in **Table 9.1** below.

**Table 9.1.** DL Definitions Conceptual Categories

Conceptual Categories	Meaning
<b>Strongly IL related</b>	The definition underlines the core information literacy skills, such as knowing when and what information is needed, where and how to obtain this information, how to critically assess and organize it and how to use it ethically
<b>Social Skills</b>	The definition stresses the core social skills relating them to Data literacy
<b>Strongly Technological Skills</b>	The definition stresses core technological skills but it also includes other concepts of Data Literacy
<b>Education related</b>	The definition relates education to information literacy and other DL concepts
<b>Mathematical or Statistics Skills related</b>	This definition stresses the mathematical or statistical skills needed

**Definition 1.** Data Literacy is the ability to understand and use data effectively to inform decisions [...] how to identify, collect, organize, analyze, summarize, and prioritize data [...] how to develop hypotheses, identify problems, interpret the data, and determine, plan, implement, and monitor courses of action (Mandinach & Gummer, 2013, p. 30). This requires awareness and ability to discover and acquire data properly, select and evaluate data critically, regulate and manage data normatively, use and share data reasonably.

**Definition 2.** The ability to ask and answer real-world questions from large and small data sets through an inquiry process, with consideration of ethical use of data. It is based on core practical and creative skills, with the ability to extend knowledge of specialist data handling skills according to goals. These include the abilities to select, clean, analyze, visualise, critique, and interpret data, as well as to communicate stories from data and to use data as part of [decision making]. (Wolff, Gooch, Montaner, Rashid & Kortuem, 2016).

**Definition 3.** Knowledge and ability to collect, process, manage, evaluate, and use data in scientific research. It emphasizes the ability to understand, use, and manage science data. It is a core component of science, students need to develop a full appreciation of the importance of data as scientific evidence and understand how to properly analyze and interpret it.

**Definition 4.** Data literacy is the ability to consume knowledge, produce coherently, and think critically about data (Bounegru, & Gray, 2021). In other words, is “the ability to understand and use data effectively to inform decisions composed of a specific skill set and knowledge base that enables educators to transform data into information and ultimately into actionable knowledge” (Mandinach and Honey, 2008).

**Definition 5.** Defining and articulating information needs, locate and access information, organize information, make ethical use of information, communicate information, use ICT skills for information processing. Data literacy it is the ability to consume for knowledge, produce coherently and think critically about data. Ultimately is the ability to engage in critical thinking to make useful deductions from data, make sense of abstractions, and put results of the analysis to use.

**Definition 6.** Ability to comprehend, analyze, and interpret data visualizations such as maps, graphs, and charts—should be considered a fundamental component of social studies education.

**Definition 7.** DL is the ability to ask and answer questions by collecting and making sense of the data encountered in daily life. Therefore, data literacy emphasizes the role of data collection and application in solving problems.

**Definition 8.** The ability to transform information into actionable instructional knowledge and practices by collecting, analyzing, and interpreting all types of data (assessment, school climate, behavioral, snapshot, longitudinal, moment-to-moment, and so on) to help determine instructional steps (Mandinach and Gummer, 2016).

**Definition 9.** The ability to transform information into actionable instructional knowledge and practices by collecting, analyzing, and interpreting all types of data (assessment, school climate, behavioral, snapshot, longitudinal, moment-to-moment, and so on) to help determine instructional steps. It combines an understanding of data with standards, disciplinary knowledge and practices, curricular knowledge, pedagogical content knowledge, and an understanding of how children learn (Mandinach, & Abrams, 2022).

**Definition 10.** Data literacy "as a type of awareness and curiosity that leads to developing competencies needed to grapple with the complex impacts of digital transformation on individual and cultural wellbeing" (Thumlert et al., 2022).

### 9.1.2 “Data Literacy (DL)” key concepts and content

The key elements and ideas that are most frequently repeated in the analysis of the scientific literature are summarized below:

1. Regarding the definitions of Data Literacy, although there is some consensus on its use, the dimension and scope vary.
2. It is often frequent to find the evolution of terminology in the analysed works and how Data Literacy has prevailed over other terms such as “Mathematical Literacy” or “Statistical Literacy”.
3. It is frequent to mention the classic definitions of D’Ignazio & Bhargava, (2015); Gummer & Mandinach (2015); Mandinach & Gummer (2013). Thus, the explanation of competences in data literacy is specified in a common way in the analysed bibliography, with widespread agreement in terms associated with the access, collection, analysis, filtering, preservation and dissemination of data for improving the decision-making process. Author’s reflections about new competences frequently come from works already considered classics such as that of Calzada y Marzal (Calzada & Marzal, 2013). Data Literacy’s new competences should cover not only those of a technical nature, but also aspects such as ethics, the reuse and interpretation of data and personal data management. Likewise, it is common to find transversal competences that emerge when dealing with data such as creativity, collaboration, communication in competency programs (Pratama et al., 2020)
4. The definition of Data Literacy is amplified with the inclusion of the critical perspective. The critical use of data acquires a new dimension, closely related to the new demands of the common framework of DigComp 2.1 Digital Competences (Carretero et al., 2017; Poce, 2019).
5. The authors consider the critical perspective necessary to be able to define more precisely the scope of Digital Literacy and its connection with the new demands of digital citizenship. Thus, the key concept of "Critical Data Literacy" or "Critical Big data literacy" arises, as a more conscious literacy of the treatment and search of data, especially in connection with its massive applications such as Big Data. The concept of "Critical Data Literacy" is frequent in literature. It is used to connect Data literacy from a more social perspective and links with the creation of a more informed citizenry. Throughout the selected bibliography we can see samples of its scope, its definition and inclusion in skills practices and programs (Carretero et al., 2017; Morales, 2019; Sander, 2020). In relation to this critical perspective, it is common to allude to the human impossibility of data management, closely related to the concept of infoxication, such as “datafication” (Pangrazio & Sefton-Green, 2020). Sometimes this problem is already linked to the Coronavirus pandemic and the need to educate citizens in data in the face of the amount of numerical information without context (Nguyen, 2021)
6. Since the word “education” and “curriculum” were included in the query, the main part of the contributions deals with the inclusion of Data literacy in training programs, from the teaching perspective and its design, but also from the competencies in teacher’s education. In this context, new voices emerge to classify the need to apply Data literacy in the educational framework, such as “Teaching analytics” that tries to unite the



teacher's experience with the “teacher's diagnostic pedagogical ability to use data and evidence to improve the quality of teaching” (Ndukwe & Daniel, 2020). Many authors try to define a framework for the application of Data Literacy in the training program for the trainers themselves (which is considered Data literacy for teachers), considered as a “continuum for data literacy for teachers or a Continuum of Data Literacy for Teaching”. (Beck & Nunnaley, 2020; Mandinach & Gummer, 2013). Thus, it is frequent that several works are oriented to “preservice teacher education” and to how to integrate Data literacy competencies into practical teacher training (Beck et al., 2020; Beck & Nunnaley, 2020; Whitesides & Beck, 2020)

7. Although some articles reflect and conceptualize Data Literacy limits and its new dimensions, the most frequent is to find, given the educative connection, studies that constitute practical case studies of examples of Data Literacy integration in the curriculum. It is generally oriented to university teaching, but we also find studies oriented to K-12 and the business environment (Henderson & Corry, 2020; Pothier & Condon, 2019). Regarding the university specialty, they are frequently linked to “Data Science” and the teaching of STEM, which is why case studies on their application in Engineering or Life Sciences are frequent (Giese et al., 2020)
8. In general, there are reflections on the difficulty of implementing these competence programs in Higher Education. Thus, several authors consider the challenge of integrating a more critical data literacy within the professional development of university professors (Raffaghelli & Stewart, 2020). Teaching and pedagogical perspectives are present in the analysed research since it is frequent to present case studies with interviews with students, questionnaires and other types of feedback that permit a better design of future Data Literacy strategies (Kennedy-Clark et al., 2020a).
9. Likewise, evaluation as a concept is present in several of the studies. Performance evaluation in Data Literacy is studied from two perspectives, from teachers and their training and from the competencies acquired by students (McDowall et al., 2020; Oguguo et al., 2020)
10. Data Literacy is not studied in isolation. Its connection with other literacies is frequent, not only associating it with more numerical competences such as Mathematics or Statistics, but also within multiliteracies. A clear link to Visual Literacy or Data Visualization is perceived (D'Ignazio & Bhargava, 2020; Kennedy -Clark et al., 2020b). There is also a connection towards the media application of data, through Media Literacy as a connection with Communication (Knaus, 2020; Van Audenhove et al., 2020)

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### 9.1.3 “Data Literacy (DataIL)” key learning objectives and outcomes integrated in distinct thematic units

#### 1-Introduction to Data Literacy (DL)

This Unit aims to introduce trainees, namely educators and librarians, to the main theoretical concepts of “Data Literacy”.

**This Unit learning objectives are:**

- to describe DL key definitions
- to identify DL key skills
- to relate DL key skills to various scientific subjects
- to reflect on DL current trends
- to estimate when and how technology must be used so that it is effective in achieving the intended goals
- to support new teaching methods which respond to the new pedagogical reality, in order to enhance their knowledge and experiences, narrow their weaknesses and achieve their learning goals in the technology age

**This Unit expected learning outcomes are that trainees will have learned to:**

- recognize DL in-depth definitions/concepts such as “Digital Literacy”, “Information”, “Information Literacy”, “Education”, “Training the Trainers”, “Digitalization”, “Technology”, “Digital Information Literacy”
- classify the skills and competences that derive from “Technical”, “Cognitive”, “Socio-emotional” concepts of Digital Literacy; they need to directly experience collaboration and inquiry to best support their own students
- relate DL key skills to various scientific subjects, clarify how they are using technology and why



- infer on DL current trends to use as a background and why this is important for successful and independent lifelong learners
- recognize the need to keep up with changes and dynamics that prominently relate to technology
- train the trainees how to encourage the individuals of the communities they serve to develop/create knowledge and skills in using new technologies in a responsible, ethical and safe use and dissemination of information for learning, work and everyday life societal participation to fulfil personal, social or commercial goals
- train the trainees on how to integrate DL concepts into their curriculum; provide guidance in applying the DIL framework into pre-existing coursework and provide examples of appropriate pedagogy

## **2- Understanding, Finding, and/or obtaining data**

This Unit aims to introduce trainees to look at data sources and their critical assessment, as well as research methods for data collection.

**This Unit learning objectives are:**

- Be able to distinguish between various types of research data
- Be able to identify different kinds of data (primary & secondary data); Spatial data
- Be able to classify data and records
- Be able to understand data sources

**This Unit expected learning outcomes are that trainees will have learned to:**

- To understand the importance of data as a source of research
- To identify different types of data and how to manage them
- Identify how to assess data sources and collection methods

## **3-Reading, interpreting, and evaluating data**

This Unit aims to understand how data are represented and the critical evaluation of data presentation and representation.

**This Unit learning objectives are:**

- Be able to understand data representation
- Be able to develop critical thinking regarding the use and the data presentation

**This Unit expected learning outcomes are that trainees will have learned to:**

- To understand how data is represented nowadays in different media
- To understand the misuse of Statistics & Data In The Digital Age

## **4-Managing data**

The Unit aims to understand the process of saving data with its necessary metadata to identify, manage, and access data. It Focuses on data handling, data synthesis and representation, and its ethical use.



**This Unit learning objectives are:**

- To be able to understand data management concepts, planning, and tools
- To be able to understand requirements regarding storage and security
- To be able to document the data for future users

**This Unit expected learning outcomes are that trainees will have learned to:**

- Know how to cover the data lifecycle in terms of management
- To develop a data management plan
- To understand the requirements of metadata for identifying data collections
- Understand open data movement and FAIR principles

### **5 -Data literacy connecting to multiliteracies (Visual Literacy)**

This Unit aims to connect multiliteracies pedagogies to the concept of data literacy

**This Unit learning objectives are:**

- To be able to understand different multiliteracies (New Media Literacy, Visual Literacy). Visual and Statistical Thinking
- To be able to understand the connection with Data Literacy

**This Unit expected learning outcomes are that trainees will have learned to:**

- Understand the visual application of Data literacy: visualization tools
- Understand the communicative application of Data Literacy: how is data represented in media?

### **6- Data Literacy in Science**

- This Unit aims to understand the importance of research data for Science

**This Unit learning objectives are:**

- Understand the concept of Data Science

**This Unit expected learning outcomes are that trainees will have learned to:**

- To gain insights from data
- To discover and explore patterns from data

### **7-Social perspectives in Data Literacy**

This Unit aims to understand the importance of social perspectives in the use of data and how to develop skills for becoming data literate in the current society

**This Unit learning objectives are:**

- Understand the concept of Critical Data Literacy
- Understand the social challenges behind the use and treatment of Data
- Promote Data Literacy for Social Justice

**This Unit expected learning outcomes are that trainees will have learned to:**

- To retrieve and use large-scale data for social purposes
- To understand the social perspective of Data beyond Datafication

## **8- Teaching approaches to DL in primary and secondary education**

**This Unit learning objectives are:**

- Encourage the interest of students in the importance of data in their daily life
- Connect data to students interests
- Connect data literacy to STEM capabilities in primary and secondary education
- Collaborate between librarians and faculty members for designing a curriculum on data literacy

**This Unit expected learning outcomes are that trainees will have learned to:**

- Design tools and products based on data where they can apply Critical thinking regarding the use of data
- Make informed decisions based on data

## **9-Teaching approaches to DL in tertiary education**

**This Unit learning objectives are:**

- Provide academics and students with DL awareness in higher education institutions
- Include DL in the curriculum
- Consider DL skills necessary for faculty members

**This Unit expected learning outcomes are that trainees will have to:**

- Create interactive learning resources based on DL
- Learn to transform data into insights for students' professional opportunities
- Provide learning activities (seminars, workshops) under the leadership of important institutions to increase the level of DL of faculty members
- Create digital repositories to share good practices and successful cases related to pedagogical approaches in DL

Key Teaching and Evaluation Methods is common for the six information related literacies of EDUCABILITY Program [see ***Annex 3 – Key Teaching and Evaluation Methods, common for the six information related literacies of EDUCABILITY Program***].

## **9.2 UC3M Delphi Study for Data Literacy**

This chapter refers to the detailed presentation of the results that emerged after the implementation of the DL survey using the Delphi method.

### 9.2.1 UC3M Delphi Study for Data Literacy - Definitions

The 15 experts, who completed the DL Delphi Study Questionnaire in Round 1, were asked to read 10 definitions concerning “Data Literacy-DL” and to rate them in order of importance, from 1 (least important) to 10 (most important). In particular, according to their point of view as experts, they were asked which of the definitions succeed to refer to the key issues of DL and should be definitely considered for a course aimed at educators and librarians.

DL definitions had been semantically analyzed and classified in the conceptual categories, as they are depicted in

#### Comments on the results of DL Round 1

According to the results of the Round 1 of DL Delphi study, it appears that 9 definitions were rated with an average of more than 5 out of 10, leading to the conclusion that their concepts are highly appreciated for inclusion in a curriculum aimed at educators and librarians.

The lowest scoring definition achieved 60 points. Coincidentally, it is related to newer aspects of the treatment of Data Literacy in the literature, i.e., those elements associated with citizenship literacy, disassociating itself from the traditional definition of Information Literacy.

This fact influences the point that the two most valued definitions have a strong presence of the concepts associated with Information Literacy in its most classical aspect (knowing where and how to obtain the data and how to critically evaluate them and use it ethically). Another classic meaning is the linking of Data Literacy to scientific data. This idea can be seen in the excellent assessment of definition 3, placing at number 3 in order of importance.

Other well-valued components are those associated with the educational environment and the technical requirements necessary for data literacy competencies, present in three and four definitions.

It can be said that, although the experts have given preference to the more classical definitions related to Information Literacy, they have also positively valued those that have combined them with others with a more social focus. This fact reinforces the idea of introducing these new approaches into the curriculum.

### 9.2.2 UC3M Delphi Study for Data Literacy - Key Concepts

The 15 experts, who completed the DL Delphi Study Questionnaire, were asked to read 9 key concepts concerning “Data Literacy-DL” for virtual adult training and rank them in order of importance, by putting the 1st as most important, reaching gradually the 9th as less important. In particular, according to their point of view as experts, they were asked which of the key concepts they would definitely include in a course aimed at educators and librarians, as core to DL skills and which of them as less closely-related to DL skills.

**Table 9.2. DL KC Ranking - Round 1**

Rank	Title	Mean Rank
1	<b>DL-KC1</b> Introduction to Data Literacy-DL	1.87
2	<b>DL-KC2</b> Understanding, Finding, and/or obtaining data.	2.47
3	<b>DL-KC3</b> Reading, interpreting, and evaluating data.	3.47
4	<b>DL-KC4</b> Managing data.	4.13
5	<b>DL-KC5</b> Data literacy connecting to multiliteracies ( Visual Literacy...)	5.2
6	<b>DL-KC6</b> Data Literacy in Science	6.53
7	<b>DL-KC7</b> Social perspectives in Data Literacy	6.33
8	<b>DL-KC8</b> Teaching approaches to DL in primary and secondary education	6.93
9	<b>DL-KC9</b> Teaching approaches to DL in tertiary education	8.07

### Comments on the results of DL Round 1

The results of the Delphi Study showed a great consensus among our experts. Kendall’s W was 0,611.

According to DL KC ranking above it is clear that there is a very high consensus in Key Concepts 1, 2 and 3. The KC1 was ranked as the first by the 87% of experts. This seems to be logical because it is the introductory module, the one that explains the basis of DL. The following key concept, according to the estimation of experts, is the KC 2, ranked by 60% of experts. Key concept 3 is ranked as third by 47%.

The three KCs below represent the following topics:

- DL-KC1 Introduction to Data Literacy-DL
- DL-KC2-Understanding, Finding, and/or obtaining data
- DL-KC3-Reading, interpreting, and evaluating data

The experts show that the categories in which there has been the highest consensus are the introductory ones, those that introduce the concept of data literacy, the role of data sources, and the ability to evaluate the obtained data.

### Conclusions on the results of DL Round 1

One of the main conclusions is that the experts have evaluated the KCs according to the principle of logical subordination, from more introductory to more specific. Therefore, the importance weighting follows the same order as the KCs presented.

Accordingly, KC 8 and 9 have lowest rankings. These modules focus on the importance of DL and its connection to education at different levels,

As for KCs 5, 6, and 7, a large dispersion of responses was observed.

These are those dedicated to:

- DL-KC5-Data literacy connecting to multiliteracies (Visual Literacy...)
- DL-KC6- Data Literacy in Science
- DL-KC7-Social perspectives in Data Literacy

It is noteworthy that these issues are related to the new redefinition of the discipline of Data Literacy. In this new approach, social skills and the connection to new multiliteracies are more considered.

The authors of this report believe that experts have given more importance to the concepts associated with a classical perspective of DL, influenced by the traditional concept of Information Literacy based on the selection, acquisition, and evaluation of information, in this case, data. Thus, in the first 3 KCs, there is a high level of consensus in terms of importance.

The structure proposed by the experts, therefore, seems clear. For them, it is essential to present core key issues vital to address the concept of DL and, subsequently, to broaden the focus to other perspectives and approaches. By keeping these thematic units at the beginning, trainees will be prepared to broaden their perspective about DL and apply them to all contexts in their daily lives.

### 9.2.3 UC3M Delphi Study for Data Literacy - Key Learning Objectives and Outcomes

The 15 experts, who completed the DL Delphi Study Questionnaire, were asked to read 9 sets of learning objectives and outcomes, incorporated into 9 proposed key concepts (KC) of “Data Literacy-DL”. Then, they had to rate each set of these learning objectives and outcomes in relation to their appropriateness, from Completely Agree (most appropriate) to Completely Disagree (least appropriate). In particular, according to their expertise, they were asked which of them they would evaluate as the most appropriate to be considered for the development of a virtual course aimed at educators and librarians.

**Table 9.3. DL Learning Objectives & Outcomes Rating**

Total Degree of Consensus (Completely Agree & Agree)	Sets of learning objectives and outcomes per KC	Detailed Rating			
		Completely Agree	Agree	Disagree	Completely Disagree
<b>1 (93.3%)</b>	KC3-Reading, interpreting, and evaluating data	Completely Agree	Agree	Disagree	Completely Disagree
		<b>73%</b>	20%	7%	
<b>1 (93.3%)</b>	KC4-Managing data	Completely Agree	Agree	Disagree	
		<b>80%</b>	13%	7%	
<b>1 (93.3%)</b>	KC5-Data literacy connecting to multiliteracies (Visual Literacy...)	Completely Agree	Agree	Disagree	
		<b>47%</b>	47%	7%	
<b>2 (86.7%)</b>		Completely Agree	Agree	Disagree	

Total Degree of Consensus (Completely Agree & Agree)	Sets of learning objectives and outcomes per KC	Detailed Rating			
	KC2-Understanding, Finding, and/or obtaining data	80%	7%	7%	7%
2 (86.7%)	KC6-Data Literacy in Science	Completely Agree	Agree	Disagree	
		40%	40%	0%	7%
2 (86.7%)	KC7-Social perspectives in Data Literacy	Completely Agree	Agree	Disagree	
		47%	40%	13%	
3 (80%)	KC8-Teaching approaches to DL in primary and secondary education	Completely Agree	Agree	Disagree	
		47%	33%	7%	13%
3 (80%)	KC9-Teaching approaches to DL in tertiary education	Completely Agree	Agree	Completely Disagree	
		60%	20%	13%	7%
4 (73,3%)	KC1-Introduction to Data Literacy (DL)	Completely Agree	Agree	Completely Disagree	
		60%	13%	13%	13%

The results show four different blocks depending on the level of compliance. The first, with four categories, has a 93.3% of the total Degree of Consensus (Completely Agree & Agree). The second has 86.7%, with 3 KCs represented. The third has 80% with two KCs. Finally, the last one has a percentage of 73%.

The three categories that reach a 93,3% consensus are KC3-Reading, interpreting, and evaluating data, KC4-Managing data, and KC5-Data literacy connecting to multiliteracies (Visual Literacy...)

Another 3 of the nine sets of DL learning objectives and outcomes reach a consensus of 86.7%. The names are KC2- Understanding, Finding, and/or obtaining data, KC6-Data Literacy in Science, and KC7-Social perspectives in Data Literacy.

Two of the nine sets of DL learning objectives and outcomes reach a consensus of 80%, being the following: KC8- Teaching approaches to DL in primary and secondary education, KC9- Teaching approaches to DL in tertiary education.

The last category ranked was KC1-Introduction to Data Literacy (DL), achieving a consensus of 73.3%.

An interesting outcome yields if we compare the ranking of DL key concepts in section 3.3.5.2 of this report, with the rating of consensus between experts on Data learning objectives and outcomes in section 3.3.5.3. This comparison is depicted in **Table 9.4** below.



**Table 9.4.** Comparison of DL Key Concepts with DL Learning Objectives & Outcomes integrated in Key Concepts

DL Key Concept			DL Learning Objectives & Outcomes integrated in Key Concepts – Round 1
Rank Position	Title	Mean Rank	Completely Agree & Agree %
1	<b>DL-KC1</b> Introduction to Data Literacy-DL	1.87	73.3%
2	<b>DL-KC2</b> Understanding, Finding, and/or obtaining data	2.47	86.7%
3	<b>DL-KC3</b> Reading, interpreting, and evaluating data	3.47	93.3%
4	<b>DL-KC4</b> Managing data	4.13	93.3%
5	<b>DL-KC5</b> Data literacy connecting to multiliteracies (Visual Literacy...)	5.2	93.3%
6	<b>DL-KC6</b> Data Literacy in Science	6.53	86.7%
7	<b>DL-KC7</b> Social perspectives in Data Literacy	6.33	86.7%
8	<b>DL-KC8</b> Teaching approaches to DL in primary and secondary education	6.93	80.0%
9	<b>DL-KC9</b> Teaching approaches to DL in tertiary education	8.07	80.0%

The most highly ranked KC, the number 1 did not achieve the highest consensus. This may be because, being an introductory module, experts have more knowledge or opinions on how it should be structured and the necessary learning objectives. This rich debate can be seen through the comments and suggestions that experts have left in this section. They constitute a guide to redefine these learning objectives and provide a qualitative and phenomenographic approach essential in this work. The experts' comments are listed below.

#### 9.2.4 UC3M Delphi Study for Data Literacy - Key Teaching and Evaluation Methods

The 15 experts, who completed the DL Delphi Study Questionnaire, were asked to read nine (9) teaching and evaluation approaches concerning “Data Literacy-DL” for virtual adult training, namely educators and librarians and to rank them in order of importance, by putting the 1st as most important and the last as the least important. In particular, according to their point of view as experts, they were asked which of them facilitate the development of Information Literacy Skills (e.g., searching, critically evaluating, ethically using and sharing information for a topic) and additionally facilitate critical thinking, cooperative learning and enhance the will to attend an asynchronous course in a virtual learning environment.

Results of the Delphi Study showed that the consensus among our experts is lower than in previous sections with a Kendal W of 0.47

**Table 9.5. DL Key Teaching and Evaluation Methods Ranking**

DL Key Teaching and Evaluation Methods Ranking –		
Rank	Title	Mean Rank
1	<b>DL-TEM3</b> In each DL Unit, trainees will be visually (video) presented with at least two or three distinct ways of searching for information on a specific DL topic, in the Internet, in a library catalog and in scientific data bases. Furthermore, a method will be displayed on how to evaluate retrieved information, in terms of relevance and validity. After this, trainees will be asked to perform their own searches for specific information regarding a DL question and to evaluate their results, in terms of relevance and validity. [Level of mastery: Understanding & Application via computer interactive learning – behaviorism approach –IL SKILL: Searching & Evaluating information for a topic]. Finally, trainees will submit the list of their retrieved and evaluated results to the DL VLE’s Course Forum for review and discussion. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILL: Social engagement].	1.87
2	<b>DL-TEM4</b> In each DL Unit, trainees will be asked to study their retrieved information and to write a properly cited short answer to a DL question. After this, they will be asked to submit their answer to the DL VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her answer and will submit one review to three other participants’ answers. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILLS: Analysis, Synthesis, Ethical use & Sharing of information for a topic, E-Social engagement].	3.8
3	<b>DL-TEM2</b> In each DL Unit, trainees will be asked to think of key words that will help them find useful information on how to answer a question. In order to help them think of the appropriate terms they will be given a list of pertinent key words and they will be asked to complete an e-crossword of broader, synonym, narrower terms, etc. [Level of mastery: Understanding via computer interactive learning – cognitivism approach –IL SKILL: Analysis of a topic].	4
4	<b>DL-TEM1</b> In each DL Unit, trainees will be asked to watch an introductory video. After this, they will be asked to submit a short answer to the DL VLE’s Course Forum, regarding a question, relevant to the introductory video. All trainees’ answers will be visible to every participant in the DL VLE’s Course Forum for review and discussion among them [Level of mastery: Understanding via peer learning – constructivism approach–IL SKILL: E-Social engagement].	4.13
5	<b>DL- TEM7</b> In each DL Unit, trainees will be asked to read at least one of the proposed references linked to the DL VLE’s Course and to write a summary that they will have to submit to the DL VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way, every trainee will receive three reviews for his/her abstract and will submit one review to three other participants’ abstracts. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILLS: Analysis, Synthesis, Ethical use & Sharing of information for a topic, E-Social engagement].	4.93
6	<b>DL-TEM8</b> Towards the end of each DL Unit, trainees will be asked to choose a DL topic of their preference. Then they will be asked to search for specific information regarding their topic, to read them and to evaluate them in terms of relevance and validity and to submit a short, properly cited essay or ppt to the DL VLE’s Course. Their essay or ppt will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her essay or ppt and will submit one review to three other participants’ essay or ppt. [Level of mastery: Knowledge and application via peer learning – constructivism approach–IL	5.13

DL Key Teaching and Evaluation Methods Ranking –		
Rank	Title	Mean Rank
	SKILLS: Searching, Evaluating, Analysis, Synthesis, Ethical use & Sharing of information for a topic, E-Social engagement].	
7	<b>DL-TEM6</b> In each DL Unit, trainees will be presented with a video- lecture. The video-lecture will be automatically paused every time a sub-topic will have been completed and a pop-up, true or false or three-four choice questions, will appear on the screen. Each trainee will have to answer it in order for the video-lecture to continue. After an answer has been completed the learner will get immediate feedback and the video-lecture will be allowed to continue. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic]	6.07
8	<b>DL-TEM5</b> In each DL Unit, after a short video-lecture, trainees will be asked to answer a reflection E-quiz. Automatic feedback will be given per answer. Each trainee will be able to take the reflection E-quiz as many times as he/she wishes. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic]	6.73
9	<b>DL-TEM9</b> Trainees who will have acquired a total of 60% or more to the various interactive sub-tasks of each DL Unit will be allowed to continue to the next DL Unit. If not, they will have to repeat it. Upon successful completion of the whole DL E-course (at least 60% or more) trainees will be able to download a certificate of attendance in DL for educators and librarians.	8.33

Results from this category shows that experts ranked the proposed teaching and evaluation method entitled DL-TEM3, as the most important. This approach relates closely to the development of two core Information Literacy skills, namely searching effectively for credible and reliable sources that respond to specific information needs and evaluating them critically. Moreover, experts seem to find very important for an asynchronous course in a virtual learning environment, the combination of the proposed teaching and evaluation methods, which derive from two learning theories, behaviorism and constructivism. In particular, behaviorism approach will allow understanding of a learning objective and application of the acquired knowledge related to this objective via computer interactive learning. Constructivism approach will prompt trainees to review and discuss their acquired knowledge with other peers, leading to an “indirect” evaluation of the specific learning outcome and enhancing the skill of online social engagement. Moreover, it gives fosters participation by sharing the results of the searches through the VLE forum, making learning collaborative.

The second most important proposed teaching and evaluation method is the one entitled DL-TEM4 which is related to the constructivist approach and particularly values collaboration and peer learning by placing the course forum as an important assessment element.

Next, the third most important proposed teaching and evaluation method is DL-TEM2. From a cognitivist learning perspective, the experts valued the importance of defining a discipline well through its keywords. Completing an element such as a crossword puzzle is valued to reinforce the concepts learned.

Teaching and evaluation methods entitled DL-TEM1, DL-TEM7 and DL-TEM8 were ranked respectively in positions 4, 5, 6. Finally, DL-TEM9 which proposes an overall evaluation method for virtual adult training was ranked in the last position.

# 10 Sustainable Development Literacy

by UNS



## 10.1 UNS Source mapping for Sustainable Development Literacy

Summary of Key findings of Task 1: Mapping of the state of research in Information Literacy and in Emerging Literacies: “Sustainable Development Literacy (SL)” by the partner UNS-Serbia - <https://www.uns.ac.rs/index.php/en/>

### 10.1.1 “Sustainable Development Literacy (SDL)” Definitions

The following definitions concerning “Sustainable Development Literacy (SDL)” emerged after an extensive and systematic review on the subject. In particular, the definitions below refer to the key issues of SL and have been selected to be evaluated by experts in the field. Moreover, SDL definitions have been semantically analyzed and classified in the conceptual categories, as they are depicted in **Table 10.1** below.

**Table 10.1.** *SDL Definitions Conceptual Categories*

Conceptual Categories	Meaning
<b>Ecology related issues</b>	The definition underlines the core information literacy skills, such as knowing when and what information is needed, where and how to obtain this information, how to critically assess and organize it and how to use it ethically
<b>Economy related issues</b>	The definition stresses the core information literacy skills but it also includes other concepts of sustainable development literacy
<b>Ethical issues</b>	The definition stresses the core safety and privacy skills when communicating and socializing digitally
<b>Educational aspect of SDL</b>	The definition stresses core skills to create content in a variety of forms, making use of language, images, sound, and mobile technologies, and construct new knowledge or digital sources

**Definition 1.** Sustainability is a concept, a goal, and a strategy needed for the reconciliation of social justice, ecological integrity and the wellbeing of all living systems on the planet. The goal is to create an ecologically and socially just world within the means of nature without compromising future generations. Sustainability refers to the process or strategy of moving towards a sustainable future.

**Definition 2.** Learning how to respond to erratic and extreme weather, learning how to grow and distribute food more equitably, and with less ecological damage, as well as learning how to mitigate and adapt to dramatic social, economic, and environmental changes will become some of the most important skills young people can acquire or develop.

**Definition 3.** One of the major mechanisms to enact lasting and impactful change toward achieving UN Sustainability Development Goals is educating future teachers in sustainability literacy. To do so, we should make a course for primary school teachers. The goal of the course should be to develop sustainability literacy among primary school teachers by providing engaging content-knowledge and enabling them to employ these concepts in their future classrooms. SDL education should begin at the earliest age. It is conducted through non-formal and formal education where universities have a key place. Education should give a new vision, skills and knowledge to future educators and their students. It is necessary to make clear what is “sustainability” and “sustainable development” in everyday life and in professional life.

**Definition 4.** We define sustainability literacy as having the understanding, skills, attitudes and attributes to take informed action for the benefit of oneself and others, now and into a long term future. This definition echoes the teaching of sustainable development but avoids rather focusing only on developing conceptual understanding or only focusing on disciplines of environmental science, and specifically aims to foster the ability of students in any discipline to take effective and appropriate action. This definition is arrived at by synthesizing various learning outcomes and characteristics.

**Definition 5.** Education for sustainable development includes formal, non-formal and informal learning, and currently there is a shift of emphasis from education to learning in education for sustainability. Consequently, sustainability learning is best understood as a multi-level concept that comprises individual learning as well as group, organizational, and societal learning. Such a multi-level definition, which furthermore strongly emphasizes the role of transdisciplinary learning.

**Definition 6.** Aside from learners acquiring skills and knowledge to comprehend sustainability issues, other social outcomes are also expected from education for sustainable development: it must prepare students and professionals not just to reflect about the current challenges, considering social, economic and environmental perspectives, but to make appropriate decisions and take action to address them, achieving its purpose by transforming the society. Sustainability education addresses the deepest structures of epistemology, ontology, cosmology, and ethics. At the macro level, this can drive global approaches to technology, professional practices, and policymaking. At the mezzo level, it can assist in the cultural transformation of educational institutions toward a relational paradigm of sustainability, thereby enabling capacities to address pressing global issues and assist in achieving the SDGs.

**Definition 7.** The basic premise of sustainable development is that human and natural systems are dynamically interdependent and cannot be considered in isolation to resolve critical issues.



Human societies and ecological systems are so interconnected that they are co-adaptive. Sustainability is the doctrine that economic growth and development must take place, and be maintained over time, within the limits set by ecology in the broadest sense – by the interrelations of human beings and their works, the biosphere and the physical and chemical laws that govern it. It follows that environmental protection and economic development are complementary rather than antagonistic processes. By embracing societal, environmental, economic, and cultural dimensions of sustainable development in a holistic and integrated manner, education for sustainable development enables all individuals to fully develop the knowledge, perspectives, values and skills necessary to take part in decisions to improve the quality of life both locally and globally on terms which are most relevant to their daily lives.

**Definition 8.** Sustainable development is concerned with the creation and the sustaining of the conditions for current and future generations of humans to live well on this planet. The notion of sustainable development says: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Hence, right from the beginning a multi-prong approach to the idea of a sustainable society was taken that went beyond concerns for only the destruction of the natural environment and included the concern for the meeting of the essential needs of all people and that those needs are met in a sustainable way in consideration of the needs of future generations, including concern for equitable access to, and distribution of, resources.

**Definition 9.** SDL is about the total project of human flourishing on a planet with finite resources and it requires changing our current processes, especially our processes of education which produce citizens who perpetuate unsustainable practices. Education for sustainable development should equip students with skills to take an active part in and contribute to the life of society, such as critical and creative thinking, communication, conflict management and problem-solving strategies, project assessment, being respectful of the Earth and life in all its diversity, being committed to promoting democracy in a society without exclusion and where peace prevails. SDL education intends to make the next generation good decision makers and critical thinkers who reflect on their values and the values embedded in the institutions in their surroundings, as well as on their and other people’s underlying assumptions (for example stereotypes on gender, minorities, migrants, etc.).

**Definition 10.** Sustainable development implies an understanding of highly connected and interdependent social, economic, environmental and political system; it is grounded within multi-organizational and stakeholder environments; it is framed within a web of administrative, statutory and legal requirements; and it is difficult to disentangle problem structures and their root causes, and to attribute outcomes to specific policy interventions. Evaluation and evidence-based practice are extremely challenging within such contexts. Local communities, both urban and rural, are the critical drivers for sustainable development. Stakeholders for SDL are communities, groups, scientists, students, NGOs, government’s employees, educators, institutions, local population. They should be able to recognize and to understand problems and to find sustainable solution, one or more than one.

### 10.1.2 “Sustainable Development Literacy (SDL)” key concepts and content

A key concept related to sustainable development literacy is the possibility to educate teachers, students and librarians to understand what SDL means and to become the agents of sustainable development literacy. Researchers have identified definitions from one of the bibliographic editions made by Leicht et al. (2018) who quote the definitions of Education for Sustainable Development – ESD from the documents made by UNESCO in 2014. This document states that ESD is holistic and transformational education and concerns learning content and outcomes, pedagogy and the learning environment. ESD aims to produce learning outcomes that include core competencies such as critical and systemic thinking, collaborative decision-making, and taking responsibility for present and future generations. In order to deliver such diverse and evolving issues, ESD uses innovative pedagogy, encouraging teaching and learning in an interactive, learner centred way that enables exploratory, action-oriented and transformative learning. Learners are enabled to think critically and systematically, they develop values and attitudes for a sustainable future. One of the key features of the future Global Action Programme on ESD is the concentration on five ‘priority action areas’: “1. Advancing policy, 2. Transforming learning and training environments, 3. Building capacities of educators and trainers, 4. Empowering and mobilizing youth, 5. Accelerating sustainable solutions at local level” (UNESCO, 2014, p. 15). Rieckmann et al. (2017) said that what ESD requires is a shift from teaching to learning. It asks for an action-oriented, transformative pedagogy, which supports self-directed learning, participation and collaboration, problem-orientation, inter- and transdisciplinarity and the linking of formal and informal learning. Cebrián et al. (2020) showed that ESD aims at developing competencies that empower individuals to reflect on their own actions, taking into account their current and future social, cultural, economic, and environmental impacts, from a local and a global perspective.

Shephard et al. (2015) states that it is necessary to decide: a) which learning outcomes are appropriate for education for sustainable development; b) how to include values, attitudes and behaviours into ESD; and c) how to change people’s attitudes and dispositions, and to achieve values and attitudes, skills and behaviour consistent with sustainable development. Cebrián et al. (2020) think that although economic well-being remains an important outcome of education for countries, communities, families and individuals, the ESD focus seems to be drifting away from economic competitiveness and towards global citizenship, social justice and sustainability.

Researchers found out that there are different concepts of sustainable development learning. R. Hansmann (2010) clarifies the concept of sustainability learning and specifically analyzes motivational aspects. He pointed out that the learning processes of individuals play a fundamental role, since individuals constitute and shape the larger social aggregates, but the learning processes on the level of social aggregates are also important since social systems embed and influence individuals. Therefore, sustainability learning needs to be: a) a multi-level concept, comprising individual learning as well as learning processes of human systems ranging from groups and organizations to human societies, and mankind as a whole; b) transdisciplinary and mutual learning between science and society which increase the capacity of mankind to manage human-environment systems in sustainable ways; c) learning based on systemic considerations, the two-fold role, in which motivations act as determinants and targeted outcomes of sustainability learning processes, is explained together with the outstanding role that cooperation, hence cooperative motivation, plays for sustainable development; d) multifaceted learning, which means that controversial discourses on what sustainability

ultimately means (for the scientific community, for a given cultural or political entity, organization, or individual person) are considered. In 2011 Tilbury stated that the development of specific courses and programs on sustainability, usually called a built-on approach, would only improve the sustainability literacy of a self-selected group who wish to follow a career in this field (2011, p. 24). Instead, a built-in approach is needed that integrates sustainability in existing study and research (Wals, 2013; Disterheft et al., 2013) summarized. By providing new platforms and approaches, sustainability science and ESD foster a more open dialog on visions and interpretations for sustainable development and the development of new mental models like interdisciplinarity, transdisciplinarity, critical thinking, system-thinking, anticipatory thinking etc.

The system of education for sustainable development is aimed at different educational goals. Nasibulina stated that some of those various goals are aimed: „at prevention of ecological catastrophe, provision of quality life and environmental well-being of the country and region, development of environmental infrastructure, preservation of human health, acculturation, environmental awareness, overcoming of the destructive consumerism, training of population in understanding of the necessity to save natural resources and pollution abatement“ (Nasibulina, 2015, p. 1079). It is, also, an instrument of forming civic society, civic responsibility and democratization of social relations; it creates conditions for access to ecological information and formation of NGO networks, contributes to the development of values promoting national interests of every country. The same author recognizes that ESD provides solution to general educational problems by „strengthening the status of education as a social institution, improvement of general quality of education through its systemacity, reiteration from the anthropocentric to the eco-centric paradigm, priority of moral values in upbringing, forming of strategic thinking skills, networking with the broad range of stakeholders, distancing from scientism and technocratism in education in the direction of culture-centric education; formation of genuine interest to learning, bonding of teachers and students and incentives for independent study; inclusion of interactive methods of teaching, modern approaches and educational technologies in education process, transition from a reproductive system of knowledge transfer to creative teaching methods; systematicity and multidisciplinary of education based on understanding of interdependence and comprehensiveness of problems of nature, society and economy, and, for example, preservation of further education institutions and quality improvement of teaching natural sciences“ (Nasibulina, 2015, p. 1079). It is necessary to make „synthesis of national traditions and world innovations, and apprehension of the positive experience of each country, that is, expansion of ESD beyond the limits of environmental education, its educational potential and a high status of informal education“ (Nasibulina, 2015, p. 1078).

It is possible to reach the education for sustainable development goals if we accept teaching models and pedagogical approaches different from traditional ones. Here are some of the most frequently mentioned teaching models in the SDL literature.

The main approach would be the holism and holistic approach to the SDL. Lambrechts et al. (2016) pointed out that the United Nations Decade of Education for Sustainable Development (DESD) lasted from 2005 until 2014 and that one of the results was recognition of the need for thorough integration of sustainability issues at all levels of education. It should be done via a holistic, inter- and transdisciplinary approach and with a clear focus on values (UNESCO, 2009).

Within higher education there should be extended debate in the competence-based education. Competences integrate knowledge, skills, values and attitudes (Baethge et al., 2006).

Holistic approach is a tool for assessing student teachers' competence development in education for sustainable development (ESD). These competencies, according to Brandt et al. (2019), should consist of: content knowledge (CK), pedagogical content knowledge (PCK) and the willingness to actively support and implement ESD. Also, Pauw et al. (2015) pointed out that the holism or a holistic approach includes multiple perspectives on content. ESD emphasizes the necessity to include all three dimensions (environmental, social, economic) and focus on their interrelationship, as well as interactions over time and space. Holistic approach and pluralism in education are suggested as essential to promote sustainable development.

Competence-based education is the next important characteristic of SDL education. It is a type of education that focuses on the clear definition of competences to be achieved and assessed during the education program, as Lambrechts et al. (2016) have shown. Although both educational innovations have their merits for universities they also seem to guide higher education in opposite directions. This pedagogy has been labelled pluralism, and is characterized by a striving to acknowledge and engage different perspectives, views and values when dealing with sustainable development issues. The authors have found out that competence-based education focuses on the ability of students to develop important knowledge, values, aptitudes, and attitudes necessary to address complex issues they will encounter in their future personal lives and professional careers. We should keep in mind that competence-based education is opposite to repetition or indoctrination.

In the review by Lozano et al. (2017) it is pointed out that the „competences are a way of describing desired educational outcomes (Bohlinger, 2008; Hager and Beckett, 1995; Hyland, 1993; Mulder et al., 2007; Sturmberg and Hinchy, 2010, as cited in Lozano et al., 2017, p. 3) , which „include cognitive, functional, ethical, and personal dimensions (Commission for European Communities, 2005, as cited in Lozano et al., 2017, p. 3), and also „link complex knowledge, skills, and attitudes“ (Wiek et al., 2011). They have presented a synthesis of twelve education for sustainable development competences. The ESD competences are: Systems thinking; Interdisciplinary work; Anticipatory thinking; Justice, responsibility and ethics; Critical thinking and analysis; Interpersonal relations and collaboration; Empathy and change of perspective; Communication and use of media; Strategic action; Personal involvement; Assessment and evaluation; and Tolerance for ambiguity and uncertainty (Lozano et al., 2017, pp. 4–5). Also, pedagogical approaches have been divided to: a) universal: broadly applicable pedagogies that have been used in many disciplines and contexts (case studies, interdisciplinary team teaching, lecturing, mind and concept maps, and project and/or problem-based learning); b) community and social justice: pedagogies developed specifically for use in addressing social justice and community-building (community service learning, jigsaw/interlinked teams, participatory action research); and c) Environmental Education: pedagogies emerging from environmental sciences and environmental education practices (eco-justice and community, place-based environmental education, supply chain/Life Cycle Analysis, and traditional ecological knowledge) (Lozano et al., 2017, pp. 6–7).

There are two different models for sustainability teaching: a) Curriculum, Sustainable Development, Competences, Teacher Training – CSCT Model and b) Learning for the future: The Competences in Education for Sustainable Development – ECE Model, according to F. Bertschy

et al. (2013). CSCT model distinguishes three superordinate dimensions of competence - overall competences: teaching/communicating; reflecting/visioning; networking which contain five competence domains: knowledge, systems-thinking, emotions, values and ethics, action. ECE model aims at people, groups and institutions with multiplier function regarding the implementation of sustainable development, and it particularly aims at educators of teachers, too. The four competence fields are compartmentalized according to the three target domains: a) Holistic approach: Networked, integral thinking, taking complexity into account; b) Envisioning change: Learning from the past, inspired acting in the present, taking into account visions and alternatives for the future, exploring new avenues and co-creating them; and c) Achieving transformation: Change in educators' attitudes and actions, implementing new goals and practicing new procedures, implementing reorientation and alignment of the educational system towards sustainability on all levels. Each of the target fields is allotted some briefly described competencies in the above-mentioned four fields learning to know, learning to do, learning to live and learning to be. Two functions of education in the context of sustainable development are of importance: education in the sense of conveying specific competencies for sustainable development on the one hand; the function of education as a means for the implementation of concrete goals of sustainable development on the other. The second function of education in the context of sustainable development is aimed only at educational institutions, which, besides a general educational mandate also have a vocational one.

Pauw et al. (2015) think that the concept of sustainability consciousness SC is a composite notion, unifying contents in environmental, social, and economic issues, as well as psychological constructs relating to knowledge, attitudes, and behaviors relating to such issues. From their point of view, holism or a holistic approach includes multiple perspectives on content. ESD emphasizes the necessity to include all three dimensions (environmental, social, economic) and focus on their interrelationship, as well as interactions over time and space (Gough, 2002; Summers & Childs, 2007). In the study it is shown that ESD focuses on the development of skills and action competence for sustainability (Mogensen & Schnack, 2020). This pedagogy has been labelled pluralism (Lijmbach et al., 2002; Rudsberg & Öhman, 2010), and is characterized by a striving to acknowledge and engage different perspectives, views and values when dealing with SD issues. As we can see from the study, Pauw et al. (2015) regard holism and pluralism in education essential to promote SD.

One of the themes that keeps appearing throughout the literature on SDL is identification of critical thinking and understanding with a sustainability orientation as an important component of sustainability literacy. Iris Bergmann (2012) wrote a book review of *The Handbook of Sustainability Literacy*, ed. By Poppy Villiers-Stuart and Arran Stibbe (available at the address: <http://arts.brighton.ac.uk/stibbe-handbook-of-sustainability>), and says: „It means here not only understanding the unsustainable paths and the structures and systems that support them, but also re-assessing and re-thinking them under a new paradigm to leverage different kinds of questions that lead to new solutions“ (Bergmann, 2012, p. 719).

Cebrián and Junyent cited Wals: „The use of certain types of pedagogies and teaching and learning approaches and strategies fosters the competencies or skills necessary to deal with sustainability, such as critical and creative thinking, problem-solving skills, action competence, collaboration and futures thinking, therefore creating empowered and globally-responsible citizens and professionals who can become active change agents“ (Wals, 2010 as cited in Cebrián & Junyent, 2015, p. 2771). In their previous article Cebrián and Junyent (2014) developed a



theoretical framework of the professional competencies in ESD and elaborated seven key components of SDL:

- Future/alternative scenarios visioning: understanding the different scenarios, possible futures, promoting work with different visions and scenarios for alternative and future changes.
- Contextualizing: taking into account the different dimensions of a problem or action, the spatial dimension (local-global) and the temporal dimension (past, present and future).
- Work and live with complexity: the ability to identify and connect the ecological, economic and social dimensions of problems. Generate the conditions for systems thinking in the school environment.
- Think critically: creating the conditions for critical thinking to question assumptions and to recognize and respect different trends and views in different situations.
- Decision-making, participation and acting for change: moving from awareness to action; sharing responsibilities and engaging in joint action. Clarify values: values clarification and strengthening behavior towards sustainability thinking, mutual respect and understanding of other values.
- Establish a dialogue between disciplines: developing teaching and learning approaches based on innovation and interdisciplinarity.
- Manage emotions and concerns: promoting reflection on one's own emotions and as a means to reach a deeper understanding of problems and situations.

As a tertiary business educator to local and international students from non-Western cultures and also from developing economies, Sidiropoulos (2014) has observed lower levels of environmental awareness and action in international students. Also, Elliott (2007) pointed out that it is necessary to develop new learning and teaching opportunities for students centred on the real world practices of sustainable development; to examine the quality of modules within the current curricula; and to develop a credited 'volunteering' module for students.

To be able to develop sustainability literacy the transformative approach or transformative learning is used in order to unleash its transformative potential. As Larsson and Holmberg (2018) pointed out that: „by incorporating a transformative approach, the learning environment could: provide guidance in uncertain environments, foster exploration of new possibilities rather than exploitation of old certainties (cf. March, 1991), include through elements of future state visioning (cf. Stewart, 1993), systems thinking (von Bertalanffy, 1968), and bridge the gap between present and future through processes of learning, leadership and creation (cf. Senge, 1990)“ (Larsson & Holmberg, 2018, p. 4412). Makrakis and Kostoulas-Makrakis (2012) stated that the transformative learning is „a shift of consciousness that alters: our way of being in the world (learning to be), our way for discovering others by discovering ourselves (learning to live together), our way of learning how to learn as well as acquiring, constructing, disseminating and managing knowledge (learning to know) and our way of putting knowledge into action (learning to do), as well as learning to transform“ (Makrakis & Kostoulas-Makrakis, 2012, p. 8). They said that, Masters degree programmes in the field of ESD show that the great majority: “a) focus on the environmental pillar of sustainable development, neglecting the other three pillars (social, cultural and economic); b) do not exploit the potential of ICTs in addressing sustainability issues, especially Web 2 technologies and use of open education resources (learning objects) available



in the Web; and c) employ techno-centric approaches, meaning that curriculum is developed by experts without the end-users' inputs" (Makrakis & Kostoulas-Makrakis, 2012, pp. 9–10).

Arjen Wals (2011) is also questioning the pedagogical approach used for environmental education and education for sustainable development. He says that a „whole range of forms of learning is emerging: transdisciplinary learning, transformative learning, anticipatory learning, collaborative learning and, indeed, social learning are just a few of those“ (Wals, 2011, p. 180). He states that „new forms of learning are entering the arena of EE and ESD such as ‘social learning’, learning by mirroring one’s own ideas, views, values and perspectives with those of others, and ‘transformative social learning’, which requires the integrative switching back and forth among a set of mindsets. Four areas of research in new learning methods are identified“ (Wals, 2011, p. 177).

Another very important aspect of SDL is the implementation of interdisciplinary education. Annan-Diab and Molinari (2017) say that „only by following an interdisciplinary approach, sustainable development education will be able to confront 'problems that cross traditional disciplines, involve multiple stakeholders, and occur on multiple scales' (Dale & Newman, 2005, p. 353), such as climate change, poverty and inequalities, acknowledging the interdependence between society and ecosystems“ (Annan-Diab & Molinari, 2017, p. 77). They also think that „the Six Principles of PRME (Purpose, Values, Method, Research, Partnerships and Dialogue) provide a framework for education institutions to embed sustainable development and ethics into the curriculum, within and across disciplines“ (Annan-Diab & Molinari, 2017, p. 77). In the paper, the cases of advancing PRME objectives programs at the University of Wisconsin-Madison and the University of Minnesota, both in the USA, the Royal Roads University, in Canada, e-learning project to train teachers and decision-makers in education for sustainable development, piloted at Bologna and Rimini campuses, in Italy, postgraduate program in Environmental Studies and Resource Management at The Energy and Resources Institute (TERI) University, in India, were analysed. The MBA course selected for this study is delivered in London and in Moscow and approximately 200 students enrol every year (80 students attending classes in the UK and 120 in Russia). We should always have in mind that „Even when education for sustainable development is provided through a combination of subjects, it can only be considered interdisciplinary when there is coordination and coherence across subjects“ (Summers et al., 2005 as cited in Annan-Diab & Molinari, 2017, p. 78).

In the study by Di Fabio and Rosen (2018) the psychology of sustainability and sustainable development is presented and they say that „it creates a new axis of psychological reflection on what is really sustainable for individuals in the environments, including the ecological environment. It considers a meaningful and sustainable construction, with coherence, direction, significance, and belonging (Di Fabio, 2017b as cited in Di Fabio & Rosen, 2018, p. 2). Some empirical results were discussed in the article, which „permit us to widen the perspective on the community environment, the global environment and the cross-cultural environment, focusing on strengths and resources and their use in a preventative perspective and as a bridge between the natural environment, the person, the group, the organization, the community and countries“ (Di Fabio, 2018; Di Fabio & Rosen, 2018, p. 3).

Howlett et al. (2016) in their study aim to argue that substantive changes are required in both curricula and pedagogical practice in higher education institutions to challenge dominant epistemologies and discourses and to unsettle current ways of thinking about, and acting in

relation to, the environment. Central to such a shift is the need for higher education curricula to be interdisciplinary and for pedagogical practices to work to build capacities in students for critical and reflective thinking. In this paper, a case study and the author's reflections is offered on a subject designed to promote capacities in students for critical and reflective thinking via an interdisciplinary approach. The paper uses data from student reflective essays and student course evaluations to make an argument for the success of this approach. The authors discovered that the genuine transformative learning can occur within a constructivist informed pedagogical approach to teaching for sustainability and the genuine transformation can occur in students' thinking processes (which the paper argues is critical for effective education in sustainability) with appropriately designed courses in higher education. As a result there will be more effective environmental actors and thinkers, who can critically engage with the complexity of environmental problems. The social implication is that there will be more effective and socially just higher education for sustainability.

The next question is how to educate the educators in the area of SDL. Results of the case study by Consorte-McCrea et al. (2018) indicate the importance of allowing academic staff the time and space to think and talk, so that engagement in sustainable development is possible. They also identify a need to re-frame sustainability to evoke positive emotions, capitalising on the things that can be achieved, rather than creating a sense of enormity that results in disempowerment. In the study by Mam et al. (2017) the key concepts are related to: (1) the demand of faculty members with the capacity for ESD, (2) faculty engagement in capacity building for ESD, and (3) developing faculty members' capacity for ESD could be one of the influential factors to help them find approaches to promoting the sustainable self concept in their disciplines. Also, in the paper by Somerville and Green (2012) the development of sustainability literate teachers has been identified as a key challenge for the implementation of education for sustainability in Australian schools (Skamp, 2010) and elsewhere (Nolet, 2009). This paper reports on the first year of a participatory action research project that investigates the learning of school teachers, teacher educators, school children and teacher education students, in relation to the integration of place-based sustainability education across the curriculum of a low SES primary school. The methods of data collection included digital visual and audio recorded observations and reflections by teacher educators; reflective observations, focus groups, and interviews with teachers and principals; and the collection of student artefacts from school and teacher education students. A number of different conceptual and theoretical lenses are brought to the analysis of this data including 'thinking through country'; sustainability literacies and new technologies; and contemporary theories of space, place and body. In this baseline paper, the overall findings are summarized under the categories of the participating groups: - teacher, teacher educator, school student, teacher education student, and the school/place/community nexus.

In the wake of colleges and universities being criticized for inadequately preparing their students for the grand challenges of the twenty-first-century, the New American University proposes to prepare future leaders to address these challenges and contribute to a more sustainable way of life. One of the major mechanisms to enact lasting and impactful change toward achieving this goal is educating future teachers in sustainability literacy. This chapter by Warren et al. (2014) describes a newly required hybrid course at Arizona State University titled Sustainability Science for Teachers. The course, launched in the K-8th grade teacher education program in fall 2012, imparts sustainability lessons in meaningful ways by integrating technology and digital

storytelling with in-class activities. The goal of the course is to develop sustainability literacy among preservice teachers by providing engaging content-knowledge and enabling them to employ these concepts in their future classrooms. Analyzing pre- and post-tests that capture preservice teachers' conceptual maps along with preservice teacher feedback provides data for an initial evaluation of this new course. This chapter examines the learning outcomes and lessons learned from creating and implementing a course focused on sustainability targeted to preservice teachers.

In their literature review, Stevenson et al. (2017) investigated how teacher education academics embed sustainability education in learning and teaching, using a systematic literature review of peer-reviewed journal articles. A taxonomy of four distinctive approaches was developed: (1) embedding sustainability education widely across curriculum areas, courses, and institutions; (2) through a dedicated core/compulsory subject; (3) through a component of a core/compulsory subject; and (4) through a dedicated elective subject. This paper investigates the differing rationales, theoretical frames and pedagogical approaches used and identifies the perceived challenges underpinning each of these approaches. The final section offers an analysis and discussion of the implications of our review findings for teacher education academics and researchers, and others in the broader academic community who are interested in change towards sustainability through education.

In the paper by Kioupi and Voulvoulis (2019) we can see that a new model of ESD must be developed. It will emphasize the capacity-building and empowerment of learners to reach their own decisions over behavioural change. The knowledge transfer and instructional form of teaching there will be no more. ESD learners need more participation, self-determination, autonomous thinking and knowledge creation. In this paper, sustainability is contextualised as a goal of education and a framework that connects the SDGs to educational learning outcomes is developed. As Warren et al. (2014) have shown the Sustainability Education Framework for Teachers (SEFT) intends to build a capacity for educators to be able to understand: (i) the broad, complex nature of sustainability, (ii) the problem-oriented, solution driven nature of sustainability, and (iii) how sustainability connects to them as both citizens and classroom teachers. SEFT embraces four ways of thinking: futures, values, systems, and strategies which are conceptualized as being bi-directional and interconnected. The framework aids in linking sustainability topics that are seemingly disparate to the novice teacher population by building upon knowledge, skills, and attitudes necessary for problem solving with respect to complex sustainability challenges. Imagined as a conceptual framework, it offers organizing principles for examining and considering sustainability problem/solution constellations in a coherent fashion. The framework provides the opportunity for self-reflection and independent enquiries by considering and learning through real world foci. Likewise, SEFT offers a logical framework for working in interpersonal, intragroup, and intergroup situations. The four lenses require considering critical inquiries related to: a) societal values, equity, and visions of the future; b) unpacking the status quo; and c) exploring and d) articulating pathways towards a sustainable tomorrow.

There is a group of papers dealing with a Problem Oriented Project Based Learning and Action Oriented Learning approach to SDL. In their study, Yasin and Rahman (2011) claim that education should be planned to serve the real life situation without compromising the societal and environmental values of future generations. This paper, also, discusses the framework of teaching and learning a course using Problem Oriented Project Based Learning (POPBL) in an

effort to promote ESD. Fabbri (2013) wanted to develop and test a model, based on literature and best practice that institutions of higher education could use to inform their work in sustainability science. This work used a case study, action research approach to test the developed model to determine if the expected outcomes were achieved. This work puts forth a new conceptual model suggesting that sustainability science is a field of research, learning, and community engagement and it offers a new applied model that demonstrates how society, through its institutions of higher education, can functionally and effectively integrate research, learning, and community to work in the field of sustainability science and foster sustainability in social-ecological systems. This study is potentially transformative in suggesting new ways that institutions of higher education can address the challenge of sustainability.

The article by Gatti et al. (2019) presents and evaluates a new teaching technique for ESD based on the so-called action learning approach. The learning model is a sustainability gamification. There were the pre-game and post-game surveys developed to evaluate the students' learning experience of a business game focused on sustainability (napuro). The results suggest that napuro affects attitudes toward sustainability and develops the students' critical-thinking skills. The study, also, highlights the central role of motivation and personal interests in influencing students' learning outcomes.

One of the important aspects of achieving SDG is through developing ecological literacy. Boehnert (2015) explains that sustainability educators developed the concept of ecological literacy to provide a basis for understanding environmental problems and developing new capacities and critical skills to respond effectively. This paper presents a theoretical introduction to ecological literacy for design education. It starts with a philosophical overview of why ecological literacy is necessary, including details of some of the planet's vital signs. The paper then describes six ecological principles (networks, nested systems, cycles, flows, development and dynamic balance) along with associated design concepts (resilience, epistemological awareness, a circular economy, energy literacy, emergence and the ecological footprint). The final section explains why critical ecological literacy is necessary to make the work of transforming unsustainable conditions and designing sustainable ways of living possible. The author says: „There will be no long-term future unless this goal becomes possible“ (Boehnert, 2015, p. 1).

Alongside the development of ecological literacy stands the concept of greening the universities. Winter et al. (2015) state that universities can be excellent examples of organisations working towards greater sustainability. Using university business, facilities and campus as teaching resources can help to raise the profile of sustainability issues and enhance student learning. The authors suggest that the teachers should “reflect critically with students on what sustainability issues the university is addressing and use campus facilities and operations as case studies, for example with respect to the university's stance on biodiversity, travel, and food” (Winter et al., 2015, p. 2). Hopkinson et al. (2008) suggest that campus buildings can be used to teach sustainability principles in design and operations and the Centre for Green Schools suggest how to do this in Architecture. There have also been a number of successful Green Dragon's Den competitions used to foster innovation and solutions in this field. Other examples include using university environmental performance data in the teaching of statistics or considering the procurement policies and practices of the institution as a case study for sustainable procurement in Business. There is also growing support for more joined up strategies to promote

and link campus sustainability issues and the curriculum through the concept of 'Living Laboratory'.

In the aforementioned study, D. Tilbury (2011) says that there is possibility to engage campus management for sustainability development literacy: "Schemes such as the ISO 14001 or Eco-campus have played a role in catalysing efforts in this area. These activities, mostly driven by estates directors and their teams rarely make an impact on students' formal learning opportunities. ...Examples of campus activities extending their influence on core university provision are rare" (Tilbury, 2011, p. 21). The author also states that funding sources are encouraging academics to go beyond their discipline boundaries and seek partnerships with colleagues who have similar interests but differing methodologies and/or perspectives. There has also been a push towards research that has impact in a social as well as in an academic sense and this trend is 'research as social change' (Schratz and Walker, 1995 as cited in Tilbury, 2011). HE institutions promote forms of research that are conscious and explicit about the power, politics and participatory relations underpinning research practice. Initial reports of sustainability in HE would suggest that the issues and solutions for progressing sustainability lie with universities and the sector itself, but the HE sector has learned that it must reach beyond the university walls to address sustainability within the communities of practice that they serve (Ryan et al., 2010; Mochizuki and Fadeeva, 2008; Lozano, 2007; Lotz-Sisitka, 2011). Also, since curriculum and pedagogy are at the core of HE experiences, they need to be transformed if universities and colleges are to make a meaningful contribution to sustainable development (UNECE, 2011 as cited in Tilbury 2011).

Riegerová (2011) wrote that although there are a lot of approaches in environmental education, it is significant that they have some common features and aims of environmental education. These common ideas might be the basic pillars for making individual concepts of environmental education. It is obvious that particular teachers create their own concepts of environmental education which are based on their knowledge of the issues, their own experience, opinions and attitudes. There is not one strict way that should be followed by teachers but it is up to them how they will work with the aims, features and content of the environmental education. Teachers should realise that the main goal of environmental education is not to command students and tell them what is wrong and right. Teachers should encourage them to make their own opinions and attitudes towards environmental issues.

There are few articles about interconnections of the SDL and learning process. In the doctoral thesis by D. L. Wilson (2012) the key concepts are connected with environmental literacy, transdisciplinarity and "deep learning". He concludes, citing Portney: "A close examination of the conceptual literature leads one to the conclusion that sustainability is complex and multi-dimensional (Portney, 2003, as cited in Wilson, 2012, p. 65) . Subsequently, any effort to educate the public about the concept of sustainability and more importantly the resolution of problems in the environmental, economic, and social domains must include instruction across these dimensions" (Wilson, 2012, pp. 65–66).

In his thesis E. E. Bowling (2011) acknowledged that three broad themes emerged as common values among the sustainability instructors: connectedness and relationships, community and place, and diversity and inclusiveness. Reflection was a tool utilized universally by instructors to personalize the learning process, cultivate understanding of connectedness and relationships, and incorporate feelings into the learning process. Competencies and skills related to



sustainability and those related to civic engagement were very similar; engagement in community is a sustainable practice.

Williams (2006) said that according to the experiences from Wales show that the education for sustainable development does not lend itself to management in the traditional, hierarchical, organizational sense. There has to be a focus on relationships, interdependencies and interconnections between all the different organizations and individuals at work on the agenda; new decision-making structures have to be designed, bringing in professionals and communities, organizations and citizens, and based on effective partnerships and networks.

The study by Diamond and Irwin (2013) will be of value to academic staff and educational developers looking to develop practice in embedding student sustainable literacy (SSL) in teaching and learning, but also to harness the potential of e-learning. In the book chapter by Cotton and Winter (2010), the authors presented several pedagogical models of sustainable pedagogy: role-plays and simulations, group discussions, stimulus activities, case studies, critical readings and writing, field work. Moving forward from teaching information literacy to educating sustainability literacy that touches any and every circumstances of life seems to be the libraries' meaningful contribution to help achieve the Agenda 2030 goals, explained Hauke (2017).

A question of course design for SDL teaching is also very important. Cassidy et al. (2015) as authors of the case study said: „While there is growing interest by post-secondary educators in bringing aspects of sustainability into courses and programs, very few training opportunities exist. We designed and led a two and a half day Sustainability Education Intensive (SEI) in 2009 and 2010 at the University of British Columbia as a pilot project. This paper focuses on three activities that were part of our SEI – ‘sustainability literacy’, ‘sustainability artifact’ and ‘give one, get one’ that we have presented at conferences. We also provide a brief overview of the workshop, along with steps and templates to allow people to use or adapt them at their own institution“ (Cassidy et al., 2015, p. 1). Bacon et al. (2011) have shown, „in responses to dynamic interest emerging from university students and society, scholars from Environmental Studies, Engineering, Sociology, Education and Politics Departments united to create the curriculum. New courses and labs were designed and pre-existing courses were ‘radically retrofitted’ and more tightly integrated through co-instruction and content. The co-authors discuss the background and collaborative processes that led to the emergence of this curriculum and describe the pedagogy and results associated with the student projects. [...] This paper shows the development process, design and content of an interdisciplinary sustainability curriculum that integrates engineering with the social and ecological sciences while enlivening campus-community relationships through student projects. Several replicable practices include the contents and integration of topical classes, the strategies to overcome the obstacles for developing interdisciplinary student teams engaged in problem-based learning and approaches to negotiate institutional hurdles“ (Bacon et al., 2011, p. 193).

Fisher and McAdams (2015) examined data „from the 2011 Sustainability Survey, which yielded a sample of 552 students at a medium-sized university in the southeastern USA. A series of four linear regression models estimate the impact of academic coursework on students' conceptualizations of sustainability (ecosystems/nature, eco-efficiency, community/ well-being and systemic change/innovation). [...] The results indicate that the type of course that students take significantly impacts the way in which students conceptualize SDL term; the number of



courses taken has no statistically significant impact. This suggests that mere exposure to a particular theme in a class, rather than continued exposure to courses related to sustainability, is more important in shaping students' perceptions" (Fisher & McAdams, 2015, p. 407). According to the studies by Décamps and his associates (Décamps & Wersun, 2018; Décamps et al., 2017) there is a tool for helping students to learn more on SDL called Sustainability Literacy Test - Sulitest. The 5th UK and Ireland PRME Regional Chapter Conference was organized by the School of Business and Management, Queen Mary University of London in 2018. The Sulitest Workshop on 'The Sustainability Literacy Test: A UN-sponsored online tool to develop core knowledge and student learning for sustainable development' was held on June 26th. The Conference participants were given the chance to sample Sulitest via the "Discovery Module". Décamps et al. (2017) pointed out that the Sulitest makes it possible to integrate sustainability into higher education and enables higher education institutions to assess if they are producing graduates that are sustainability literate. The usage of the Sulitest „provides a large dataset to draw a snapshot in the measurement of Sustainability Literacy and to monitor progress over time“ (Décamps et al., 2017, p. 138).

There are also studies pointing out more specific courses for achieving SDL connected with life-long learning issues. In the case study presented by Dolores et al. (2017) the key concept was to observe one focus group of five persons and to discuss with them several questions connected with sustainability development. The study deals with the education of the senior persons. Azeiteiro et al. (2015) show that the Education for Sustainable Development (ESD) seeks to promote and improve the quality of life-long education which is directed to the acquirement of knowledge, skills and values for sustainability, and reorienting the academic curricula (rethinking, integrating, reforming, and greening education towards sustainability), thereby raising public awareness through a better understanding of the concept of Sustainable Development (SD).

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### 10.1.3 “Sustainable Development Literacy (SDL)” key learning objectives and outcomes integrated in distinct thematic units

#### 1. Introduction to Sustainable Development Literacy (SDL)

**This Unit learning objectives are:**

- introducing the main theoretical concepts and the practical outcomes of SDL in connection with achieving the UN SDGs;
- to reduce inequality in access and attainment of education;
- to motivate others to educate themselves;
- to recognize one’s own needs for education.

**This Unit expected learning outcomes is that trainees will:**

- understand the connection of SDL and achieving the UN SDGs;
- become aware of inequality in access to and attainment of education, particularly between girls and boys and in rural areas, and about reasons for a lack of equitable access to quality education and lifelong learning opportunities;
- be able through participatory methods to motivate and empower others to demand and use educational opportunities;
- recognize the intrinsic value of education and analyze and identify their own learning needs in their personal development.

#### 2. Interdisciplinary approach to the SDL teaching and learning in specific age groups (Indicator: CORE)

**This Unit learning objectives are:**

- introduction of an interdisciplinary approach to the SDL teaching and learning in specific age groups;
- to speak up against all forms of age discrimination and debate the benefits of full empowerment of all age groups;
- to advocate for the LLL possibilities;
- to introduce different forms of education (formal, nonformal, informal) for achieving SDL.

**This Unit expected learning outcomes is that trainees will:**

- become familiar with an interdisciplinary approach to the SDL teaching and learning in specific age groups;
- become the agents of annihilation the age discrimination;
- understand the important role of education and lifelong learning opportunities for all;
- accept the formal, nonformal, and informal learning as the main drivers of sustainable development and in achieving the UN SDGs.

### **3. Teaching connection between environment, society, and economy**

**This Unit learning objectives are:**

- teaching connection between environment, society, and economy;
- explaining basic physical, social, and psychological human needs and identifying how these needs are currently addressed in their own physical urban/rural settlements;
- addressing basics of sustainable planning and building;
- teaching how to decouple economic growth from natural hazards and natural degradation.

**This Unit expected learning outcomes is that trainees will:**

- understand the connection between environment, society, and economy
- become agents of change towards sustainability since they realize how innovation, entrepreneurship, and new job creation can contribute to decent work and a sustainability-driven economy in their own community;
- support the sustainable planning and building;
- be able to understand the principles of decoupling of economic growth from the impacts of natural hazards and environmental degradation.

### **4. SDL as the tool for critical thinking and empowering students with sustainability competences**

**This Unit learning objectives are:**

- introducing SDL as the tool for critical thinking;
- empowering students with sustainability competencies like Systems thinking; Anticipatory thinking; Normative thinking; Strategic thinking; Collaboration thinking; Self-awareness; Integrated problem-solving.
- explaining how to identify a problem, organize and express ideas, synthesize information from more than one source;
- show the trainees how to critically assess issues of peace, justice, inclusion, and strong institutions in their region, nationally and globally;
- teaching how to recognize and reflect on one's own personal demands on the local infrastructure such as carbon and water footprints and food miles.

**This Unit expected learning outcomes is that trainees will:**

- recognize SDL as the tool for critical thinking;
- from more than one source;
- critically assess issues of peace, justice, inclusion, and strong institutions in their region, nationally and globally;
- recognize and reflect on their own personal demands on the local infrastructure such as carbon and water footprints and food miles;
- become self-aware and realize that they themselves are the agents of change;
- learn the integrated way of problem-solving.



## **5. Filling the gap between social groups and reducing inequalities to foster equitable social development and inclusion**

**This Unit learning objectives are:**

- teach the students about the indicators that measure and describe inequalities;
- show the local, national, and global processes that both promote and hinder equality;
- teach the ways of filling the gap between social groups;
- raise the awareness of and reducing the inequalities;
- negotiate the rights of different groups based on shared values and ethical principles;
- fostering equitable social development;
- inclusion of minority groups.

**This Unit expected learning outcomes is that trainees will:**

- be able to recognize the inequalities in their surroundings as well as in the wider world and is able to recognize the problematic consequences;
- know to recognize the local, national, and global processes that both promote and hinder equality;
- be ready to become agents of filling the gap between social groups;
- become aware of inequalities and recognize the need of reducing the inequalities;
- be ready to negotiate the rights of different groups based on shared values and ethical principles;
- change the attitude from passive to active in fostering equitable social development;
- be able to plan, implement and evaluate strategies to include minority groups in their working space, schools, etc.

## **6. SDL and promoting the integrated and sustainable management of natural resources and ecosystems**

**This Unit learning objectives are:**

- promoting the integrated management of natural resources;
- keep the sustainable development of ecosystems;
- explain the production and consumption patterns and value chains and the interrelatedness of production and consumption;
- teaching the strategies and practices of sustainable production and consumption;
- promote different lifestyles;
- explain differences between needs and wants and reflect on the students own individual consumer behavior in light of the needs of the natural world, other people, cultures and countries, and future generations;
- teach how to evaluate, participate in, and influence decision-making processes about acquisitions in the public sector.

**This Unit expected learning outcomes is that trainees will:**

- understand the need for integrated management of natural resources;

- become the advocates for keeping the sustainable development of ecosystems;
- be able to understand the production and consumption patterns and value chains and the interrelatedness of production and consumption;
- accept the strategies and practices of sustainable production and consumption;
- become promoters of different lifestyles;
- be able to differentiate between needs and wants and to reflect on their own individual consumer behavior in light of the needs of the natural world, other people, cultures and countries, and future generations;
- be able to evaluate, participate in, and influence decision-making processes about acquisitions in the public sector.

## **7. Ethical approach to complex problems and ambivalent situations**

**This Unit learning objectives are:**

- enabling the ethical approach to complex problems and ambivalent situations;
- learning how to respect other people’s opinions, emotions, cultural values, ways of living, political attitudes, etc.;
- teaching the trainees to act ethically, i. e. to do in any situation whatever will produce the best outcomes taking into consideration the interests of all concerned parties;
- discuss what kind of people or organizations we want to be, and what kind of ethical examples we ought to follow;
- teach a complex set of interrelated perspectives that emphasize interpersonal concerns (caring, interdependence, etc.), and the ethical requirements of particular relationships.

**This Unit expected learning outcomes is that trainees will:**

- accept the attitude which enables the ethical approach to complex problems and ambivalent situations;
- know how to respect other people’s opinions, emotions, cultural values, ways of living, political attitudes, etc.;
- be able to act ethically, i. e. to do in any situation whatever will produce the best outcomes taking into consideration the interests of all concerned parties;
- recognize what kind of people they want to be or in what kind of organization to work in, and what kind of ethical examples they ought to follow;
- become aware of a complex set of interrelated perspectives that emphasize interpersonal concerns (caring, interdependence, etc.), and the ethical requirements of a particular relation.

## **8. Transformative learning for changing unsustainable to sustainable patterns**

**This Unit learning objectives are:**

- Introducing transformative pedagogy as the key driver for delivering SDGs in the classroom;
- to combine the elements of constructivist and critical pedagogy;
- to empower students to examine critically their beliefs, values, and knowledge;

- to develop a reflective knowledge base;
- to acquire an appreciation for multiple perspectives;
- to develop a sense of critical consciousness and agency.

**This Unit expected learning outcomes is that trainees will:**

- be able to use transformative pedagogy as the key driver for achieving SDGs;
- be ready to combine the elements of constructivist and critical pedagogy in their classrooms;
- be eager to examine critically their beliefs, values, and knowledge in order to change them if necessary, develop a sense of self-examination and redefinition of oneself;
- develop a reflective knowledge base and learn how to use it;
- acquire an appreciation for multiple perspectives;
- have a developed sense of critical consciousness, social critique, social advocacy, and agency.

## **9. Responsibility for the decision-making and behavior**

**This Unit learning objectives are:**

- to explain the responsibility of each person for their own decision-making and behavior;
- the promotion of the development of productive and socially responsible individuals;
- teaching trainees to become agents of change in local decision-making, speaking up against injustice;
- explaining how to evaluate, participate in and influence decision-making related to management strategies of local, national, and international enterprises concerning poverty generation and eradication;
- how to participate in decision-making related to public policies concerning the combat against hunger and malnutrition and the promotion of sustainable agriculture, gender issues, well-being, climate change, etc.

**This Unit expected learning outcomes is that trainees will:**

- accept responsibility for the decision-making and behavior;
- become productive and socially responsible individuals;
- know how to evaluate, participate in, and influence decision-making related to management strategies of local, national, and international enterprises concerning poverty generation and eradication;
- know how to participate in decision-making related to public policies concerning the combat against hunger and malnutrition and the promotion of sustainable agriculture, gender issues, well-being, climate change, etc.

## **10. SDL and raising basic standards of living and enhancing economic growth in order to eradicate poverty**

**This Unit learning objectives are:**

- promotion of well-being for all at all ages;

- explaining the best ways of raising basic standards of living;
- showing the socio-political-economic dimensions of health and well-being;
- to explain the relationship between employment and economic growth, and know about other moderating factors like a growing labor force or new technologies that substitute jobs;
- teaching the relevant prevention strategies to foster positive physical and mental health and well-being;
- to teach how the SDL helps to end poverty in all its forms everywhere;
- teaching how to advocate prevention strategies and to promote health and well-being.

**This Unit expected learning outcomes is that trainees will:**

- know how to promote well-being for all at all ages;
- recognize the best ways of raising basic standards of living and act accordingly;
- know the socio-political-economic dimensions of health and well-being;
- know the relation between employment and economic growth, and knows about other moderating factors like a growing labor force or new technologies that substitute jobs;
- accept the relevant prevention strategies to foster positive physical and mental health and well-being and is able to plan, implement, evaluate and replicate those strategies;
- learn how the SDL helps to end poverty in all its forms everywhere;
- learn not only to advocate prevention strategies and to promote health and well-being but also to perceive when others need help and to seek help for themselves and others.

Key Teaching and Evaluation Methods is common for the six information related literacies of EDUCABILITY Program [see *Annex 3 – Key Teaching and Evaluation Methods, common for the six information related literacies of EDUCABILITY Program*].

## 10.2 UNS Delphi Study for Sustainable Development Literacy

This chapter refers to the detailed presentation of the results that emerged after the implementation of the SDL survey using the Delphi method.

### 10.2.1 UNS Delphi Study for Sustainable Development Literacy - Definitions

#### Comments on the results of SDL Round 1 & 2

The results of the Round 1 showed rather low agreement among our experts when they had to decide which definition of the SDL is the best of all. Kendall's W was 0.141 ( $\chi^2=16.48$ ,  $df=9$ ,  $p=0.06$ ) in the Round 1. After the Round 2, agreement among our experts has significantly increased. Kendall's W was 0.34 ( $\chi^2=39.32$ ,  $df=9$ ,  $p<0.01$ ) in the Round 2. However, due to the large variability of the experts' responses, we have opted to use the average, the mode and the percentage of answers in each category when interpreting results.

Definitions under the numbers 1 and 7 were graded highly both in the Round 1 and Round 2 and hence we will focus on them in our further activities. After the Round 2 definitions under numbers 3, 6, 8 and 9 were also recognized as useful and relevant by our experts since they have received almost 70% of grades 1-4. On the other hand, definitions number 2 and 4 were assessed

as less relevant by our experts. Although semantical analysis shows that the definition no. 1 is more focused on ecological and ethical aspects, and the no. 7 is about ecological, economic and educational aspects, but they are recognized to be important by our experts. Definitions no. 3, 6 and 9 are mostly dealing with skills which should be acquired through our future SDL course and the definition no. 8 is about the ethical issues only. The definitions no. 2 and 4 are about more than one aspect of the SDL, so they could not be recognized as coherent definitions, so they were graded with lower marks.

We have encountered a problem that some definitions were graded by some of our experts with the highest grade, but the others have graded it with the lowest grade. For example, no. 10 is graded by 6 of our experts with the grade 1, but the others have graded it as less important with the 2 experts who graded it with grade 10. Therefore, we have no consensus on this definition (it is only 49%).

### **Conclusions on the results of SDL Round 1 & 2**

We can conclude that the definition no. 4 is the most agreed upon with the median rate of 5 by 11 out of 13 experts. However, the grade 5 indicates that the definition is not of particular importance. Definition no. 2 has grade 9 as a dominant value, and it is estimated as the least important with very high consensus from the experts. Definition no. 5 has rather atypical bimodal distribution of answers, probably due to the fact that these definitions are focused almost exclusively on the educational aspect of sustainability issues. On the other hand, the rest of definitions mostly cover more than one aspect of sustainability literacy, and hence they were generally graded as more relevant, having the most grades in the range between 1 and 3. These include definitions no. 1, 3, and 6-10.

In general, the team of experts didn't show very high level of consensus on the importance of definitions. However, the fact that the most definitions are consistently graded very high, offers us a solid ground to define the future core of sustainability literacy issues that should be covered within curricula. These definitions cover both educational, but also ethical, environmental, economical and other aspects of sustainable development.

## **10.2.2 UNS Delphi Study for Sustainable Development Literacy - Key Concepts**

### **Comments on the results of SDL Round 1 & 2**

Similar to the explanation about the Definitions of the SDL in the Section 1, the results of the Delphi Study showed that the consensus among our experts has increased after the second round. Kendall's W was 0.21 ( $\chi^2=24.46$ ,  $df=9$ ,  $p<0.01$ ) in the first round. Kendall's W was 0.38 ( $\chi^2=44.21$ ,  $df=9$ ,  $p<0.01$ ) in the round 2.

The highest rank by percentage was given to the KC1, KC2, KC4, both in the first round and the second round. In general, the consensus that was already achieved among experts in the first round was further strengthened in the round 2. The following charts show the distributions of rankings for each of ten key concepts. Upper bar shows the proportion of rankings in the first round, while the bottom bar shows the rankings given in the second round.

## Conclusions about the results of SDL Round 1 & 2

The results indicate very high consensus among experts that the key concept 1 should be covered at the very beginning of the future course. It was ranked as the first by 69% of experts. The following key concept, according to the estimation of experts, should be the key concept 4 as it was ranked second also by 69% of our experts. Key concept no. 3 is ranked as third by 62% of experts. On the other side of the scale, key concepts number 6 and 10 have lowest rankings, with ranks lower than 8 given by 54% and 46% of experts respectfully. It may be concluded that the most relevant issues that should be covered in introductory lessons are definitions of sustainable development, modes of critical thinking about human impact on environment, and connections among environment, society, and economy. On the other hand, the rankings of key concepts related to the management of natural resources and challenging poverty problems indicate that these concepts should be elaborated in later phases of the sustainability literacy course. Key concepts 7 and 9 have most disperse distribution of rankings which, in our opinion, indicates that these issues are of general importance and should be tackled within practically all other lessons as they concern with the issues of responsibility and ethics. Finally, key concepts number 2, 5, and 8 have the largest proportions of medium ranks. This may be attributed to the experts' perception that, after the initial introduction, and teaching basic concepts of sustainable development, lessons to follow should focus more on interdisciplinarity aspect of sustainability literacy and transformative learning. In this way, students will broaden their perspective and be more prepared to elaborate topics covered later in the course using the more transdisciplinary approach.

### 10.2.3 UNS Delphi Study for Sustainable Development Literacy - Key Learning Objectives and Outcomes

The results of both rounds show that a high percentage of experts agreed with proposed learning objectives and outcomes for each key concept, so their most common answers were Agree and Completely Agree. No expert answered with Complete disagree.

**Table 10.2.** *KC1 - Introduction to Sustainable Development Literacy (SDL)*

KC1	Completely Agree	Agree	Disagree	Completely Disagree
Round 1	38%	62%	0%	0%
Round 2	8%	92%	0%	0%
Comments	Round 1: A well-rounded theoretical/conceptual basis is a necessary requirement in this context.			

**Table 10.3.** *KC2 - Interdisciplinary approach to the SDL teaching and learning in specific age groups*

KC2	Completely Agree	Agree	Disagree	Completely Disagree
Round 1	38%	38%	23%	0%
Round 2	38%	46%	15%	0%



<b>Comments</b>	<b>Round 1:</b> The most valuable element here is the accent on formal, nonformal and informal education. Interdisciplinary approach to issues as such is unavoidable at this point of our civilization.
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**Table 10.4. KC3 - Teaching connection between environment, society, and economy**

KC3	Completely Agree	Agree	Disagree	Completely Disagree
Round 1	62%	38%	0%	0%
Round 2	85%	15%	0%	0%

**Comments** -

**Table 10.5. KC4 - SDL as the tool for critical thinking and empowering students with sustainability competences**

KC4	Completely Agree	Agree	Disagree	Completely Disagree
Round 1	69%	31%	0%	0%
Round 2	100%	0%	0%	0%

**Comments** **Round 1:**

1. To teach students what is a thought and what is a fact; how to reinforce the claim by proof; how the facts are being manipulated and in which interest etc. Show some methods for the development of critical thinking (six hats, debates, discussions, maps of intelligence, problem tree).
2. I maintain that critical thinking is the most crucial concept in SDL. It's applications are very open-ended so it can prove useful even beyond the scope of this topic. Most importantly, critical thinking competences are very empowering - in a complicated world where individual action may seem insignificant in the grand scheme of things, critical thinking helps put things into perspective. People are more likely to avoid passive resignation and adopt a proactive attitude.

**Table 10.6. KC5 - Filling the gap between social groups and reducing inequalities to foster equitable social development and inclusion**

KC5	Completely Agree	Agree	Disagree	Completely Disagree
Round 1	54%	31%	15%	0%
Round 2	85%	15%	0%	0%

**Comments** **Round 1:** Given that income inequality is a growing issue around the world, it seems pertinent to underline that specific problems of sustainability exist in areas other than environment and ecology.

**Table 10.7. KC6 - SDL and promoting the integrated and sustainable management of natural resources and ecosystems**

KC6	Completely Agree	Agree	Disagree	Completely Disagree
Round 1	54%	46%	0%	0%
Round 2	77%	23%	0%	0%
Comments	-			

**Table 10.8. KC7 - Ethical approach to complex problems and ambivalent situations**

KC7	Completely Agree	Agree	Disagree	Completely Disagree
Round 1	46%	38%	8%	8%
Round 2	77%	15%	8%	0%

**Comments**

**Round 1:**

1. Možda i najvažniji deo ako se tiče primene i primera kao i realnih, postojećih ljudskih dilema i ideja i upitanosti kako su one rešene. Što se tiče scenarija za nastavni čas predstavlja najizazovnije područje jer se mogu povezati problemi koji su u okolini učenika i mogu se prilagoditi različitim uzrastima učenika. (Translation: Perhaps the most important part when it comes to the application of examples as well as real, existing human dilemmas and ideas and questions about how they are solved. Concerning the lesson scenario, this is the most challenging area because it can connect the problems in the student's environment and can be adapted to different ages of students.)

2. My opinion of any kind of applied ethics course is very low. One's ethical convictions are a deeply personal issue and are a systemic product of upbringing, so they cannot be easily distilled into a single teaching topic. Furthermore, individual ethical principles are incredibly varied, and most courses on applied ethics tend to presuppose a specific ethical standpoint (in this case, the "produce the best outcome" objective indicates a utilitarian standpoint). The only outcome I find agreeable here is "recognize what kind of people they want to be", and even then I believe such an outcome can better be achieved with a good course on critical thinking.

**Table 10.9. KC8 - Transformative learning for changing unsustainable to sustainable patterns**

KC8	Completely Agree	Agree	Disagree	Completely Disagree
Round 1	46%	38%	15%	0%
Round 2	69%	15%	15%	0%

**Comments**

**Round 1:** Informing educators and librarians about newest pedagogical approaches and techniques is paramount, especially when said approaches could provide adaptability in educational practice. Generally speaking, it often isn't difficult to incorporate new information into the tried and tested teaching

methodology. However, realigning existing information with a novel teaching methodology is a more invested process, and that is why transformative pedagogy is an important topic to be included in this kind of course.

**Table 10.10.** *KC9 - Responsibility for the decision-making and behavior*

KC9	Completely Agree	Agree	Disagree	Completely Disagree
Round 1	38%	31%	31%	0%
Round 2	69%	8%	23%	0%

**Comments** **Round 1:** My only reservation here is that teaching about responsibility can oftentimes end up being "preachy". And as we can see globally right now, a significant number of people have a tendency to dig their heels in when faced with arguments regarding individual responsibility. Perhaps a better approach would include instructing educators and librarians how to foster responsibility among their students as an emerging quality rather than as an explicit topic.

**Table 10.11.** *KC10 - SDL and raising basic standards of living and enhancing economic growth in order to eradicate poverty*

KC10	Completely Agree	Agree	Disagree	Completely Disagree
Round 1	31%	62%	8%	0%
Round 2	8%	92%	0%	0%

**Comments** -

### Conclusions about the results of SDL Round 1 & 2

In the first round, answers Agree and Completely Agree appeared in approximately similar proportions for the most concepts, while only for concepts number 3 and 4 experts in the vast majority answered Completely agree (62% and 69%). In the second round, experts reached a higher consensus and in a far greater number fully agreed with the proposed learning objectives and outcomes - the vast majority of experts answered Completely agree for seven concepts (69% for 8<sup>th</sup> and 9<sup>th</sup> concept, 77% for 6<sup>th</sup> and 7<sup>th</sup>, 85% for 3<sup>rd</sup> and 5<sup>th</sup>, 100% for 4<sup>th</sup>). Three experts constructively commented on some concepts in the first round (concepts 1, 2, 4, 5, 7-9). There were no comments in the second round. A very few experts disagreed with the proposed objectives and outcomes in the second round. The experts answered Disagree in a small percentage for the following concepts: 15% for 2<sup>nd</sup> and 8<sup>th</sup>, 8% for 7<sup>th</sup>, and 23% for 9<sup>th</sup> concept. For example, 23% of experts answered Disagree for the learning objectives and outcomes for the 9<sup>th</sup> concept, which relates to the responsibility for decision-making and behavior of individuals.

## 10.2.4 UNS Delphi Study for Sustainable Development Literacy - Key Teaching and Evaluation Methods

In this group of questions, experts ranked the relevance of key teaching and evaluation methods for the future course. Results of the Delphi Study showed that the consensus among our experts has significantly improved after the second round. Kendall's W was 0.35 ( $\chi^2=31.71$ ,  $df=8$ ,  $p<0.01$ ) in the first round, and 0.69 ( $\chi^2=71.96$ ,  $df=8$ ,  $p<0.01$ ) in the second.

Team of UNS experts have showed the high level of agreement when assessing the importance of key teaching and evaluation methods even during the first round. This agreement was further improved in the second round and was significantly higher than the agreement achieved about key definitions and key concepts and contents. Key teaching methods that were graded as the most relevant were the first and the third. Similar to the assessment of key concepts and contents, experts recognized the importance of providing students with the comprehensive core overview of definitions related to sustainable development, as well as key competences for searching and retrieving information on a specific sustainable development topic.

Median rank of the key teaching method 5 was 3, which indicates that the experts think that courses should be supplemented with appropriate quizzes and interactive feedback on learning achievement. Relatively high ranking of the key teaching method 8 indicates that courses should also include activities that would make students more active and involved in teaching process. They should explore SDG topics on their own and make reports and presentations that will be evaluated by their peers. Key teaching methods 7 and 9 are evaluated as the least important. By key method 7 students would be expected to read at least one of the proposed references linked to the course and write the summary. This key method was, however, ranked rather low which indicates that experts' opinion is that this type of activity is not particularly important and useful for students.

Furthermore, the lowest ranking of key teaching method 9 indicates that students should not be constrained in advancing the course based on their achievement in previous course units. The rest of the key teaching methods show very clear relevance rankings with the key method 2 as 5th, key method 4 as 6th, and key method 6 as 7th. This means that we should consider using all the methods in our future course.

# ANNEXES

## Annex 1 – General Guidelines & Suggestions for the Source Mapping

### EDUCABILITY

#### BUILDING THE CAPACITY OF EDUCATORS & LIBRARIANS IN INFORMATION LITERACY

#### IO1: Transnational Information Literacy Ecosystem Mapping (TILEM)

Leading Partner - UNIWA

Preliminary action for Task 1: - Mapping of the state of research in Information Literacy and in Emerging Literacies

### General Guidelines & Suggestions for the Source Mapping

#### 1. Introduction-Aim & Objectives

The aim of this paper is to inform partners of EDUCABILITY Program about the compilation of a separate source mapping (literature review) for each one of this Program's six information-related literacies: Digital Literacy (DL), Mobile Literacy (ML), Media and Information Literacy (MIL), Critical Information Literacy (CIL), Data Literacy (DL), Sustainable Development Literacy (SDL). Each literature review should be showcased as a mapping report resulting from a funded research project. In more detail, this paper stands as a guide which takes as an example the field of Media and Information Literacy (MIL). Its specific objectives are:

- to guide partners to compile their mapping report step by step;
- to help partners to define the questions, the purpose, the specific objectives and to focus on the intended deliverables and the intended audience of their mapping report;
- to give examples to partners about searching, locating, appraising and managing in a systematic way, key items (i.e., relevant curriculum content, books, book chapters, research/scientific articles, reviews, studies, case studies, reports, etc.) regarding the literacy they have been assigned to review;
- to aid partners to specify the key concepts and content of their literacy, by summarizing and synthesizing the research and other evidence presented/discussed in their selected items.

The endpoint of each mapping report should be to deliver a **set of key concepts** and the **key content** for their literacy, that will be used for the creation of an integrated online, open access, asynchronous specific literacy course curriculum, for educators and librarians in their country and in the participant countries, Cyprus, Greece, Spain and Serbia.

## 2. Suggested methodology

The suggested methodology for the identification/location, collection, management, appraisal, synthesis and presentation of the relevant literature is as follows:

Firstly, it should be highlighted that it is important for the mapping report to be questioned. Taking Media and Information Literacy (MIL) as an example, the factors that will determine how the data is identified, collected and presented are the question, together with the purpose, the specific objectives and focus of the mapping report, the intended deliverables and the intended audience.

### 2.1 What is the question of the mapping report? -MIL example

The specific questions are:

- What are the most recent definitions of MIL by experts (i.e., pertinent organizations, prominent scientists, etc.)?
- What are the most recent curriculums that have been published or that are available in various forms (print, electronic) in the field?
- Who have these curriculums been developed by?
- Have these curriculums been evaluated (i.e., via surveys, via other scientific methods, etc.), do they offer academic credits, are they credit-free seminars, presentations, etc., are they delivered in person/face-to-face, remotely, etc.?
- What is the general purpose and the intended audience of these curriculums (i.e., students of different school and university levels, professionals, in Europe, in the U.S.A, in other countries, etc.)?
- What is the content, the learning objectives, the teaching approaches and the learning outcomes of these curriculums?
- How have these curriculums been adjusted to the needs of the intended audience (i.e., according to age, educational, professional, cultural background, in person/face-to-face, remotely, etc.)?
- What are the common and the different MIL concepts of these curriculums?
- In the absence of an adequate number of curriculums and/or in lack of relevant content for EDUCABILITY purpose, what other types of content (i.e., books, book chapters, research/scientific articles, reviews, studies, case studies, reports, etc.) are available for the identification of the key concepts for the development of MIL content curriculum, in general and in specific for educators and librarians?

### 2.2 What is the purpose, the specific objectives and focus of the mapping report? - MIL example



The purpose of this mapping report is to identify and discuss a set of key concepts for Media and Information Literacy (MIL), that will be used for the creation of an integrated online, open access, asynchronous specific literacy **course curriculum**, for educators and librarians in Greece and in the participant countries of EDUCABILITY Program (Cyprus, Spain and Serbia).

The specific objectives are: to search, locate, appraise and manage in a systematic way, key items (i.e, relevant curriculum content, books, book chapters, research/scientific articles, reviews, studies, case studies, reports, etc.) regarding MIL and to specify its **key concepts** and the **key content**, by summarizing and synthesizing the research evidence discussed in the aforementioned items.

### 2.3 What are the intended deliverables of the mapping report? - MIL example

This review will be showcased as a mapping report resulting from a funded research project. The deliverables for Media and Information Literacy (MIL) will be:

- MIL Definitions.
- Presentation and discussion of MIL key concepts and content.
- Suggestions for a MIL content curriculum, containing learning objectives, teaching approaches, learning outcomes and evaluation methods for educators and librarians.

### 2.4 What is the intended audience of the mapping report? - MIL example

The intended audience of this mapping report is the fifteen (15) experts in the field of Media and Information Literacy, i.e., information scientists, professors, journalists, librarians, etc. who will evaluate the source mapping via a Delphi study, in order to finalize the context of the MIL integrated online, open access, asynchronous course curriculum, for educators and librarians, in Greece and in the participant countries. It has to be noted that experts will be selected during **IO1/Task 2** [*The leading partner -UNIWA-Greece will submit to all participating countries a set of key features for a needs analysis aiming at the creation of the pool of the trainees (experts). Key role for the creation of the trainees' pool will play the Representatives Program. The needs analysis will focus on the identification of their qualifications (i.e., their expertise in the various subjects of the new literacies, experience in distance learning programs, etc.) and on the identification of their various characteristics (i.e., specification of learning needs, communities they serve etc.). The leading partner will ask the other partners for review and final approval. Following this, the leading partner will call all partners to create a pool of approximately 15 trainees, based on the above needs' analysis, for every participating country (Cyprus, Serbia, Greece, Spain), involving their associate partners that will contribute towards this direction (through the Representatives Program). The total number of trainees, namely educators in various types of education (formal, informal, non-formal) and librarians in different kinds of libraries will be approximately 60 persons, depending on each partner's specific educational and library ecosystem. After the needs analysis completion, and the creation of the pool of trainees, the participating countries will submit the results to the leading partner. The leading partner will integrate all contributions into a final transnational needs analysis report and it will send it to all members for feedback, final*

*editing and approval. The complete transnational report on the needs analysis will be issued in the form of a text.”]*

### 3. Protocols

#### 3.1 Identification/location protocol of the relevant literacy -MIL example

- The first action of this phase will be to reckon on the most adequate search strategy for the purpose of the source mapping. It is proposed that Google Scholar should be used as a state-of-the-art search engine due to three main reasons: it searches all scientifically known databases, the full content of which one can access via institutional accounts; it can yield results that are not included in fee-databases and which may be equally important for any type of research; it uses sophisticated mechanisms for literature ranking in terms of relevance, year of publication and search techniques, e.g. by using Boolean search operators such as AND, OR, NOT, which can eliminate the “information noise”. Furthermore, for the location of specific curriculums concerning MIL, it may be useful to search throughout the Internet in order to retrieve additional information that may not have been yet published in research/scientific bibliography. However, other databases can be also used, according to each partner’s source mapping needs.
- Next, an adequate search terms’ string should be created, that could yield the most relevant and appropriate conceptual, theory and research articles, book chapters, as well as scientific studies and any other type of scientific content focused on MIL. As this is an iterative process, the search terms’ string will have to be tested and revised several times before deciding its final form. For example, the search terms’ string that could yield the most relevant literature in MIL are [“information literacy” AND media], [“information literacy” AND media AND news], [“media and information literacy” AND definition\*], [“media and information literacy” AND definition\*], [“media and information literacy” AND curriculum\*], [“media and information literacy” AND teach\*], [“media and information literacy” AND learn\*], [“media literacy”], etc.

#### 3.2 Collection and management protocol of the relevant literacy -MIL example

- Suggested tools are Publish or Perish (freely available) Mendeley, Atlas.ti, excel, etc.

#### 3.3 Appraisal protocol of the relevant literacy -MIL example

- **Relevance/appropriateness** to the topic could be estimated according to the following inclusion and exclusion criteria: the main contribution of each type of item concerned exactly the topic, concerned only one specific aspect of the topic but in a meaningful approach, concerned limited but significant aspects of the topic, concerned only limited and not significant aspects of the topic. Respectively, **quality** of the retrieved items could be estimated according to the following inclusion and exclusion criteria: creators/authors specified clearly the aim, the objectives, the methodology the outcomes, the literature and their work had been peer-reviewed;

creators/authors discussed thoroughly the concepts, the literature and their work had been peer-reviewed; Both aforementioned criteria but non peer-reviewed; Both aforementioned criteria but missing more than one elements, e.g. methodology or outcomes.

- **Accuracy:** The objectives of the item are clearly stated and the data collection methods are adequately described. Important statements in the item are supported by references.
- **Consistency:** The item's design is appropriate with respect to the research objectives and the study/survey/experiment's research questions are answered.
- **Timeliness:** the retrieved item needs to be based on items published relatively recently (i.e.in the past fifteen years).
- **Completeness– for case studies:** the case study context is defined and a clear chain of evidence is established from observations to conclusion.
- **Completeness– for surveys:** the authors justify the sampling approach and sample size, population representation, and generalizability are discussed.
- **Completeness– for experiments:** variables applied in the study are adequately measured and information about the treatment and control condition is described.
- **Bias detected or not:** by providing transparency about the study/survey/experiment/review protocol and by openly sharing the research data underlying the analysis and the findings, so as other scholars are enabled to cross-check the findings and examine if other interpretations could be possible.
- **Quality of Web site content:** authority, timeliness

### 3.4 Synthesis protocol of the relevant literacy

After studying each item an effort should be made to answer the questions of chapter “2.1. What is the question of the mapping report?”.

After finishing with all items, a conclusive summary should be written and a tabulated framework should be created.

### 3.5 Presentation protocol of the relevant literacy

For the presentation of the final source mapping, it is suggested that partners should follow the **IMRAD** format, which indicates a pattern or format rather than a complete list of headings or components of research papers, namely, the **I**ntroduction (explains the scope and objective of the study in the light of current knowledge on the subject), the **M**aterials and **M**ethods (describes how the study was conducted), the **R**esults section (reports what was found in the study) and the **D**iscussion section (explains meaning and significance of the results and provides suggestions for future directions of research).

For the references it is suggested that partners should follow APA style.

## Bibliography

Efthymiou, F., & Kouis, D. (2019). A holistic, user-driven approach to the development of an innovative, open-access Educational Framework for six existing and emerging information-related literacies. *Journal of Integrated Information Management*, 4(2), 29–35. <https://doi:10.26265/jiim.v4i2.4417>

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Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., ... & Stewart, L. A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic reviews*, 4(1), 1-9.

## Annex 2 –

# UNIWA [Task 2] Trainees’ needs analysis for the creation of a Pool of 60 experts - Intellectual Output 1 [IO1] - Leading partner: UNIWA-Greece

### General guidelines for Selecting the Delphi Study Experts

Each EDUCABILITY Partner, UNIWA-Greece, CUT-Cyprus, UC3M-Spain, UNS-SERBIA, should select 15 experts, namely educators and librarians, to participate in a Delphi study. CSICY -Cyprus is also invited to help the four other partners in this task.

Each Delphi study will take place virtually during the 10th month (September 2021) of EDUCABILITY Project, in the country of the corresponding Partner.

The selection of the experts should be based on the following criteria:

- experts should already have knowledge and experience with the corresponding literacy of each Partner,
- inclusion of experts with little knowledge might distort the results and this should be avoided,
- experts should have strong reading and writing skills,
- effective communication skills,
- sufficient time to participate in the Delphi study,
- a high level of motivation to complete the Delphi study rounds,
- the heterogeneity of the experts must be maintained to ensure the validity of the results,
- this heterogeneity can be expressed in the expertise of the panels and through other dimensions (e.g., each member of the panel should be an expert in a subject matter or a field study),
- we should try to screen the panels to make sure that we have selected a group of experts who represent diverse perspectives about the focus area,
- it is important to select panel members who have a balance between impartiality and an interest in the topic.

#### Sources:

- Chedi, J. M. (2017). A Preliminary Review on Needs Analysis and Delphi Technique: Effective Tools for Data Collection. *Journal of Asian Vocational Education and Training*, 10, 44-52.
- Warner, L. A. S., & Harder, A. (2020). Conducting the Needs Assessment# 10: The Delphi Technique. *EDIS*, 2020(4).

### UNIWA-Greece

The 15 experts from Greece should participate in one Delphi study to determine the main components and content of a curriculum for Media and Information Literacy.

## CUT-Cyprus

**Option 1:** The 15 experts from Cyprus should participate in two separate Delphi studies to determine the main components and content of two curricula, one for Digital Literacy and one for Mobile Literacy. CUT-Cyprus should reassure the participation of at least 7-8 experts in each separate Delphi study.

**Option 2:** Due to the fact that Digital Literacy and Mobile Literacy are closely interrelated, CUT-Cyprus may ask all 15 experts to participate in the two separate Delphi studies, one for Digital Literacy and one for Mobile Literacy, to determine the main components and content of the two curricula.

**Option 3:** CUT-Cyprus may design a single Delphi study for both literacies (Digital Literacy and Mobile Literacy), where all 15 experts should participate, to determine the main components and content of two separate curricula.

## UC3M-Spain

**Option 1:** The 15 experts from Spain should participate in two separate Delphi studies to determine the main components and content of two curricula, one for Data Literacy and one for Critical Literacy. UC3M-Spain should reassure the participation of at least 7-8 experts in each separate Delphi study.

**Option 2:** UC3M-Spain may ask all 15 experts, if they all fulfill the Delphi study selection criteria for both literacies, to participate in the two separate Delphi studies, one for Data Literacy and one for Critical Literacy, to determine the main components and content of the two curricula.

**Option 3:** UC3M-Spain may design a single Delphi study for both literacies (Data Literacy and Critical Literacy), where all 15 experts should participate, to determine the main components and content of two separate curricula. In this case, experts should fulfill the Delphi study selection criteria for both literacies.

## UNS-SERBIA

The 15 experts from Serbia should participate in one Delphi study to determine the main components and content of a curriculum for Sustainability Literacy.

## Knowledge Resource Nomination Worksheet (KRNW)

- **Step 1** - Prepare your KRNW (see example in Experts\_needs\_analysis.xlsx-Step\_1 “What kind of experts do we need?” and complete appropriately)
  - Identify relevant qualification
  - Identify relevant area of specialization
  - Identify relevant professional practice
- **Step 2** - Populate KRNW with names (see example in Experts\_needs\_analysis.xlsx-Step\_2 “Names” and complete appropriately)



- Write in names of individuals in relevant qualification, specialization and professional practice
- **Step 3** - Nominate /search experts (see example in Experts\_needs\_analysis.xlsx-Step\_3 “Expert contact details” and complete appropriately)
  - Search and write experts’ contact details
  - Search for additional experts
  - Contact experts informally to ask for their intention and availability
- **Step 4** - Rank experts (see in Experts\_needs\_analysis.xlsx-Step\_4 “Experts ranking” and complete appropriately)
  - Categorize experts according to appropriate list, e.g.
    - educators in primary sector, in secondary sector, in tertiary sector,
    - librarians in public libraries, school librarians, university librarians
  - Rank experts based on their qualification
  - Rank experts based on their availability
- **Step 5** - Ethical responsibility towards experts
  - Prepare the ethical responsibility documents towards “expert” sample and/or research community
  - Take the necessary actions required by your university/organization to obtain permission for conducting the Delphi study
- **Step 6** - Invite experts
  - Invite experts to sign their compliance with the requirements of EDUCABILITY project (see below, example letter of expert contact/invitation)
  - Stop inviting experts when panel size is reached

**(Example of the experts’ contact/invitation letter for the Delphi study)**

To .....[name]  
[address]

Dear [Ms/Mr/Dr/Prof .....],

We would like to invite you as an expert in the field of [fill in your literacy, e.g., Media and Information Literacy] in ... [fill in your country, e.g., Greece] to participate in a transnational Delphi process. The aim of the study is to recognize experts’ opinions on the following subjects concerning a curriculum, under development, in [fill in your literacy, e.g., Media and Information Literacy] for educators and librarians. In more detail, you will be asked to read the main components and key concepts of the curriculum and to rank them according to (a) significance of scope/content (b) appropriateness of learning objectives and outcomes, (c) appropriateness of teaching methods, (d) appropriateness of evaluation methods.

We realize that the professionals we are approaching are extremely busy in their respective fields, but because of the important input you can bring to the project we hope

that you will agree to participate in it. In practical terms, we would require no more than a working day of your time, spread out over to two separate occasions.

We are the ... [your nationality, e.g., Greek] partner in project EDUCABILITY (BUILDING THE CAPACITY OF EDUCATORS & LIBRARIANS IN INFORMATION LITERACY), financed by the European Commission ERASMUS + and conducted in 4 EU countries, Greece, Cyprus, Spain and Serbia. For more details, please visit <https://iml.alis.uniwa.gr/projects/> and <https://educability.cut.ac.cy/>.

Each country participating in the project will invite 15 experts from various fields relevant to Information Literacy and information-related literacies (UNIWA-Greece: Media & Information Literacy, CUT-Cyprus: Digital Literacy & Mobile Literacy, UC3M-Spain: Critical Literacy & Data Literacy, UNS-SERBIA: Sustainability Literacy). Experts are coming from public institutions, academic centers and non-governmental organizations and are invited to participate in a Delphi process to reach a national consensus on issues of the study.

The Delphi Process will consist of 2 rounds. Experts will send their answers by e-mail or other ICT tool, filling in the specially prepared forms.

This Delphi process will involve rating the importance of all answers generated by experts in [insert your country e.g., Greece] (round 1), reaching consensus in national level (round 2).

All participating experts will be acknowledged in the project report and will receive a copy of the report that will be submitted to the European Commission.

We would appreciate your participation in this important process for policy making in Europe. If you agree, please complete the attached forms [here, each partner should attach the documents required by their organization's Research Ethics Committee, e.g., for UNIWA see <https://research-ethics-comittee.uniwa.gr/>] and return it by email to [email address].

Should you wish to discuss the project or your participation in more detail please feel free to contact me on [insert contact telephone number].

Thank you in advance for your time,

Yours sincerely,

[name EDUCABILITY partner]

[institution EDUCABILITY partner]

[post address EDUCABILITY partner]

Please, send your review and recommendations for this document, to [feuthim@uniwa.gr](mailto:feuthim@uniwa.gr) and to [m.akroteriatou@cut.ac.cy](mailto:m.akroteriatou@cut.ac.cy).

## Annex 3 –

### Key Teaching and Evaluation Methods, common for the six information related literacies of EDUCABILITY Program

The following teaching and evaluation approaches concern “six information related literacies” within the context of EDUCABILITY Program, for virtual adult training, namely educators and librarians. They are proposed to experts to rank them in order of importance, by putting the 1st as most important and the last as the least important. In particular, experts are asked which of them facilitate the development of Information Literacy Skills (e.g., searching, critically evaluating, ethically using and sharing information for a topic) and additionally facilitate critical thinking, cooperative learning and enhance the will to attend an asynchronous course in a virtual learning environment.

- In each IL Unit, trainees will be asked to watch an introductory video. After this, they will be asked to submit a short answer to the VLE’s Course Forum, regarding a question, relevant to the introductory video. All trainees’ answers will be visible to every participant in the VLE’s Course Forum for review and discussion among them [Level of mastery: Understanding via peer learning – constructivism approach–IL SKILL: E-Social engagement].
- In each IL Unit, trainees will be asked to think of key words that will help them find useful information on how to answer a question. In order to help them think of the appropriate terms they will be given a list of pertinent key words and they will be asked to complete an e-crossword of broader, synonym, narrower terms, etc. [Level of mastery: Understanding via computer interactive learning – cognitivism approach –IL SKILL: Analysis of a topic].
- In each IL Unit, trainees will be visually (video) presented with at least two or three distinct ways of searching for information on a specific topic, in the Internet, in a library catalog and in scientific data bases. Furthermore, a method will be displayed on how to evaluate retrieved information, in terms of relevance and validity. After this, trainees will be asked to perform their own searches for specific information regarding a question and to evaluate their results, in terms of relevance and validity. [Level of mastery: Understanding & Application via computer interactive learning – behaviorism approach –IL SKILL: Searching & Evaluating information for a topic]. Finally, trainees will submit the list of their retrieved and evaluated results to the MIL VLE’s Course Forum for review and discussion. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILL: Social engagement].
- In each IL Unit, trainees will be asked to study their retrieved information and to write a properly cited short answer to a question. After this, they will be asked to submit their answer to the VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her answer and will submit one review to three other participants’ answers. [Level of mastery: Knowledge via peer learning – constructivism approach–

IL SKILLS: Analysis, Synthesis, Ethical use & Sharing of information for a topic, E-Social engagement].

- In each Unit, after a short video-lecture, trainees will be asked to answer a reflection E-quiz. Automatic feedback will be given per answer. Each trainee will be able to take the reflection E-quiz as many times as he/she wishes. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic].
- In each Unit, trainees will be presented with a video- lecture. The video-lecture will be automatically paused every time a sub-topic will have been completed and a pop-up, true or false or three-four choice questions, will appear on the screen. Each trainee will have to answer it in order for the video-lecture to continue. After an answer has been completed the learner will get immediate feedback and the video-lecture will be allowed to continue. [Level of mastery: Understanding via computer interactive learning – behaviorism approach –IL SKILL: Analysis of a topic].
- In each Unit, trainees will be asked to read at least one of the proposed references linked to the VLE’s Course and to write a summary that they will have to submit to the VLE’s Course Forum. Their answer will be randomly forwarded to at least three other participants for review. In this way, every trainee will receive three reviews for his/her abstract and will submit one review to three other participants’ abstracts. [Level of mastery: Knowledge via peer learning – constructivism approach–IL SKILLS: Analysis, Synthesis, Ethical use & Sharing of information for a topic, E-Social engagement].
- Towards the end of each Unit, trainees will be asked to choose a topic of their preference. Then they will be asked to search for specific information regarding their topic, to read them and to evaluate them in terms of relevance and validity and to submit a short, properly cited essay or ppt to the VLE’s Course. Their essay or ppt will be randomly forwarded to at least three other participants for review. In this way every trainee will receive three reviews for his/her essay or ppt and will submit one review to three other participants’ essay or ppt. [Level of mastery: Knowledge and application via peer learning – constructivism approach–IL SKILLS: Searching, Evaluating, Analysis, Synthesis, Ethical use & Sharing of information for a topic, E-Social engagement].

Trainees who will have acquired a total of 60% or more to the various interactive sub-tasks of each Unit will be allowed to continue to the next Unit. If not, they will have to repeat it. Upon successful completion of the whole E-course (at least 60% or more) trainees will be able to download a certificate of attendance in the pertinent IL for educators and librarians.



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