L-Cloud

Developing Tomorrow's Cloud Education Leaders

DEVELOPING TOMORROW'S CLOUD EDUCATION LEADERS

IO2 Qualification Framework for Education Cloud Leaders based on Skills and Competence

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www.L-Cloud.eu

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INTRODUCTION

L-CLOUD is the acronym that stands for ***Developing Tomorrow's Cloud Education Leaders*.** It's a two year project (started October 2018 and finishing September 2020), co-funded with the support of the European Union – Key Strategic Partnership for School Education under the European Program Erasmus plus. It has been co-funded by the Cypriot National Agency, Foundation for the Management of European Lifelong Learning Programmes (FMELLP) in 2018. The partners involved are:

1. EACG-European Association of Career Guidance as project coordinator (Cyprus).
2. UB – Universidad de Barcelona (Spain).
3. Colegiul National Pedagogic "Mircea Scarlat" (Romania).
4. DOUKA EKPAIDEFTIRIA AE - Palladion Lykeion Ekfpaideuthria Douka (Greece).
5. EUROGEO VZW- European Association of Geographers (Belgium).
6. DLEARN - European Digital Learning Network (Italy).

Cloud computing is an innovative technology that uses the Internet to deliver a wide variety of IT services and it is experiencing an exponential growth. For instance, supporting products such as mobile device applications are multiplying including email, information storage, file sharing, collaborative tools, digital communications and other services.

At the same time, school leaders expectations are changing, so that educational institutions must show significant leadership to embrace the challenges of innovative collaborative tools and content (ex. 24/7 access to secure, reliable networks and the ability to create, deliver and share contents across institutions).

Cloud Computing adoption in education remains fragmented because while Cloud Computing offers many advantages, decision makers are largely unaware of the potential benefits for learning, teaching, administration and management. Therefore, training and support systems are needed to help them keep up to date with the rapidly changing Cloud Computing environment. Leadership is also needed for pedagogical change, otherwise educators will continue the paradox of using old teaching methods but with new tools.

The aim of IO2 is to identify and define a set of competences for leadership in educational Cloud Computing. To accomplish this, the present report is divided into two parts. The first is a conceptual approach to the notion of competencies, Cloud Computing and leadership. The second part presents the design of the L-Cloud competence framework, which introduces the competence framework composed by a number an associated areas or dimensions and descriptors. Divided into three phases, the first one refers to the state of the art presented by all participating colleagues (European Association of Career Guidance, Cyprus; Universitat de Barcelona, Spain; Colegiul National Pedagogic "Mircea Scarlat", Romania; Douka Ekpaideftiria Ae - Palladion Lykeion Ekfpauthria Douka, Greece; European Association of Geographers, Belgium; and European Digital Learning Network, Italy) with respect to digital literacy, educational leadership and Cloud Computing. The second proposes a redefinition of the axes - dimensions and competences. And the last one, the POD Model: Pedagogical, Organisational and Digital Model of L-Cloud Competences Framework.

To this respect, we have considered the structure and results of O1 into a conceptual mapping (O1: Guidelines for Skills and Competences for Adaptive Education Cloud Leaders). The most relevant

competency models currently available in relation to ICT, to educational leadership and to teacher education have also been analysed and compared. As a result, the POD MODEL, contains three major interrelated axes: Pedagogical, Organizational and Digital, with leadership across all, giving rise as a consequence an associated number of competencies, presented in this report

Finally, we propose to review, refine and validate the previous competence framework. To this purpose, a template of this model has been presented so that it can be discussed and validated in the different key stakeholders expert panels (including innovative teachers, educational institution managers and education decision-makers) which will be carried out (in Cyprus, Spain, Romania, Greece, Belgium and Italy). On the basis of the feedback received, we will refine and validate the L-Cloud competence model.

O2.A1: DEFINITION OF THE COMPETENCE FRAMEWORK

1. CONCEPTUAL FRAMEWORK

In this section, we first present an approach to the concepts of competencies, Cloud Computing, and educational leadership, which are key concepts for the subsequent design of the L-Cloud competencies framework.

1.1. THE CONCEPT OF COMPETENCE

A **competence** is a **set of personal characteristics** (e.g., skills, knowledge, attitudes) that an individual possesses or needs to acquire, in order to perform an activity within a specific context, whereas performance may range from the basic level of proficiency to the highest levels of excellence (Sampson & Fytros, 2008). **Key competences** are those which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment (European Commission, 2007). The European Communities (2008) defines competence as "the proven ability to use knowledge, skills and personal, social and/or methodological abilities (attitudes), in work or study situations and in professional and personal development. (...) competence is described in terms of responsibility and autonomy" (p. 11). We also understand **competences** as "a complex combination of knowledge, skills, understanding, values, attitudes and desire which lead to effective, embodied human action in the world, in a particular domain" (Deakin, 2008, p. 313).

The European Commission (2013, p. 10) highlights several characteristics of the concept of competence as applied to education:

- It involves tacit and explicit knowledge, cognitive and practical skills, as well as dispositions (motivation, beliefs, value orientations and emotions).
- It enables to meet complex demands, by mobilizing resources in context and deploying them in a coherent way.
- It empowers to act professionally and appropriately in a situation.
- It allows teachers for undertaking tasks effectively (achieving the desired outcome) and efficiently (optimizing resources and efforts).
- It can be demonstrated to a certain level of achievement along a continuum.

We start from the idea of understanding competencies as a **dynamic combination** of learning to think, know, feel and act in the educational system, intertwined at different levels: individual, school, local community, administrations and professional networks. The L-Cloud project will take into account the entire educational community to determine the dimensions -areas and competencies- descriptors. The key dimensions in the leadership of Cloud Computing are: a) understanding **knowledge** as a set of related facts, principles, theories and practices; b) theoretical-practical **skills** such as the ability to apply knowledge and use know-how to complete tasks and solve problems; and **competencies** such as the ability to use knowledge, personal, social and professional skills in different contexts (European Union, 2019).

1.2. DEFINING CLOUD COMPUTING

In the report drawn up by Mell & Grance (2011), Cloud Computing is a "model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction" (p. 2). Taking into account this definition, the main features of Cloud Computing are: i) on-demand self-service, ii) broad network access, iii) resource pooling, iv) raid elasticity, and v) measured service.

As a consequence the **profile of an expert in Cloud Computing** requires training in a series of basic competencies:

1. Assess the need to use a Cloud-based scenario for each type of institution.
2. Assess the strengths and weaknesses of Cloud Computing.
3. Identify the most suitable type of cloud: public, private or hybrid.
4. Master the fundamental elements of a cloud: service catalog, self-service portal, automation, analysis, etc.
5. Know the different virtualization solutions and the role they play in the world of Cloud Computing.
6. Know the main providers of Cloud Computing platforms (e.g. Amazon EC2, Microsoft Azure, Google, Salesforce, etc.).

In this way, the European Parliament (2012) signalled that Cloud Computing, moreover, is a service that "allows customers to save data by transferring it over the Internet or another network" (p. 5). On their behalf, Koutsopoulos & Kotsanis (2014) identify a new **paradigm, Community or School on the Cloud**[1]. This paradigm simultaneously takes into account cultural, pedagogical, technical / technological, administrative, social and political factors in a holistic approach, an integral part of which are the basic education stakeholders. The authors define Cloud Computing as an ICT technology that can be fully determined in a three-dimensional space consisting of: a) on-demand self-service, broad network access, resource pooling, raid elasticity, and measured service, all previously mentioned; b) the type of service (infrastructure –IaaS-, Platform –PaaS-, Software –SaaS); and c) the form of deployment (private cloud, community cloud, public cloud and hybrid cloud), which can become an integral part of education. For these authors, **Cloud Computing** brings many benefits to education such as: savings, flexibility, effectiveness, sharing, real time Access and reduces the risk of obsolescence. The **School on the Cloud** also offers: digitalization, learning, understanding, collaborating, updating and communicating.

From this point of view, Cloud Computing can be viewed as a model with ubiquitous, convenient and on-demand access in which a series of configurable computing resources are shared and quickly provisioned and relaunched with a minimum of management effort or interaction in the provision of ser-

[1] Koutsopoulos & Kotsanis (2014) argue that the School on the Cloud: connecting education to the Cloud created 4 working groups whose primary function was to enable research around their focus and sharing of ideas: 1) **i-Leader**: leadership and management in the transition from ground to Cloud: infrastructure, mentality, innovation and change; 2) **i-Teacher**: the changing role of the teacher, teacher training; 3) **i-Learner**: Integrating the Cloud in education through personalisation in formal and informal education, special needs; and 4) **i-Future**: what is the future we want in education, visions of open education, interactivity, impact and communicating in the Cloud.

vices (Salinas, 2013). The ubiquitous learning aspect offers: **permanency (**the information remains permanent), **accessibility** (the information is everywhere and available to the learner), i**mmediacy** (the information can be retrieved immediately by the learner), **interactivity** (the learner can interact with peers, teachers, and experts through different media, and **context-awareness** (the environment can adapt to the learner's real situation to provide adequate information).

In this sense, the cloud can: a) transform learning and teaching and improve the quality of education by offering accessibility, personalization and flexibility; and b) offer opportunities to improve the quality of education by offering flexibility and accessibility. In this sense, Cloud Computing expands access to information and interactive tools to improve learning and relationships between the entire educational community. It has the potential to greatly change how education works, both online and face-to-face. Indeed, Bhatia (2014) identifies in School in the Cloud five "surprising" ways it is transforming education: no more expensive textbooks, no more outdated learning materials, no expensive hardware required, no expensive software required and reaching more, and more diverse learners.

For this reason, it is important for educational leaders in Cloud Computing to acquire the necessary competences to transforming education by promoting changes in processes and systems.

1.3. DEFINING EDUCATIONAL LEADERSHIP

In this section, the concept of educational leadership is approached from different personal and professional styles and competencies. Still, we lack a common framework on leadership to be developed in Cloud Computing. To this end, it is important to establish a framework for change allowing to train teachers, educators, managers, administrators, principals and key-stakeholders on the necessary Cloud Computing competencies in order to generate pedagogical and organizational opportunities and create new Cloud Computing learning environments.

A general concept of leadership demands constant interaction, generating a continuous transformation of relationships. To this end, the leader presents some attributes: strategic vision, initiative, innovation, commitment to profitability and sustained growth, empowerment or leadership of people with delegation, creativity applied to the task and influence and negotiation. For Day, Harris & Hadfield (2001), leadership is a process of building and maintaining a sense of vision, culture and interpersonal relationships. Leadership is a process of building and maintaining a sense of vision, culture and interpersonal relationships. On the other hand, Smith and Peterson (1990, p. 58) understand leadership as "the actions of a person to manage the problems of the organization that are expressed in the events that others face. Bolman (2004) asserts that leadership is manifestly a key and fundamental factor in the creation, development and maintenance of professional learning communities.

If we focus on educational leadership, the educational leader has a number of a) **personal qualities** (flexibility, constancy, autonomy, reliability, integrity and balance), b) **interpersonal skills** (empathy, concern for others, assertiveness, active listening, clarity and teamwork), c) **leadership capacity** (delegate, motivate, quality control, staff development, openness to the outside world, leadership) and d) **technical management skills** (project planning, negotiation, organisation of resources, understanding of context and negotiation). Robinson (2007) identifies five dimensions of pedagogical leadership: a) setting goals and expectations, b) obtaining resources strategically, c) planning,

coordination and evaluation of teaching and curriculum, d) promotion and participation in teacher learning and 5) development and ensuring an orderly and supportive environment.

Harris (2004) approached distributed or collective leadership as "a form of collective instance to incorporate the activities of some individuals in a school who work to mobilize and guide other teachers in the process of improving their teaching" (p. 14). And pedagogical leadership, "the directors, in addition to working on how to improve student results, boosting the performance of all members of the school, especially teachers, are directly involved in the tasks necessary for this improvement". Bernal & Ibarrola (2015) point to pedagogical leadership as one of the means to improve the quality of education. Furthermore, the teacher can exercise his or her own leadership. Increasing autonomy in schools (OECD, 2009) implies a change in the type of leadership, since educational leaders have a higher level of responsibility and accountability.

Finally, in the digital society Donert (2018) proposes ten e-Leadership framework characteristics, identified necessary for effective strategic and operational e-leadership at senior, middle and lower hierarchical levels in higher education in order that collegial and entrepreneurial high trust environments can be enabled to emerge interactively through the development of technological innovations in tandem with e-leadership and good communication. These are structured in the three following dimensions:

- Purpose: e-leadership visioning and strategic planning; meaning making and sense making in complex adaptive systems of higher education organizations; learning and teaching, pedagogic leadership; and research and enterprise management.
- People: e-leadership/virtual team leadership of collegiality, organizational values, behaviours and culture; trust; academic freedom; social, legal and ethical issues; diversity and equal opportunities; gender issues; e-leadership presence, interpersonal skills and emotional intelligence; empowering others; communication skills and organizational relations including speed of response; innovation; risk taking; distributed leadership: ownership.
- Structures and social systems: organizational structure and policy; management, finance and operations including distributed leadership systems, speed of response and change management skills; quality management and monitoring; assessment and evaluation; technology, support for infrastructure, problem-solving skills, information technology skills, innovation, risk taking.

1.4. TARGET GROUP

The target group of the framework of competencies in Cloud education leadership is the entire educational community, but especially educators, teachers, evaluators and education principals, administrators and key-stakeholders who play different but complementary roles in the educational institutions.

2. L-CLOUD COMPETENCE FRAMEWORK DESIGN

This second part is divided into three phases. In the first one, we collected the different frameworks of competences provided by the partnership, based on certain criteria. In a second phase we analysed these frameworks by restructuring and redefining areas and competencies linked to digital literacy, Cloud Computing and educational leadership, in line with the construction of the L-Cloud Competence framework. In the last phase, assuming that leadership is a feature across these areas, we fertilised the previous model with this idea, bringing as a consequence three axes of analysis which are: pedagogical leadership, digital leadership, and organisational/management leadership. By analysing the intersections of these three axes, we came up to the POD model (Pedagogical, organisational and digital axes of the L-Cloud Computing Competence framework), as specified in the next sections.

2.1. PHASE 1: STATE OF THE ART: PARTNERS COMPETENCE FRAMEWORKS

Based on O1 (Guidelines for Skills and Competences for Adaptive Education Cloud Leaders), we analysed the selected competence framework and documents presented by the different participating partners (UB, Colegiul National Pedagogic Mircea Scarlat, DOUKAS Schools, EUROGEO and DLearn). The criteria for selecting the documents were their relation to educational leadership, digital literacy, pedagogy and Cloud Computing. The documents, of national and international nature, are numbered below:

- EEAG:
    1) Five Traits of a Good Educational Leader (USA).
    2) The Teacher Leadership Competencies (USA).
    3) Educator and School Leader Competencies Can promote systems coherence in Competency Education (USA).
    4) Teacher Leader Competency Framework (USA).
    5) Nine Competencies for Teaching Empathy (USA).
    6) Leadership Competency Framework (Australia).
    7) Top 10 Digital Skills for Education Leaders (USA).
    8) Charlotte Danielson's Framework for Teaching (USA).
    9) Digital Learning Framework for Post-Primary Schools (Ireland).
    10) Professional Development Framework for Digital Learning (South Africa).
    11) Technology in Education Framework: Teaching and Learning (Canada).
- UB:
    - Educational leadership competence frameworks LOMCE (Organic Law) (Spain).
    - Common Framework of Digital Teaching Competence (Spain).
    - Catalonia: Digital framework - Digital Agenda 2020 (Catalonia, Spain).
    - Digital Teaching Competence of the Teachers of Catalonia (Catalonia, Spain).
    - Digital competences in Spain, how to improve them? (Spain).

- Colegiul National Pedagogic “Mircea Scarlat”
    - Leadership Competency Framework (USA).
    - Standards for school leaders: competency frameworks and their applicability (UK).
    - UNESCO ICT Competency Framework for Teachers.
- Doukas:
    - KIPP Leadership Framework and Competency Model (USA).
    - Teach to Lead – Leadership Competency Framework (Australia).
    - Leadership Competency Framework (USA).
- EUROGEO:
    - Education competency frameworks (UK).
    - Digital Skills competency framework (UK).
    - Strategisch competentie Denken (The Netherlands).
    - Schoolleidersregister po basiscompetenties (The Netherlands).
    - Het geheim van de innovatieve schoolleider (The Netherlands).
    - Waar blijft de middenmanager? Een onderzoek naar de strategische rol van team- en afdelingsleiders in het voortgezet onderwijs (The Netherlands).
    - De leidinggevende in het onderwijs als regisseur (The Netherlands).
    - Competentieontwikkeling M-decreet (Belgium).
    - Een nieuw profiel voor de leraar secundair onderwijs. Hoe worden leraren daartoe gevormd? (Belgium).
- DLEARN:
    - Leadership Competency Framework (UK).
    - Digital Competence of Educators (Luxemburg).

The analysis of the documents approached us to the competencies educational leaders need to have in relation to teaching, to policies and to management of institutions, both at personal and professional levels.

As with respect to digital literacy, the documents include "good practice" and provided with competence descriptors for educational leaders that promote innovative pedagogical approaches that incorporate digital technologies. Generally speaking, digital competences refers to the creative, critical and safe use of digital technologies to achieve objectives related to work, employability, learning, use of leisure time, inclusion and participation in society.

Educators, principals and administrators need to master the use and or the application of digital technologies to enrich and improve learning, as well as to grow professionally. Educational leaders ensure the integration of technology to support productive learning and management systems. However, little is mentioned about the implementation and use of Cloud Computing.

In some countries, educational legislation establishes specific requirements for educational managers, suggesting training courses related to access managerial positions in public schools. Again, leadership in Cloud Computing (as part of digital innovation) is not specifically mentioned.

On the other hand, these frameworks point to the relationship between teaching and leadership, and

describe the descriptors and leadership competencies that are considered most important for the performance of principals, and teaching leaders.

In conclusion, the different competence frameworks and documents analysed refer to three main dimensions: leadership, digital literacy and general teaching competences. An identified limitation is the lack of a shared definition of leadership and educational leadership. This is necessary to clearly define the competences for adaptive educational cloud leaders

2.2. PHASE 2: STRUCTURING AND REFINING AREAS, DIMENSIONS AND COMPETENCES

First of all, we identified and analysed a set of existing competence frameworks related to the different areas of L-Cloud, i.e. digital literacy, Cloud Computing and educational leadership. This exercise included frameworks related to 21st Century skills and lifelong learning approaches. For this purpose, the documents set out in 2.1 were examined.

After reading and analysing the different frameworks, a series of dimensions and competencies were extracted (Table 1). This process resulted to the identification of 33 possible dimensions and 434 potential competences (See Annex 1 for details).

Table 1: Identification dimensions and number of competences

Dimensions	N. Competences	Dimensions	N. Competences
Communication	16	Decision making	5
Collaboration	22	Personal qualities	27
Participation	8	Productivity and Accountability	3
Teamwork	5	Potential	1
Mobility	1	Knowledge	13
Digital competence	90	Teaching	6
Digital Identity	5	Ethics	6
Social & Civic Comp.	10	Inclusion, diversity & equality	2
Sense of initiative	1	Relationship	5
Learning to learn	19	Design, planning and didactic	9
Cultural awareness & expression	4	Organization & management space	4
Leadership and responsibility	134	Development professional	11
Information / media literacy	6	Entrepreneurship & internalization	2
Creativity and Innovation	14	Sustainability	2
Critical thinking	7	Management	14
Problem solving	6	Effective and strategy	3
Flexibility and Adaptability	**3**	**TOTAL 33**	**TOTAL 434**

Once the frameworks were analysed and synthesised, the corresponding dimensions and competences' candidates identified, an attempt was made to group them into three main axes: Digital Literacy, Educational Leadership and Cloud Computing (Figure 1 and Annex 2):

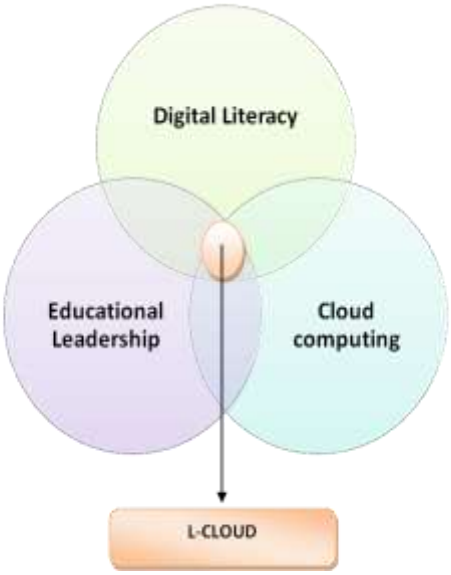


Figure 1: The three main axes of analysis for the competence framework

Using the documentation provided by each partner, in Figure 1 we can see the intersection of the three initial areas. In Annex 2, we explain how the process was done, and which competencies across these dimensions were collected.

2.3. PHASE 3. THE POD MODEL: TOWARDS THE L-CLOUD COMPUTING COMPETENCE FRAMEWORK

Leadership is at the core of what L-CLOUD deals with. Then, we propose at the core of the model the dimension Leadership across the three main axes.

Considering that the education/learning aspects emerge as part of all models and competences, we consider that Pedagogy should be part of the model, but from the Leadership point of view. The organizational/management should also be considered from the leadership point of view. As a consequence we came up with a model in which the three initial axes of analysis (digital, educational, and Cloud Computing), result in a consolidated model with three axes that support the L-CLOUD competence framework: pedagogical, organizational-management and digital leadership. The intersection of these axes is the core of the L-CLOUD model (Figure 2).

Figure 2: The tree axes supporting the L-CLOUD Competences Framework. Leadership is across all.

The axes intersect each other, as well as all the three. This will help us to identify the core competencies of the cloud education leaders (Figure 3).

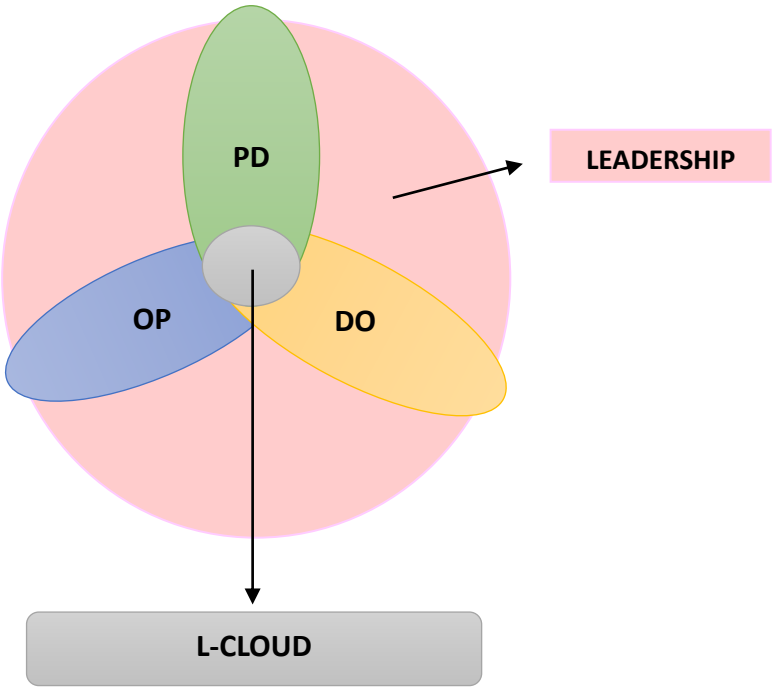


Figure 3: Intersections of the three key L-CLOUD axes

For the purpose of the project each axe does not make sense on their own; rather to analyse the different intersections in twos: 1) pedagogical and organisational; 2) organisational and digital; and 3)

digital and pedagogical. Finally there will be a group of core competencies that feed up from the three with common characteristics.

The result of this exercise is shown in Table 2. The common areas are presented with the two-by-two intersections.

Table 2: Two-by-two intersections

AXES	AREAS
PEDAGOGICAL & ORGANIZATIONAL (PO)	**1. Flexibility and Adaptability** **2. Knowledge** **3. Teaching** **4. Learning to learn** **5. Social, civic and intercultural inclusion**
ORGANIZATIONAL & DIGITAL (OD)	**1. Organizational and management digital resources** **2. Relationship and internalization**
DIGITAL & PEDAGOGICAL (DP)	**1. Design, planning and didactics** **2. Creative and development** **3. Ethics and responsibility digital**

(To see the competencies associated with each area and dimension, see Annex 3)

Table 3: Transversal axis

AXE	AREAS
PO+OD+DP AND LEADERSHIP	**1. Communication** **2. Collaboration and participation** **3. Innovation and creativity** **4. Professional Development** **5. Leadership and responsibility**

(To see the competencies associated with each area and dimension, see Annex 4)

The competences from two-by-two intersections of axes, together with the ones of the transversal axis give rise to the **POD MODEL**: The Pedagogical, Organisational and Digital L-CLOUD Competence framework (table 4). This model contains six main areas and the corresponding competences, as shown in Table 3.

Table 3: THE POD MODEL COMPETENCES FRAMEWORK

AXES	AREAS	COMPETENCES
	1. Communication, Collaboration and Participation	1.1. **Capacity** for communication, collaboration and active participation in educational networks in **Cloud Computing** environments. 1.2. **Capacity** to establish a shared vision **about Cloud Computing in learning environments** 1.3. **Skill** to build professional networks with other school leaders aiming to guide and support learners **in Cloud Computing.** 1.4. **Dispositions** to team building at the school 1.5. **Disposition for** active participation in educational networks in **Cloud Computing** environments.
	2. Innovation, creativity and creation	2.1. **Knowledge for the** creation and dissemination of educational contents and resources in **Cloud Computing**. 2.2. **Ability** to select, apply resources, and use methodological **Cloud Computing-based strategies** in teaching and learning. 2.3. **Ability to lead** pedagogical innovations **in Cloud Computing** coherence with the educational project and the infrastructures of the centre. 2.4. **Ability to creatively** use **of Cloud Computing** in different educational contexts. 2.5. **Disposition** to research, innovation and technology transfer networks in **Cloud Computing**. 2.6. **Disposition** to express creative ideas, experiences and emotions **in Cloud Computing.**
	3. Professional Development	3.1. Construction and reflective practice of the professional digital self-identity. 3.2. **Disposition** to incorporate teaching innovations based on **Cloud Computing**. 3.3. **Ability to** active participation in educational research and practitioner networks, virtual learning communities and professional development in **Cloud Computing**. 3.4. Disposition to participate in Cloud Computing Professional Development programmes (CPD). 3.5. Promoting reflexive practice and professional development focused on engage-

PEDAGOGICAL + ORGANITZATIONAL + DIGITAL → L-CLOUD		ment, responsibility, teaching, learning and leadership, and keeping abreast of change.
	4. Leadership, ethics and responsibility	4.1. **Knowledge on** how to effectively and ethically use of the different types of Cloud Computing (public, private and hybrid) and their services, tools and functionalities (SaaS, PaaS and IaaS). 4.2. **Knowledge** on how to integrate **Cloud Computing** and resources to enhance learning objectives. 4.3. **Knowledge on** legal issues about safety, data protection, privacy and healthy use **of Cloud Computing.** 4.4. **Knowledge to** solve complex problem solving in Cloud Computing. 4.5. Negotiation **skills** (social and political interactions) with multiple educational stakeholders, actors and contexts, and decision making in **Cloud Computing.** 4.6. **Ability to** manage personal emotions. 4.7. **Ability to** critically assess your own practice as leaders and develop their understanding of effective and sustainable **leadership**. 4.8. **Disposition to** accept responsibilities to planning and implementing **Cloud Computing** in education. 4.9. **Disposition to** Identifying and removing barriers **to create/maintain a Cloud Computing infrastructure.** 4.10. **Disposition** to motivating, encouraging, trusting and valuing colleagues **to create and use Cloud Computing in their contexts** 4.11. **Disposition** to social and global awareness and responsibility in relation to Cloud Computing 4.12. **Disposition to become** aware of the ethical dimensions of **leadership in Cloud Computing.**
	5. Social and intercultural relationship and internalization	5.1. **Knowledge on how** to build and maintain effective relationships with the educational community **through Cloud Computing.** 5.2. **Skills** on how to work effectively with the community, partners and stakeholders of **Cloud Computing.** 5.3. **Ability** to promote mobility, entrepreneurship, training and cooperation in Europe **on Cloud Computing.** 5.4. **Disposition to** respecting and being aware of the diversity of learners' cultures and

		identifying common values. 5.5. **Disposition to f**oster a commitment to inclusion, cross-cultural skills and equal opportunity. 5.6. **Disposition to promote** and build an adequate digital identity **in Cloud Computing.**
	6. Pedagogical and Organizational	6.1. **Knowledge** on how to access, analyze, validate, reflect on knowledge in a variety of **Cloud Computing** environments. 6.2. **Knowledge** on class management, assessment and feedback processes in **Cloud Computing.** 6.3. Pedagogical content **knowledge in Cloud Computing** in relation to different subjects, its content and structure. 6.4. **Knowledge** on using, developing, creating and management **of Cloud Computing,** including applications, devices, and networks 6.5. **Skills to identify** students' learning needs, and learning progress in the cloud. 6.6. **Skills to** creating, organizing, sharing and publishing digital resources taking into account different **Cloud Computing** learning environments.

O2.A2: COMPETENCE FRAMEWORK CONSULTATION AND VALIDATION

3. INTRODUCTION

In O2/A2 - Competence framework consultation and validation, we reviewed, refined and validated the competence framework designed in O2/A1 through a consultation process: partners presented the competence clusters and components identified in O2/A1 to a panel of experts and practitioners (key-stakeholders from the educational sector including innovation teachers, managers of educational institutions and educational decision makers). They collected their feedback in order to re-fine and validate results in terms of key e-cloud competences. The consultation process was con-ducted in each participating country through face-to-face and/or virtual focus groups, which took place in June to September 2019. We organized 8 focus groups, one for each partner. In addition, virtual focus groups were organized in Spain and Italy. To this end, a questionnaire was designed and distributed among partners' educational networks in those countries. In total, we collected 17 questionnaires (14 in Spain and 3 in Italy).

This document aimed to provide a generic framework that will serve as a basis for the organization of the workshops in the different project countries. It intended to guide L-Cloud partners in planning their focus groups following a homogenous basis. This allowed for securing consistency and comparability of the results of the focus groups, which ensured the refinement of the competence framework designed in O1/A1.

First, the document describes the workshops' organization: the target group, the event diffusion and registration processed, as well as the settings in which workshops should was organized (space, time and facilitators). Afterwards, the document proposes the data analysis and the results about the focus groups' consultation and validation.

The document is includes annexes, i.e. template documents and tools was used in the focus groups.

4. FOCUS GROUP' ORGANIZATION

With a view towards homogeneity, this section presents the way national focus group workshops should was organized: it elicited the actors who should participated, as well as the way they should was approached by the project's partners. Moreover, the settings in which workshops should was organized (space, time and facilitators) was being described.

4.1. TARGET GROUPS

The focus groups include educational stakeholders, experts and practitioners (including innovation teachers, ICT coordinators, managers and principals of educational institutions and educational decision makers). Furthermore, partners are free to involve other key-actors in the fields of

educational management, digital education and Cloud Computing (local policy makers, research stakeholders, representatives of local associations and others interested actors of the local communities, like parents' associations).

The workshops consist of focus groups which aim at stimulating active discussion among the different actors. Hence, we recommend that they involve **8 to 12 participants**.

4.2. EVENT DIFFUSION

Workshops should be announced in advanced in order to reach the targeted number of participants. To do so, we recommend that partners prepare a mailing including a short introduction to the project and the workshop objectives, as well as an invitation poster highlighting the addressed thematic areas (a template is provided in Annex 5). Partners can also state that participants will receive a certificate of participation.

4.3. PARTICIPANTS' REGISTRATION PROCESS

Interested participants will be requested to fill in an online registration form (provided in Annex 6), using *Google Form* or any other similar tool. We suggest that partners keep a list of all interested participants, so to involve them in further project activities, and for reporting matters.

From those who filled in the registration form, partners will select the workshop(s)' participants. Selected participants will be notified by e-mail and receive an agenda of the event, as well as an introductory document (including the project outline and the first version of the competence framework).

4.4. SETTINGS

The workshop should take place in a room equipped with a projector and an Internet connection. A PowerPoint presentation will be given. The space should be rather informal, in order to stimulate active discussion among participants.

Workshops are expected to be **2 hours**. At least **two researchers** should monitor the workshop: one will present the project, the competence framework, and facilitate discussions, while the other one will take notes and pictures, as well as collect materials created by participants. The event should be recorded (audio and / or video) in order to enable a quality data collection.

Facilitators should circulate a participation list (template available in Annex 7) that each attendant will fill in and sign. If needed, consider having consent forms completed by participants before or at the beginning of the workshop.

At the end of the session, the need to pass a questionnaire about the discussion group will be assessed (Annex 9).

5. CONSULTATION AND VALIDATION: STRUCTURE

This section aims to provide partners with a common structure to conduct their national focus groups. It proposes an agenda which elicits the different stages to follow and the thematic areas to cover. All stages are reflected in a PowerPoint presentation (Annex 11), that partners may translate, edit and use to guide their workshop.

The focus group workshops were organized in Cyprus, Belgium, Greece, Italy, Romania and Spain. The aim was to gather educational experts' and practitioners' perspectives on the different clusters of the competence framework.

UB partner (Spain) was responsible for organizing and preparing the focus groups' material, provided a guidelines document for guiding partners in planning their workshops, following a homogenous basis, as well as collecting and reporting results.

5.1. PARTICIPANTS

The focus group gather a heterogeneous people included innovation teachers, ICT coordinators, managers and principals of educational institutions and educational decision makers. The focus groups aimed to collect in-depth information about their perceptions about Leader on Cloud Education their perspectives. Workshops were widely diffused by each partner in order to reach the targeted number of participants. In total, 81 participants were gathered (10 Cyprus, 12 Romania, 5 in Greece, 9 in Italy, 21 in Belgium and 24 in Spain).

Participants' registration was done in two ways: through an online registration form, using Google Forms; and a selection of potential person with the following profiles: innovative teachers, ICT coordinators, managers and principals of educational institutions, and decision makers. To this end, they were contacted by email with an invitation to participate. The participants who agreed to be part of the consultation and validation of the competence framework, received an agenda of the event, as well as a short document with the introduction to the project and link to it.

5.2. FOCUS GROUPS

In all countries and partner institutions, focus groups were organized according to the following structure:

A. Introduction (indicative time: 15 min.)

After a short roundtable in which participants introduced themselves, the facilitator explained the workshop's outline, objectives and agenda.

B. Presentation of the L-Cloud project (indicative time: 20 min.)

The facilitator introduced participants to the following points:

- The consortium, context, focus, objectives, expected results and activities;

- The status of Cloud Computing in education and related policies / initiatives at EU and local levels (optional).

C. Individual task and focus group discussion (indicative time: 1'15 hour)

This stage aimed to collect participants' feedback on the first version of the L-Cloud competence framework. It consisted of the following steps.

Instructions (indicative time: 5 min.)

Individual task (indicative time: 15 min.)

Each attendee answered the following questions:

- Which competences should a leader in Cloud Computing have?
- What would be the most important areas or dimensions of these competences?
- What elements should the competency framework of a leader in Cloud Computing have?

A first version of the competency framework (Annex 8) was given for them to assess and comment on.

Group work (indicative time: 25 min.)

Participants were divided into three or four heterogeneous groups (depending on the number of participants), i.e., mixed groups of teachers, educational managers, decision makers, research stakeholders, representatives of local associations, etc. The discussion topics to discuss by each group were:

- How well do you think that the proposed framework addresses the criteria under which it has been developed? In what respects it might need improvement?
- Does the descriptor(s) included the most relevant one(s) per area? Which other descriptor(s) might be also included?
- How appropriate are they for allowing assessment of the educational leaders' competences (as can-do-statements)? In what respects they can be improved?

Group discussion (indicative time: 30 min.)

The participants presented outcomes of discussions by sharing their perspectives on the relevance of the different components of the framework (i.e. competences, knowledge, skills and dispositions). The facilitator stimulated discussion among participants. They considered additional topics for discussion if needed (e.g., other things that participants would like to add?).

F. Debrief and wrap-up (indicative time: 10 min.)

At the end of the workshop, the facilitator synthesized what was done during the workshop, explained what was done with the data collected, as well as elicited the next steps of the project.

5.3. DATA ANALYSIS

In order to validate the L-CLOUD POD MODEL of competences (table 3), different discussion groups (7 - 12 people) were held in all partner countries. In total, we organized 8 focus groups. It was agreed that the modality of these could be face-to-face and/or virtual. For the former, a digital presentation (Annex 11) was elaborated; furthermore, the competence model (Annex 8) was distributed for consultation and validation. The discussion groups were held during the months of June, July and September, 2019. Figure 4 shows pictures from different face-to-face focus groups.

Figure 4: Focus groups' pictures

In addition, virtual focus groups were organized in Spain and Italy. To this end, a questionnaire was designed (Annex 12) and distributed among educational networks in those countries. In total, we collected 17 questionnaires (14 in Spain and 3in Italy). Additionally, an international workshop was held in Ljubljana Slovenia by EUROGEO, where 30 education experts were introduced to the aims of the project and then they reviewed and evaluated the competences.

Subsequently, the data and observations obtained from the focus groups (both individual and group) were analyzed, taking into account relevance criteria (0-5), the clarity of the concepts and the observations made by the participants.

The partners reported on the events and results of their focus groups following the indications provided by the Barcelona team. The analysis was carried out aiming at:

- The validation of the framework (Annex 8).
- Gathering comments and suggestions for improvement of the framework.

6. RESULTS: L-CLOUD POD COMPETENCE MODEL

The participants of the focus groups valued the initiative very positively, and pointed out the synthesis and precision of being able to include the most relevant leader's competencies for educational cloud. All agreed on the importance of the different areas with their corresponding competencies.

They highlighted the appropriateness of the proposed areas. However, they pointed out the importance of being able to transform certain competencies, that is to say, collapsing of some descriptors. To this end, the first step was to change the name from Cloud Computing to Cloud Education, and sometimes to Cloud Education Environment. Subsequently, the following recommendations were made.

Area 1 " Communication, Collaboration and Participation ": Adapt some generic competences to the context of Cloud Education. The 1.2. "Capacity to establish a shared vision about Cloud Computing in learning environments" makes more sense to place it in area 4 rather than in this one. And above all, to formulate some that makes mention of knowledge and not only of skills and dispositions.

Area 2 " Innovation, Creativity and Creation": The importance of assessing whether it was a competence based on knowledge or skill was highlighted. And the 2.6. "Disposition to express creative ideas, experiences and emotions in Cloud Computing" generates confusion, to reformulate it.

Area 3 "Professional Development": For the most part, all competencies have great relevance. And change some concept as e.g. "teacher" for "educators", since the framework focuses on leaders in Education and not only on teachers.

Area 4 "Leadership, ethics and responsibility": Remove the word leadership, since leadership is a transversal axis in all areas. Some of the competencies such as 4.2 "Knowledge on how to integrate Cloud Computing and resources to enhance learning objectives" and 4.10 "Disposition to motivating, encouraging, trusting and valuing colleagues to create and use Cloud Computing in their contexts" the participants consider that they should go into Area 6. All agree that there are a large number of competencies, 12, which can be reduced by almost half, as some are implicit within others or repeated in other areas.

Area 5 "Social and intercultural relationship and internalization". They are coherent and relative to the area. There is a repetition or similarity, hence the need to reformulate them to remain in one. There is also the need to be able to reformulate the area to make it clearer at a conceptual level.

Area 6 "Pedagogical and organizational": It is advisable to change some term mentioned as "knowledge" for "skills", and vice versa.

In view of the above, the competency framework was revised, adapting the areas and competencies as a result of observations and suggestions, taking into account in all of them the key competences' components: knowledge, skills and dispositions (sometimes provisions or attitudes). At the same time, some of them have been reformulated, or others that were not previously contemplated have been extended. The results is presented in the Table below, as a reformulated framework of competencies for cloud leaders in education (Table 4).

Table 4: L-CLOUD POD COMPETENCE MODEL

AXES	AREAS	COMPETENCES
	1. Communication, Collaboration and Participation	1.1. **Knowledge** of the foundations of communication as applied to **Cloud Education Environments** (**CEE**). 1.2. **Ability** for communication in CEE. 1.3. **Ability** to establish a shared vision on CEE in the educational organization. 1.4. **Capacity** to build and consolidate communities of interest related to CEE. 1.5. Negotiation **skills** (social and political interactions) with multiple educational stakeholders, actors and contexts, and decision making in cloud education. 1.6. **Ability to** manage personal emotions. 1.7. **Disposition** to team building and active participation in CEE**.**
	2. Innovation, Creativity and Creation	2.1. **Knowledge** of the foundations of creativity as applied to CEE 2.2. **Ability** to lead cloud education innovations in parallel to the pedagogical project and the infrastructure of the centre. 2.3. **Ability** to creatively use CEE in different educational contexts. 2.4. **Disposition** to investigate about current research, innovations and best practices in the field of cloud education. 2.5. **Disposition** to express creative ideas, experiences and emotions about CEE.
	3. Professional Development	3.1. Understanding, construction and continuous reflexion on educational leaders' professional digital identity in CEE. 3.2. Ability to actively participate in educational research and practitioner networks in CEE. 3.3. **Ability to** critically assess your own practice as leaders and develop their understanding of effective and sustainable leadership. 3.4. Disposition to participate in cloud education Professional Development programmes (CPD). 3.5. Disposition to promote reflexive practice and professional development focused on engagement, responsibility, teaching, learning and leadership, and keeping abreast of change.

L-CLOUD POD COMPETENCE MODEL	**4. Ethics and professional responsibility**	4.1. **Knowledge** on the effective and ethical use of the different types of CEE (public, private and hybrid) and their services, tools and functionalities (SaaS, PaaS and IaaS). 4.2. **Knowledge** on legal issues related to safety, data protection, privacy and a responsible use of CEE. 4.3. **Ability** to solve complex problems in CEE. 4.4. **Disposition to** Identifying and removing barriers to create/maintain a cloud education infrastructure. 4.5. **Disposition** to motivating, encouraging, trusting and valuing colleagues to create and use cloud education in their contexts 4.6. **Disposition** to social and global awareness and responsibility in relation to CEE. 4.7. **Disposition** to promote and build an ethical digital identity in cloud education.
	5. Intercultural relationships and internalization	5.1. **Knowledge** on international and global aspects of CEE. 5.2. **Ability t**o build and maintain intercultural relationships with partner, stakeholders and the educational community as a whole through CEE**.** 5.3. **Disposition** to promote international mobility, entrepreneurship, training and cooperation on cloud education. 5.4. **Disposition to r**espect and become aware of the diversity of learners' cultures, and identify common values. 5.5. **Commitment** to foster inclusion, cross-cultural skills and equal opportunity in CEE.
	6. Pedagogical and Organizational	6.1. Pedagogical content **knowledge** in relation to different subjects, contents and structure in CEE. 6.2. **Knowledge** on contextual, institutional, organizational aspects of educational policies 6.3. **Knowledge** on class management, assessment and feedback processes in **CEE.** 6.4. **Skills** on using, developing, creating and managing **CEE,** including applications, devices, and networks 6.5. **Skills** on selecting, creating, organizing, sharing and publishing educational content according to different **CEE.** 6.6. **Skills** to identify students' learning needs, and learning progress in the cloud. 6.7. **Disposition to** accept responsibilities to planning and implementing **CEE**

O2/A3: DEFINITION OF AN INTERNATIONAL PROFESSIONAL CERTIFICATION PROGRAMME

7. INTRODUCTION

Generally speaking, CPD programmes most often refer to the professional development of in-service teachers and other professional of education. CPD could be defined as ongoing education and training for practising professionals, with the aim of supporting them in keeping abreast of the rapid and numerous changes taking place in education. “Then, the purpose of most certification programs is to elevate the credibility and professionalism of the members of the associations developing and promulgating the standards and to elevate the quality of products and services delivered by certified individuals (Knapp, 1995, p. 1). These certificates are considered a tool or means to measure the knowledge or set of professional competences. In so doing, the Professional Certification is “the voluntary mechanism for validating professional knowledge and expertise in a speciality. Voluntary professional certification can set standards and lead to quality for specific skills needed to perform a specific task or role” (Harris, 2001, p. xviii).

Thus, the International Professional Certification Programme (IPCP) is an academically based document obtained by successfully completing an online course, in our case, Developing Tomorrow's Cloud Education Leaders. This document aims to certify the level of knowledge and competences that a person has acquired in a certain profession or field. It is usually issued by international experts or professional societies or organizations. On this occasion it will be issued by the European Association of Career Guidance (EACG). Normally the professional certificate programs include: the title of the course, the hours of duration, the modality of delivery (face-to-face or virtual), and the participating institutions, among others.

At European level, considering the **European Qualifications Framework (EQF),** this Certicate accomplish the Level 5, with a view of comprehensive and specialised expertise knowledge, and mastering the facts related to leadership in the specific area of leadership in cloud education (European Commission, 2018). Furthermore the **L-CLOUD International Professional Certificate** has been designed requesting creative skills for solving the current problems and issues of the new cloud education paradigm. Those professionals receiving the L-CLOUD Certificate are prepared to manage and supeervise the implementation of cloud education in educational institutions, being to advance new issues and lloking solutions. These professional are able to perform adequatly in cloud education as well as to lead othe people, e.g. techers, headmasters, etc., in all aspects of cloud education.

This Certificate has a time limit of 5 years, since, as it is a subject in constant transformation, the competences in Cloud Education Environment (CEE), requires a permanent updating to keep up with the advances in the area.

8. THE L-CLOUD ADAPTABLE CLOUD EDUCATION LEADER CERTIFICATE

Taking into account the ideas presented, the L-Cloud partnership has designed an International Professional Certification Programme, compliant with the norms of the Certified Data Protection (CDP) and the Continuing Professional Development (CPD).

This section sets out the requirements and the process to be followed to acquire the necessary skills to be a leader in Cloud Education Environment.

The **Adaptable Cloud Education Leader Certificate** consists of the following steps:

A. Online Course / Modules (MOOC): To qualify for the Certificate, the interested person will complete the different modules of the course. A total of eight components, an introductory one, six modules related to each of the competence areas of the POD Model, and an assessment and reflection of the course itself:

1) Introduction: Focus Groups consultation and validation the L-Cloud POD Model framework, Evolution of Education and Cloud-Based Tools.
2) Module 1: Communication, Collaboration and Participation en Cloud education environments (Competence Area 1).
3) Module 2: Creativity, Innovation and Creation (Competence Area 2).
4) Module 3: Professional Development (Competence Area 3).
5) Module 4: Ethics and Professional Responsibility (Competence Area 4).
6) Module 5: Intercultural Relationships and Internalization (Competence Area 5).
7) Module 6: Pedagogical and Organizational aspects (Competence Area 6).
8) Reflection and Evaluation. Participants Self Reflection, Course Evaluation.

The delivery mode of the training is online, and mostly asynchronous, enhanced with videos.

For Part A the Certification candidate needs to write 100-200 words for each module (1-6) completed, giving an executive summary of the content of the module.

B. Design of an Implementation cloud education plan in the chosen educational setting.

In order to do so, the following must be accomplished:

B1 - Write a report (300 words, the user may include annexes, links or other resources). The report shall consist of:

1. Structure of the plan
2. Methodology used (creativity and innovation in actions will be valued)
3. Implementation Plan
4. Duration
5. Intended results & and potential impact (measuring indicators, evidences, cloud-based tools).
6. Risk management and evaluation plan
7. Continuity and sustainability plan

Note: The implementation of the designed Plan in real settings is optional, however it is highly recommended.

B2 - Produce a video of 3-5 minutes duration, communicating the plan described in Part B1 with creativity vision report and evidence for its application and results, self-reflections and future steps. This video could be developed in either of the following two formats:

1. As a candidate's streaming video of the implemented plan in B1.
2. A presentation like a PPT video, with the candidate's voice-over, stressing the key facts of this implementation, so the listener understands what has been done, and what have been the results and impact in the educational institution.

Requisites for grading the Certificate

In order to receive the **Adaptable Cloud Education Leader Certification** it is required to finalise each module and deliver the proposed reports. The levels of Achievement are A (Excellent), B (Good), and C (Fair) or (F) Failure.

REFERENCES

Bernal, A. & Ibarrola, S. (2015). Liderazgo del profesor. Objetivo básico de la gestión educativa. *Revista Iberoamericana de Educación, 67,* pp. 55-70.

Bhatia, S (2014). 5 surprising ways Cloud Computing is changing education. https://cloudtweaks.com/2014/12/cloud-computing-education-2/

Bolman, R. (2004). Liderar comunidades eficaces de aprendizaje profesional. En A. Villa (Coord.). *IV Congreso Internacional sobre Dirección de Centros Educativos. Dirección para la Innovación: apertura de los centros a la Sociedad del Conocimiento*, (pp. 129-145). Bilbao, España: I.C.E de la Universidad de Deusto.

Day, C., Harris, A. & Hadfield, M. (2001): Grounding Knowledge of Schools in stakeholder realities: a multi – perspective study of effective school leaders. *School Leadership and Management, 21*(1), 19 – 42

Deakin, R. (2008). Key competencies for Education in a European context: narratives of accountability or care. *European Educational Research Journal*, 7(3), 311-118. http://dx.doi.org/10.2304/eerj.2008.7.3.311

Donert, K. (2018). The Cloud in Education: Policy, Leadership and Management Issues. In K.C. Koutsopoulos, K. Doukas & Y. Kotsanis. Handbook of Research on Educational Design and Cloud Computing in Modern Classroom Settings. IGI Global.

European Communities (2008). *The European Qualifications Framework for lifelong learning (EQF).* Luxembourg: Education and Culture DG. http://ecompetences.eu/wp-content/uploads/2013/11/EQF_broch_2008_en.pdf

European Commission (2007). *Communication from the Commission to the European Parliament and Council: Improving the Quality of Teacher Education*. COM (2007) 392 final. Brussels, 3.8.2007.

European Commission (2013). *Supporting teacher competence development for better learning outcomes.* Education and Training. http://ec.europa.eu/assets/eac/education/experts-groups/2011-2013/teacher/teachercomp_en.pdf

European Commission (2018). The European Qualifications Framework: supporting learning, work and cross-border mobility. Luxembourg: Publications Office of the European Union. doi:10.2767/385613

European Parliament (2012). *Cloud Computing. Study.* Brussels: Policy Department Economic and Scientific Policy. http://www.europarl.europa.eu/document/activities/cont/201205/20120531ATT46111/20120531ATT46111EN.pdf

European Union (2019). ESCO Handbook. European Skills, Competences, Qualifications and Occupations. European Commission. doi:10.2767/934956

Harris, A. (2004). *Improving schools through teacher leadership*. Londres, UK: Open University Press.

Harris, P. (2001). *The Guide to National Professional Certification Programs.* Amherst – Massachusetts: HRD PRESS.

Knapp, J.E. (1995). *Designing Certification and Accreditation Programs*. Pricenton: Associates International, Inc.

Koutsopoulos, K. & Kotsanis, Y. (2014). School on Cloud: Towards a paradigm shift. *Themes in Science & Technology Education, 7*(1), 47-62.

Mell, P. & Grance, T. (2011). *The NIST Definition of Cloud Computing. Recommendations of the National Institute of Standards and Technology*. Gaithersburg, Maryland: Computer Security Division, Information Technology Laboratory. https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf

OCDE. (2009). *Informe TALIS. La creación de entornos eficaces de enseñanza y aprendizaje. Síntesis de los primeros resultados*. Madrid: Santillana.

Robinson, V. M. J. (2007). *School leadership and student outcomes: Identifying what works and why*. Winmalee, NSW: Australian Council for Educational Leaders

Salinas, J. (2013). La computación en la nube y sus posibilidades para la formación. En J.J. Aguaded & J. Cabero (ed.). *Tecnologías y medios para la educación en la e-sociedad,* 137-158. Madrid: Alianza .

Sampson, D. & Fytros, D. (2008). Competence Models in Technology-Enhanced Competence-Based Learning. In H. Adelsberger, Kinshuk, J.M. Pawlowski & D. Sampson (Eds.) *Handbook on Information Technologies for Education and Training. International Handbooks on Information Systems*. Berlin: Springer.

Smith, P. & Peterson, M. (1990). *Liderazgo, Organización y Cultura: Un Modelo de dirección de Sucesos.* Madrid: Pirámide.

ANNEXES

ANNEX 1: L-CLOUD COMPETENCE FRAMEWORK - THEMATIC AGRUPATION (CATEGORIOZATION / AREAS)

Communication

1. KC1: Communication in the mother tongue: ability to express and interpret concepts, thoughts, feelings, facts and opinions in both oral and written form and to interact linguistically in an appropriate and creative way;
2. KC2: Communication in foreign languages: involving mediation and intercultural understanding;
3. Communication and Collaboration
4. Communication
5. Communication literacy
6. Communication and Collaboration
7. Ways to build, communicate and implement a shared vision
8. Digital communication & collaboration
9. Organisational communication
10. Communication using digital technologies
11. Organizational communication
12. Communication
13. Excellent communication skills
14. Communication
15. Communicate the guiding vision for the school and lead its realisation.
16. Develop learners' global awareness and understanding using digital communication and collaboration tools

Collaboration

1. Communication and Collaboration
2. Collaboration and teamwork
3. Communication and Collaboration
4. Co-operate and collaborate with colleagues to enhance their own learning and teaching.
5. Guide and support learners in the networks in which information can be found and built
6. Promote mobility and co-operation in Europe
7. Digital communication & collaboration
8. Collaborative groups
9. Dispositions to team-working, collaboration and networking Sense of self-efficacy
10. A collaborative school vision of excellence and equity that sets high standards for every pupil
11. Collaborating with colleagues, parents and social services
12. Professional collaboration
13. Learner collaboration
14. Promotion of collaborative construction of knowledge with digital resources
15. Working effectively with others
16. Professional collaboration
17. Collaborative learning
18. Collaborative Relationships
19. Build professional networks with other school leaders

20. Develop learners' global awareness and understanding using digital communication and collaboration tools
21. Initiate peer support and collaborative, work-place learning
22. Analyzing collaboratively

Participation

1. Support them to develop into fully participating and active members of society
2. Online Citizen Participation
3. Active participation in educational networks in digital environments
4. Participation in virtual learning communities for teaching updating
5. Participation in permanent training activities in the field of digital competence
6. Participation in educational research related to digital technologies
7. Developing research, innovation and technology transfer networks
8. Participate in local and global professional learning communities

Teamwork

1. Team Culture
2. Team Communication
3. Team Structures
4. Team Goals
5. Building teamsand empowering them.

Mobility

1. Promote mobility and co-operation in Europe.

Digital competence

1. KC4: Digital competence: involves the confident and critical use of information society technology (IST) and thus basic skills in information and communication technology (ICT);
2. ICT (Information, Communications and Technology) Literacy
3. Information technology
4. Digital Citizenship
5. ICT
6. Digital literacy
7. Digital communication & collaboration
8. Digital content creation
9. Make effective use of technology where this is appropriate, integrate it effectively into learning and teaching
10. Guide and support learners in the networks in which information can be found and built
11. Technology Operations and Concepts
12. Effective use of technologies in learning
13. Using teaching materials and technologies
14. Policy awareness
15. Basic knowledge
16. Knowledge application
17. Knowledge society skills
18. Integrate technology
19. Basic, complex, pervasive tools
20. New technologies, their use and impact
21. The use of appropriate new technologies
22. Data management

23. Organizational communication
24. Professional collaboration
25. Reflective practice
26. Digital Continuous Professional Development (CPD)
27. Selecting digital resources
28. Organizing, sharing and publishing digital resources
29. Creating and modifying digital resources
30. Instruction
31. Teacher-learner interaction
32. Learner collaboration
33. Self-directed learning
34. Assessment formats
35. Analysing evidence
36. Feedback and Planning
37. Accessibility and inclusion
38. Differentiation and personalization
39. Actively engaging learners
40. Information and media literacy
41. Wellbeing
42. Understanding ICT in education
43. Curriculum and assessment
44. Pedagogy
45. Organisation and administration
46. Teacher professional learning
47. Navigation, search and filtering of information, data and digital content
48. Evaluation of information, data and digital content
49. Storage and retrieval of information, data and digital content
50. Interaction through digital technologies
51. Sharing information and digital content
52. Online Citizen Participation
53. Collaboration through digital channels
54. Netiquette
55. Digital Identity Management
56. Digital content development
57. Integration and re-elaboration of digital contents
58. Copyright and Licensing
59. Program
60. Device Protection
61. Protection of personal data and digital identity
62. Health protection
63. Protection of the environment
64. Solving technical problems
65. Identification of technological needs and responses
66. Innovation and creative use of digital technology
67. Identification of gaps in digital competition
68. Participation in educational research related to digital technologies
69. Digital citizenship

70. Security in a digital environment
71. Design of apps
72. Development and management of strategies for ICT quality
73. Digital Continuous Professional Development (CPD)
74. Selecting
75. Analysing evidence
76. Feedback and Planning
77. Accessibility and inclusion
78. Differentiation and personalization
79. Content creation
80. Responsible use
81. Technological Facility
82. Know how to use the Web to efficiently find credible information and resources
83. Know what technology tools to use to solve a particular problem or to meet a specific need
84. Be able to evaluate quality digital instructional curricula. And also know how to successfully teach and take an online course
85. Make a digital presentation that primarily uses engaging images and minimal text
86. Be able to Skype or use other live digital video communication tools
87. Know how to use digital collaboration tools.
88. Adopt the habit of an enquiring mind regarding the educational value of using digital tools and resources.
89. Select appropriate digital tools and resources when fulfilling the roles of the educator
90. Students and educators competently and readily use technologies, including applications, devices, and networks, to communicate effectively, collaborate purposefully, consume strategically, produce creatively, manage reflectively, and lead ethically for improved student achievement.

Digital Identity

1. Digital Identity Management
2. Protection of personal data and digital identity
3. Promotion of digital inclusion
4. Promotion of the construction of an adequate digital identity
5. Configuration of the professional digital self-identity

Social and civic competences

1. KC6: Social and civic competences: personal, interpersonal and intercultural competence and all forms of behaviour that equip individuals to participate in an effective and constructive way in social and working life (understanding of codes of conduct and customs, civic competence, knowledge of social and political concepts and structures);
2. Social and Cross-Cultural Skills;
3. Digital Citizenship
4. Civic Literacy
5. Personal and social responsibility
6. Support them to develop into fully participating and active members of society
7. Social inclusion
8. Understand the factors that create social cohesion and exclusion in society
9. Work effectively with the local community, and with partners and stakeholders in education – parents, teacher education institutions, and representative groups
10. Dispositions to promote students' democratic attitudes and practices, as European citizens (including appreciation of diversity and multiculturality)

Sense of initiative

1. KC7: Sense of initiative and entrepreneurship: ability to turn ideas into action, involving creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives;

Learning to learn & Learning

1. KC5: Learning to learn: ability to pursue and organise one's own learning, either individually or in groups, in accordance with one's own needs, and awareness of methods and opportunities;
2. Work with learners as individuals
3. Increase the collective intelligence of learners
4. Build and manage learning environments
5. View learning as a lifelong journey
6. Evaluation and assessment processes and methods
7. Learning organizations
8. Manage and guide
9. Learning to learn and metacognition
10. Commitment to promoting the learning of all students
11. Instruction
12. Teacher-learner interaction
13. Learner collaboration
14. Actively engaging learners
15. Self-regulated learning
16. Actively engaging learners
17. Continuing Learning
18. Adult Learning
19. Integrate learners' skills development in terms of digital literacies with curriculum-based learning,

Cultural awareness and expression

1. KC8: Cultural awareness and expression: appreciation of the importance of the creative expression of ideas, experiences and emotions in a range of media.
2. Understand the factors that create social cohesion and exclusion in society
3. Issues of inclusion and diversity
4. Policy awareness

Leadership and Responsibility

1. Leadership and Responsibility
2. Personal and social responsibility
3. Preparing learners to be globally responsible in their role as eu citizens
4. Decision making
5. Leading change through people
6. Guidance
7. Power of teaching and learning
8. Resourceful
9. Lead by example
10. Reflective Practice
11. Personal Effectiveness
12. Interpersonal Effectiveness
13. Communication

14. Continuing Learning
15. Group Processes
16. Adult Learning
17. Technological Facility
18. Coaching/Mentoring
19. Collaborative Relationships
20. Community
21. Implementation
22. Advocacy
23. Policy Making
24. Engagement
25. Leading with Vision
26. Leading with Skill
27. Organizing/Advocacy
28. Building Capacity
29. Community/Culture
30. Self-Awareness
31. Self-Management
32. Social Awareness
33. Relationship Management
34. Vision, Plan
35. Act
36. Assess
37. Coaching Relationship
38. Listening
39. Powerful Questioning
40. Facilitative and Directive Coaching Styles
41. Reflection
42. Action Planning
43. Implementation
44. Team Culture
45. Team Communication
46. Team Structures
47. Team Goals
48. Long-Term Planning
49. Assessment
50. Professional Development and Meeting Design
51. Session Delivery
52. Developing Self-Awareness
53. Managing Emotions
54. Building Resilience
55. Growing as a Professional
56. Be proficient in using their district's data systems
57. Know how to use the Web to efficiently find credible information and resources
58. Know what technology tools to use to solve a particular problem or to meet a specific need
59. Be able to evaluate quality digital instructional curricula. And also know how to successfully teach and take an online course
60. Be proficient in accessing and working with district, school and student data
61. Make a digital presentation that primarily uses engaging images and minimal text
62. Be able to Skype or use other live digital video communication tools

63. Know how to use digital collaboration tools
64. Know how to effectively use mobile devices (laptops, tablets, smartphones, etc.) and to select the productivity tools necessary to be most efficient in the administrative aspects of one's job
65. Promote and facilitate the development of student voice and student leadership
66. Integrate digital tools and resources to enhance learning objectives in various learning environments.
67. Demonstrate commitment to the vision for digital learning in the province, district and school
68. Accept responsibility for planning and implementing digital learning at the school.
69. Aligning to the vision .
70. Articulating connection to the vision
71. Identifying and removing barriers
72. Championing the vision
73. Developing support
74. Planning improvement
75. Setting and monitoring goals
76. Affirmation of progress
77. Setting expectations for learning
78. Developing curriculum
79. Designing instruction
80. Supporting instruction
81. Implementing assessment
82. Emphasizing accountability
83. Responding to student needs
84. Ensuring adequate resources
85. Designing a school schedule
86. Providing co- and extra-curriculars
87. Fostering a data culture
88. Analyzing collaboratively
89. Conversing about data
90. Communicating data
91. Using research and data to drive
92. Creating and implementing clear expectations
93. Fostering a professional learning environment
94. Implementing values and character
95. Providing a positive, welcoming environment
96. Instituting behavior management
97. Developing traditions
98. Establishing processes
99. Inspiring trust and risk-taking
100. Celebrating success.
101. Assessing school culture and climate
102. Abiding by laws and regulations
103. Structuring management
104. Assisting governance
105. Instituting operational systems
106. Managing facilities
107. Allocating resources
108. Managing finances
109. Fundraising
110. Implementing a safety plan

111. Maintaining school records
112. Monitoring and adjusting
113. Understanding community
114. Involving the community
115. Ensuring stakeholder input
116. Establishing partnerships
117. Communicating to stakeholders
118. Utilizing community resources
119. The use of appropriate new technologies
120. Motivating, encouraging, trusting and valuing colleagues to do well.
121. Modelling, leading by example, especially in teaching.
122. Providing an opportunity to undertake greater responsibility and undergo development programmes from the second year of teaching.
123. Promoting professional development focused on teaching, learning and leadership, and keeping abreast of change; coaching is much in evidence
124. Encouraging initiative and allowing people –students and staff –to experiment, confident they will be supported
125. Showing interest and being generous with praise, encouragement and help in moving forward
126. Knowing the names of a very high proportion of learners; valuing and respecting them
127. Being community-minded, involving, consulting and being engaged within the local community
128. Building teamsand empowering them.
129. Focused on student achievement; puts children ahead of personal or political interests
130. Resilient and persistent in goals, but adaptable to context and people
131. Willing to develop a deep understanding of people and context.
132. Willing to take risks and challenge accepted beliefs and behaviours
133. Self-aware and able to learn
134. Optimistic and enthusiastic.

Information / media literacy

1. Information Literacy;
2. Research and Information Fluency
3. Media Literacy;
4. Information literacy
5. Information technology
6. Information and media literacy

Creativity and Innovation

1. Creativity and Innovation
2. Creativity and innovation
3. Creativity and Innovation
4. Policy innovation
5. Pervasive tools
6. Self management
7. Innovation and creative use of digital technology
8. Creation and dissemination of educational contents and resources in digital format
9. Application of innovative methodologies with the use of digital technologies
10. Incorporation of teaching innovations based on digital technologies
11. Developing research, innovation and technology transfer networks

12. Innovation
13. Creating and modifying
14. Transform learning through the innovative use of digital tools and resources

Critical thinking

1. Critical thinking
2. Critical Thinking and Problem Solving
3. Critical Thinking
4. Reflective practice
5. Reflective practice on professional activity related to digital technologies
6. Reflective practices
7. Reflective Practice

Problem Solving

1. Critical Thinking and Problem Solving
2. Problem solving
3. Problem Solving
4. Complex problem solving
5. Solving technical problems
6. Problem solving

Flexibility and Adaptability

1. Flexibility and Adaptability
2. Dispositions to change, flexibility, ongoing learning and professional improvement, including study and research
3. Intellectual flexibility

Decision Making

1. Decision Making
2. Make choices over the delivery of education
3. Negotiation skills (social and political interactions with multiple educational stakeholders, actors and contexts)
4. Wellbeing
5. Policy Making

Personal qualities

1. Global Awareness
2. Initiative and Self-Direction
3. Personal and social responsibility
4. Knowledge of human growth and development
5. Personal and social responsibility
6. Self-management
7. Manage and guide
8. Life and career
9. Promoting competitiveness
10. Self-Belief
11. Self-awareness
12. Self-management
13. Personal integrity
14. Effective and strategic influencing
15. Self-aware

16. Personal Effectiveness
17. Interpersonal Effectiveness
18. Self-Awareness
19. Self-Management
20. Social Awareness
21. Developing Self-Awareness
22. Managing Emotions
23. Building Resilience
24. Resilient and persistent in goals, but adaptable to context and people
25. Willing to take risks and challenge accepted beliefs and behaviours
26. Self-aware and able to learn
27. Optimistic and enthusiastic.

Productivity and Accountability

1. Productivity and Accountability
2. Develop and implement a system to promote professional responsibility and accountability
3. Emphasizing accountability

Potential

1. Nurturing the potential of every learner

Knowledge

1. Work with a variety of types of knowledge: access, analyse, validate, reflect on and transmit knowledge
2. Good understanding of subject knowledge
3. Be aware of the ethical dimensions of the knowledge society
4. Pedagogical Content Knowledge (PCK), implying deep knowledge about content and structure of subject matter.
5. Curricular knowledge
6. Basic knowledge
7. Knowledge application
8. Knowledge society skills
9. Manage and guide
10. Teacher as model learner
11. Using, developing and creating research knowledge to inform practices
12. Management of knowledge and information
13. The teacher has the requisite subject knowledge, pedagogical knowledge and classroom management skills

Teaching

1. Critical attitudes to one's own teaching (examining, discussing, questioning practices)
2. Teaching
3. The teacher selects and uses planning, preparation and assessment practices that progress students' learning
4. The teacher selects and uses teaching approaches appropriate to the learning objective and to students' learning needs
5. Understand the role of the teacher, the learner and the digital resources during digital learning
6. Students and educators competently and readily use technologies, including applications, devices, and networks, to communicate effectively, collaborate purposefully, consume

strategically, produce creatively, manage reflectively, and lead ethically for improved student achievement.

Ethics

1. Encourage intercultural respect and understanding
2. Respecting and being aware of the diversity of learners' cultures and identifying common values
3. Be aware of the ethical dimensions of the knowledge society
4. Protection of fundamental rights to personal integrity and privacy in the use of digital technologies
5. Responsible, safe and healthy use of digital technologies
6. Promotion of access to resources with respect to intellectual property

Relationship

1. Build and maintain effective relationships with parents, carers, partners and the community, which enhance the education of all pupils.
2. Collaborative Relationships
3. Relationship Management
4. Coaching Relationship
5. Build professional networks with other school leaders

Design, planning and didactic implementation

1. Use of digital technologies as resources and strategies in teaching and learning processes.
2. Selection of digital resources for the design of activities and didactic planning
3. Incorporation of digital technologies in coherence with the educational project and the infrastructures of the centre.
4. Incorporation of the digital competence of the students in the didactic programmes
5. Use of digital technologies to meet the diversity of students
6. Use of digital technologies in the monitoring and assessment of students
7. Application of innovative methodologies with the use of digital technologies
8. Creation and dissemination of educational contents and resources in digital format
9. The teacher selects and uses planning, preparation and assessment practices that progress students' learning

Organisation and management of space and digital resources

1. Knowledge and application of rules for the use of resources, infrastructures and digital spaces
2. Knowledge and use of the centre's general application programme
3. Organisation of digital technologies taking into account the different learning environments
4. Involvement in centre projects related to digital technologies

Professional Development

1. Configuration of the professional digital self-identity
2. Reflective practice on professional activity related to digital technologies
3. Incorporation of teaching innovations based on digital technologies
4. Participation in educational research related to digital technologies
5. Creation and dissemination of educational contents and resources in digital format
6. Participation in virtual learning communities for teaching updating
7. Participation in permanent training activities in the field of digital competence
8. Entrepreneurship and internalization
9. Professional Development and Meeting Design

10. Growing as a Professional
11. Be reflective about challenging current digital learning and teaching practice

Entrepreneurship and internalization

1. Entrepreneurship and internalization
2. Empowering others

Susteinability

1. Susteinability
2. Critique their practice as leaders and develop their understanding of effective and sustainable leadership

Management

1. Problem management
2. Development and management of strategies for information security
3. Management of knowledge and information
4. Project and portfolio management
5. Risk management
6. Data management
7. Self-management
8. Digital Identity Management
9. Development and management of strategies for ICT quality
10. Managing, protecting and sharing
11. Relationship Management
12. Enhance class management, assessment and feedback processes through the use of digital resources
13. Instituting behavior management
14. Structuring management

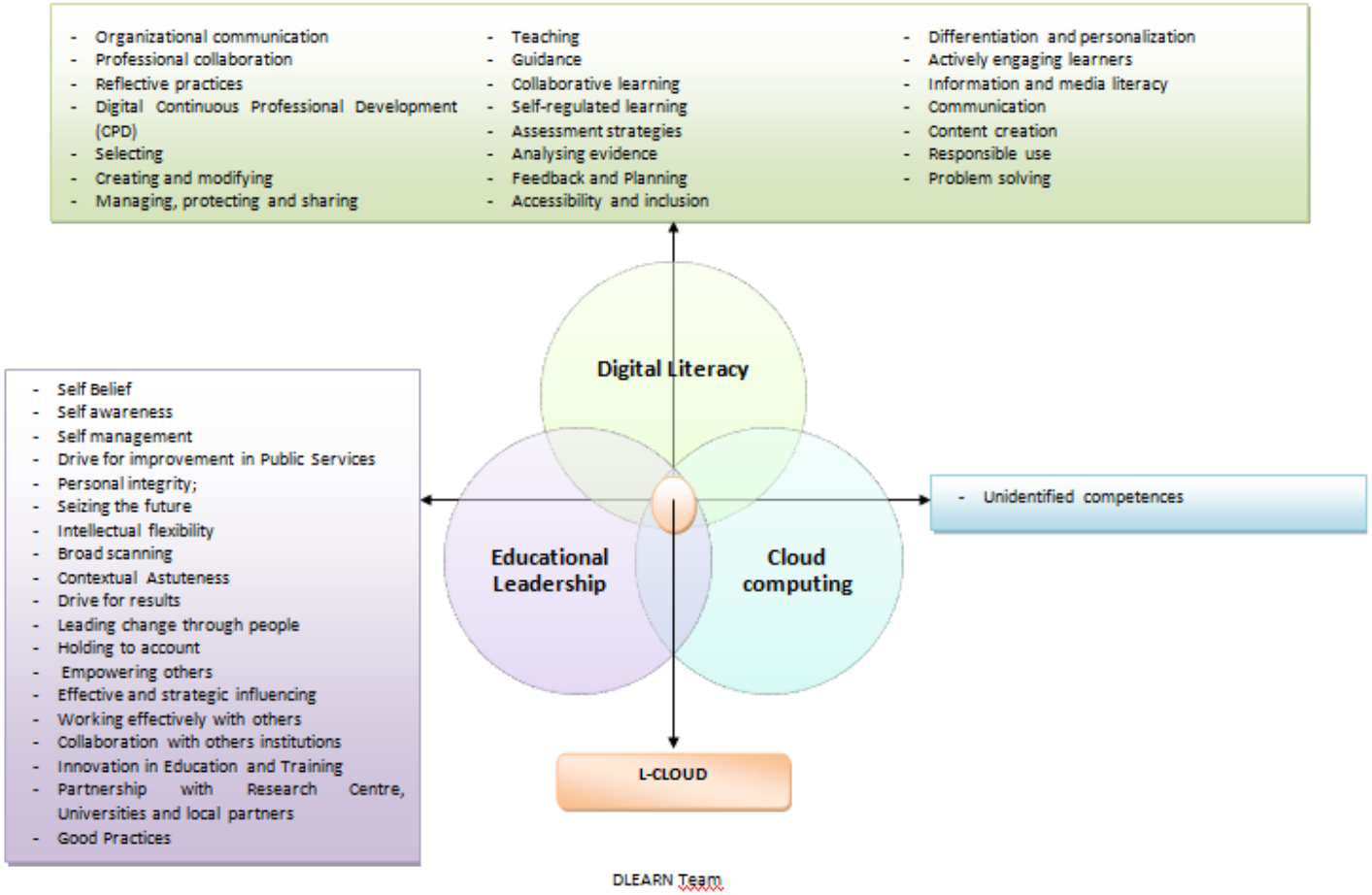
Effective & strategy

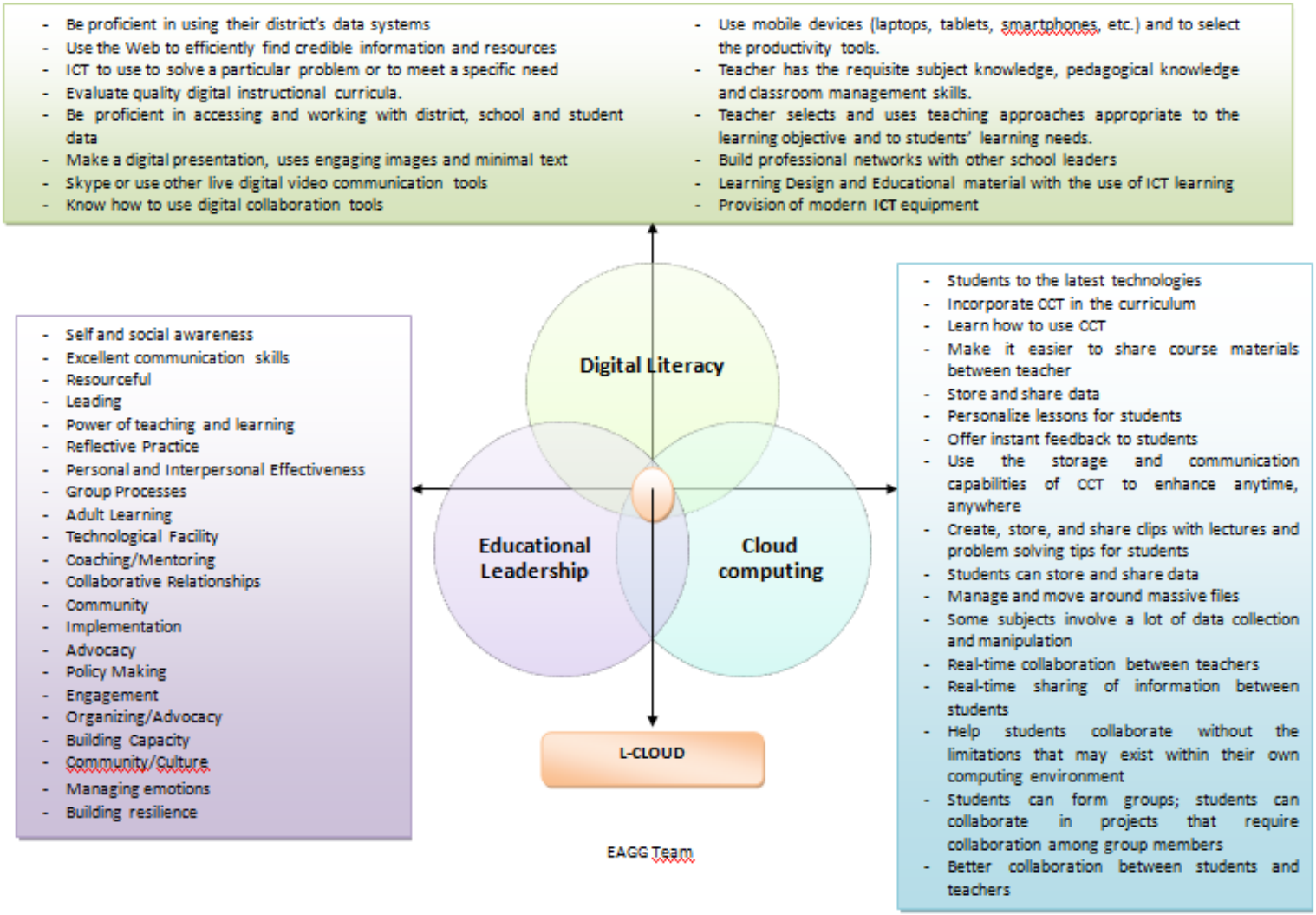
1. Effective and strategic influencing
2. Assessment strategies
3. Know how to effectively use mobile devices (laptops, tablets, smartphones, etc.) and to select the productivity tools necessary to be most efficient in the administrative aspects of one's job

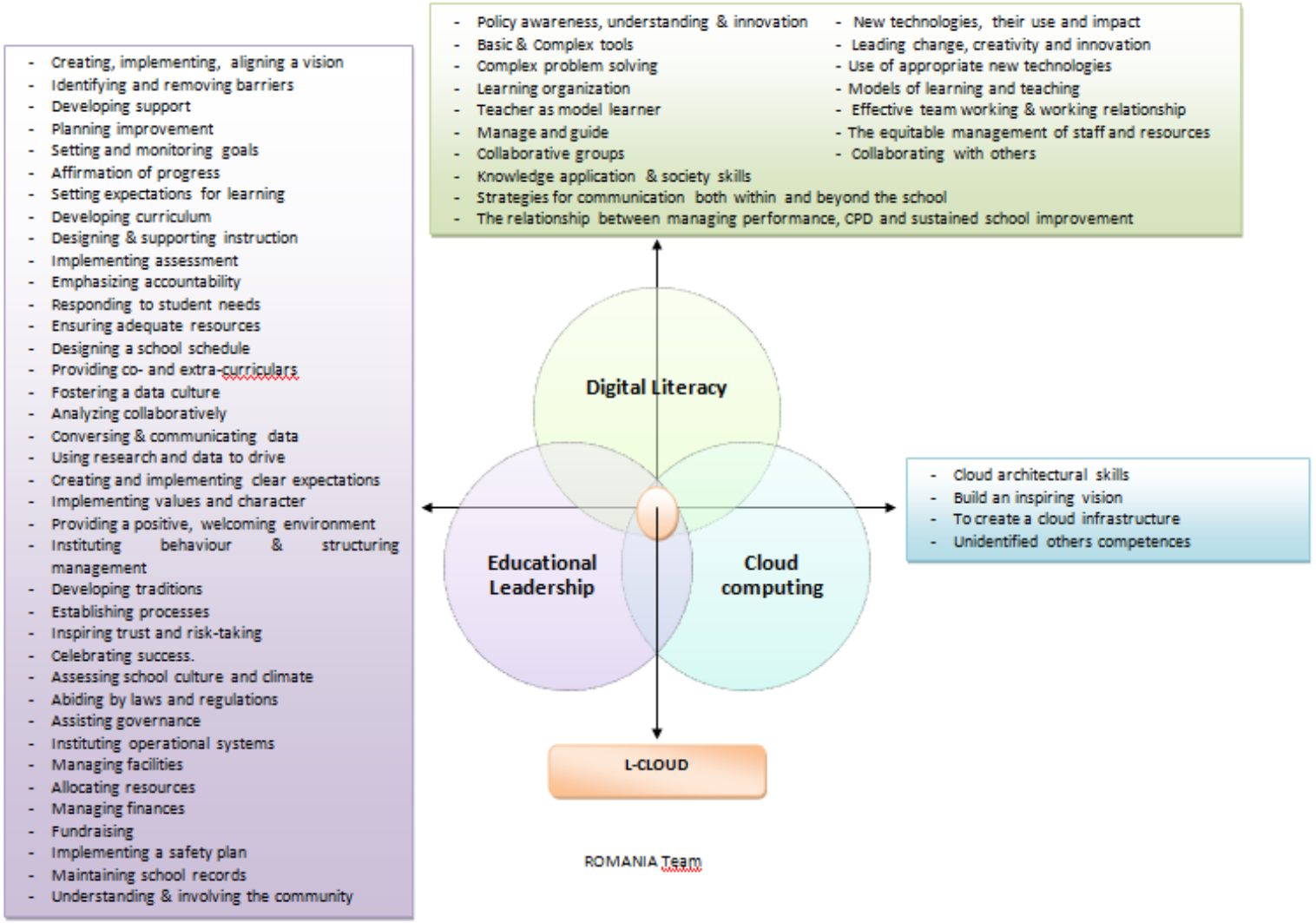
Inclusion, diversity & equality

1. Foster a commitment to inclusion, equality of opportunity and the holistic development of each student.
2. Inclusion and the ability and right of all to be the best they can be

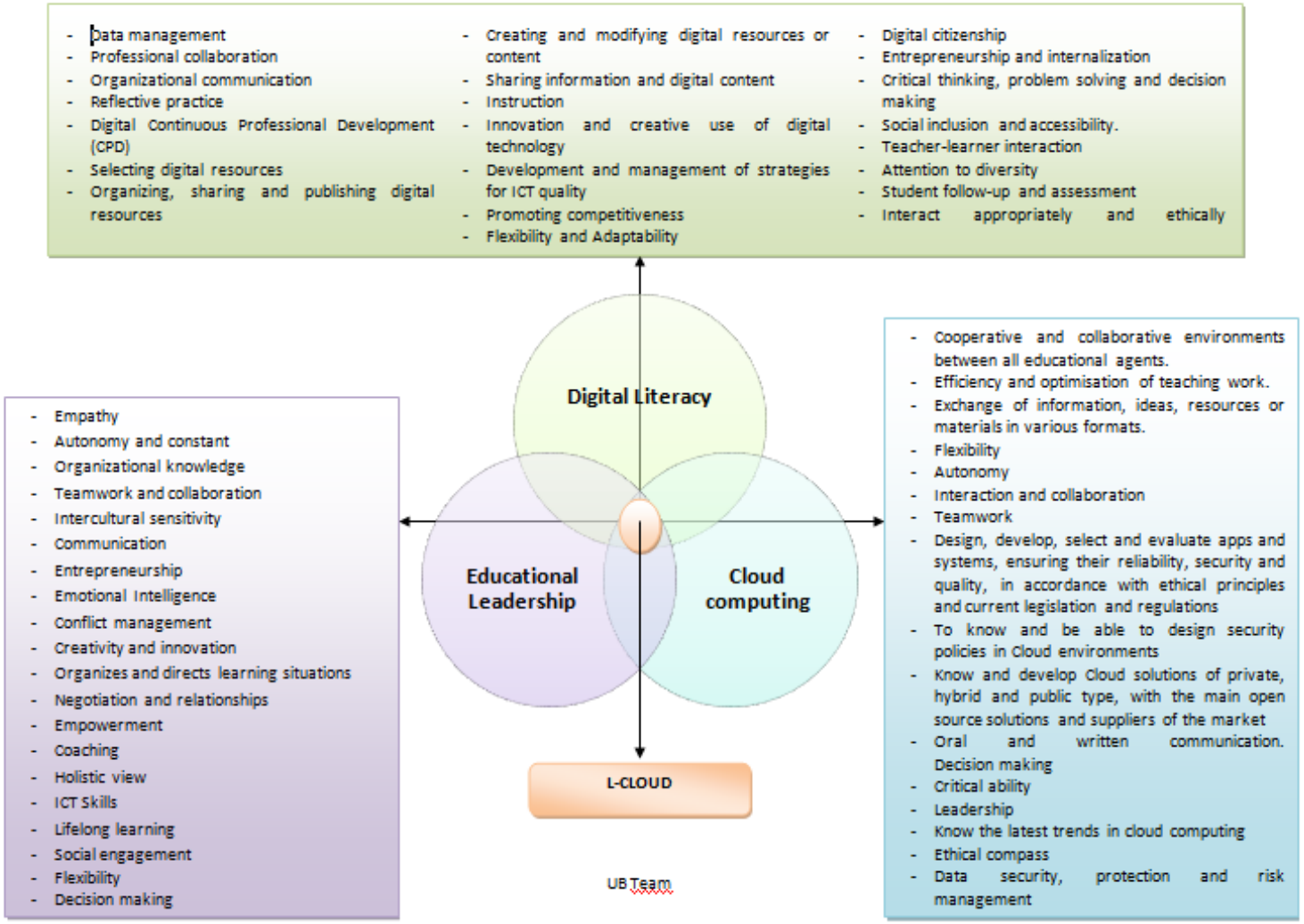
ANNEX 2: DIGITAL LITERACY, LEADERSHIP AND CLOUD COMPUTING COMPETENCES




- Be proficient in using their district's data systems
- Use the Web to efficiently find credible information and resources
- ICT to use to solve a particular problem or to meet a specific need
- Evaluate quality digital instructional curricula.
- Be proficient in accessing and working with district, school and student data
- Make a digital presentation, uses engaging images and minimal text
- Skype or use other live digital video communication tools
- Know how to use digital collaboration tools
- Use mobile devices (laptops, tablets, smartphones, etc.) and to select the productivity tools.
- Teacher has the requisite subject knowledge, pedagogical knowledge and classroom management skills.
- Teacher selects and uses teaching approaches appropriate to the learning objective and to students' learning needs.
- Build professional networks with other school leaders
- Learning Design and Educational material with the use of ICT learning
- Provision of modern ICT equipment
- Self and social awareness
- Excellent communication skills
- Resourceful
- Leading
- Power of teaching and learning
- Reflective Practice
- Personal and Interpersonal Effectiveness
- Group Processes
- Adult Learning
- Technological Facility
- Coaching/Mentoring
- Collaborative Relationships
- Community
- Implementation
- Advocacy
- Policy Making
- Engagement
- Organizing/Advocacy
- Building Capacity
- Community/Culture
- Managing emotions
- Building resilience
Digital Literacy
Educational Leadership
Cloud computing
L-CLOUD
EAGG Team
- Students to the latest technologies
- Incorporate OCT in the curriculum
- Learn how to use OCT
- Make it easier to share course materials between teacher
- Store and share data
- Personalize lessons for students
- Offer instant feedback to students
- Use the storage and communication capabilities of OCT to enhance anytime, anywhere
- Create, store, and share clips with lectures and problem solving tips for students
- Students can store and share data
- Manage and move around massive files
- Some subjects involve a lot of data collection and manipulation
- Real-time collaboration between teachers
- Real-time sharing of information between students
- Help students collaborate without the limitations that may exist within their own computing environment
- Students can form groups; students can collaborate in projects that require collaboration among group members
- Better collaboration between students and teachers



ROMANIA Team


- Data management
- Professional collaboration
- Organizational communication
- Reflective practice
- Digital Continuous Professional Development (CPD)
- Selecting digital resources
- Organizing, sharing and publishing digital resources
- Creating and modifying digital resources or content
- Sharing information and digital content
- Instruction
- Innovation and creative use of digital technology
- Development and management of strategies for ICT quality
- Promoting competitiveness
- Flexibility and Adaptability
- Digital citizenship
- Entrepreneurship and internalization
- Critical thinking, problem solving and decision making
- Social inclusion and accessibility.
- Teacher-learner interaction
- Attention to diversity
- Student follow-up and assessment
- Interact appropriately and ethically
Digital Literacy
Educational Leadership
Cloud computing
- Empathy
- Autonomy and constant
- Organizational knowledge
- Teamwork and collaboration
- Intercultural sensitivity
- Communication
- Entrepreneurship
- Emotional Intelligence
- Conflict management
- Creativity and innovation
- Organizes and directs learning situations
- Negotiation and relationships
- Empowerment
- Coaching
- Holistic view
- ICT Skills
- Lifelong learning
- Social engagement
- Flexibility
- Decision making
- Cooperative and collaborative environments between all educational agents.
- Efficiency and optimisation of teaching work.
- Exchange of information, ideas, resources or materials in various formats.
- Flexibility
- Autonomy
- Interaction and collaboration
- Teamwork
- Design, develop, select and evaluate apps and systems, ensuring their reliability, security and quality, in accordance with ethical principles and current legislation and regulations
- To know and be able to design security policies in Cloud environments
- Know and develop Cloud solutions of private, hybrid and public type, with the main open source solutions and suppliers of the market
- Oral and written communication. Decision making
- Critical ability
- Leadership
- Know the latest trends in cloud computing
- Ethical compass
- Data security, protection and risk management
L-CLOUD
UB Team

ANNEX 3: TABLE 2: TWO-BY-TWO INTERSECTIONS

	AREAS	COMPETENCES
	Flexibility and Adaptability	▪ Dispositions to change, flexibility, ongoing learning and professional improvement, including study and research. ▪ Intellectual flexibility.
	Knowledge	▪ Work with a variety of types of knowledge: access, analyze, validate, reflect on and transmit knowledge. ▪ Good understanding of subject knowledge. ▪ Pedagogical Content Knowledge (PCK), implying deep knowledge about content and structure of subject matter. ▪ Curricular knowledge. ▪ Basic knowledge. ▪ Knowledge application. ▪ Knowledge society skills. ▪ Manage and guide. ▪ Teacher as model learner. ▪ Using, developing and creating research knowledge to inform practices. ▪ Management of knowledge and information. ▪ The teacher has the requisite subject knowledge, pedagogical knowledge and classroom management skills.
	Teaching	▪ Critical attitudes to one's own teaching (examining, discussing, questioning practices). ▪ The teacher selects and uses planning, preparation and assessment practices that progress students' learning. ▪ The teacher selects and uses teaching approaches appropriate to the learning objective and to students' learning needs. ▪ Understand the role of the teacher, the learner and the digital resources during digital learning. ▪ Students and educators competently and readily use technologies, including applications, devices, and networks, to communicate effectively, collaborate purposefully, consume strategically, produce creatively, manage reflectively, and lead ethically for improved student achievement.

	Learning to learn	▪ Ability to pursue and organize one's own learning, either individually or in groups, in accordance with one's own needs, and awareness of methods and opportunities. ▪ Build and manage learning environments ▪ Evaluation and assessment processes and methods ▪ Learning organizations ▪ Self-regulated and continuing learning ▪ Integrate learners' skills development in terms of digital literacies with curriculum-based learning.
	Social, civic and intercultural inclusion	▪ Social inclusion and Cross-Cultural Skills, understand the factors that create social cohesion and exclusion in society. ▪ Support them to develop into fully participating, responsibility and active members of society. ▪ Be aware of the ethical dimensions of the knowledge society. ▪ Work effectively with the local community, and with partners and stakeholders in education – parents, teacher education institutions, and representative groups. ▪ Respecting and being aware of the diversity of learners' cultures and identifying common values. ▪ Appreciation of the importance of the creative expression of ideas, experiences and emotions in a range of media. ▪ Foster a commitment to inclusion, equality of opportunity, the holistic development and right of each student.
	Organizational and management digital resources	▪ Knowledge and application of rules for the use of resources, infrastructures and digital spaces. ▪ Knowledge and use of the centre's general application programme. ▪ Creating, organization, sharing and publishing digital technologies taking into account the different learning environments. ▪ Involvement in centre projects related to digital technologies ▪ Enhance class management, assessment and feedback processes through the use of digital resources. ▪ Promotion and configuration of the construction of an adequate digital identity. ▪ Development, managing, protecting and sharing of strategies for ICT quality.

	Relationship and internalization	▪ Build and maintain effective and collaborative relationships with educational community. ▪ Promote mobility, entrepreneurship, empowering and co-operation in Europe. ▪ Ability to turn ideas into action, involving creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives.
	Design, planning and didactic	▪ Selection and make effective use of digital technologies as resources and strategies in teaching and learning processes. ▪ Incorporation of digital technologies in coherence with the educational project and the infrastructures of the center. ▪ Application of innovative methodologies with the use of digital technologies. ▪ Creation and dissemination of educational contents and resources in digital format. ▪ Pedagogy, curriculum and assessment.
	Creative and development	▪ Developing and participating research, innovation and technology transfer networks ▪ Digital literacy and content and apps creation and re-elaboration. ▪ Pedagogy, curriculum and assessment through digital technologies. ▪ Identification of technological needs, responses and gaps in digital competition. ▪ Adopt the habit of an enquiring mind regarding the educational value of using digital tools and resources. ▪ Select appropriate digital tools and resources when fulfilling the roles of the educator
	Ethics and responsibility digital	▪ Protection of fundamental rights to personal integrity and privacy in the use of digital technologies ▪ Responsible, safe and healthy use of digital technologies ▪ Develop and implement a system to promote professional responsibility and accountability.

ANNEX 4: TABLE 3: TRANSVERSAL AXIS

AXIS	AREAS	COMPETENCES
PROFESSIONAL AND LEADER	**Communication**	▪ Communication and collaboration with and without digital technologies. ▪ Ways to build, communicate and implement a shared vision and lead its realization. ▪ Organizational communication.
	Collaboration	▪ Collaboration with the educational community: ▪ Collaborating with colleagues, parents and social services. ▪ Build professional networks with other school leaders. ▪ Guide and support learners in the networks in which information can be found and built. ▪ Teamwork / collaborative community: ▪ Team building, culture, communication and structures. ▪ Dispositions to team-working, collaboration and networking sense of self.
	Participation	▪ Active participation in educational networks in digital environments.
	Innovation and creativity	▪ Creativity and Innovation use of digital technology ▪ Policy innovation. ▪ Application of innovative methodologies with the use of digital technologies ▪ Incorporation of teaching innovations based on digital technologies ▪ Developing research, innovation and technology transfer networks.
	Professional Development	▪ Construction and reflective practice of the professional digital self-identity. ▪ Incorporation of teaching innovations based on digital technologies. ▪ Active participation in educational research and networks, virtual learning communities and permanent training activities in the field of digital competence and environments. ▪ Entrepreneurship and internalization. ▪ Digital Continuous Professional Development (CPD).
		▪ Motivating, encouraging, trusting and valuing colleagues to do well. ▪ Promoting professional development focused on engagement, teaching, learning and leadership, and keeping abreast of change. ▪ Personal qualities:

	Leadership and responsibility	➢ Self, social and global awareness and responsibility. ➢ Self-management, manage and guide. ➢ Promoting competitiveness and reflexive practice. ➢ Effective and strategic influencing. ▪ Decision making: ➢ Make choices over the delivery of education ➢ Negotiation skills (social and political interactions with multiple educational stakeholders, actors and contexts) ➢ Policy Making ▪ Critical thinking and problem solving: ➢ Reflective practice on professional activity. ➢ Complex problems solving. ▪ Manage emotions. ▪ Critique their practice as leaders and develop their understanding of effective and sustainable leadership. ▪ Know how to effectively use mobile devices, select the productivity tools necessary and evaluate quality digital instructional curricula. ▪ Integrate digital tools and resources to enhance learning objectives in various learning environments. ▪ Accept responsibility for planning and implementing digital learning at the school. ▪ Identifying and removing barriers. ▪ Setting expectations for learning. ▪ Fostering a positive, welcoming and professional learning environment.

ANNEX 5: DIFFUSION TEMPLATE

ANNEX 6: ONLINE REGISTRATION FORM

"Developing Tomorrow's Cloud Education Leaders": Online registration

Online registration form

[To be used through Google Form or any other similar tool.]

- **Name:**
- **Surname:**
- **E-mail:**
- **Name of school or institution:**
- **Position:**
- **Teaching experience (if relevant, years of experience, disciplines taught, etc.):**
- **Experience in terms of digital education / Cloud Computing:**
- **Interest in the workshop (focus group):**

ANNEX 7: CIRCULATE PARTICIPATION LIST

"Developing Tomorrow's Cloud Education Leaders": List of participants

Nº	Name	Surname	ID number	Institution	Signature
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

ANNEX 8: FIRST VERSION ABOUT THE COMPETENCE FRAMEWORK

AREAS	COMPETENCE	Relevancy (1 to 5)	Conceptual clearness	Conceptual unclear	Observations
Communication, collaboration and participation	Capacity for communication, collaboration and active participation in educational networks in Cloud Computing environments.				
	Capacity to establish a shared vision about Cloud Computing in learning environments				
	Skill to build professional networks with other school leaders aiming to guide and support learners in Cloud Computing.				
	Dispositions to team building at the school				
	Disposition for active participation in educational networks in Cloud Computing environments.				
Innovation, creativity and creation	Knowledge for the creation and dissemination of educational contents and resources in Cloud Computing.				
	Ability to select, apply resources, and use methodological Cloud Computing-based strategies in teaching and learning.				
	Ability to lead pedagogical innovations in Cloud Computing coherence with the educational project and the infrastructures of the center.				
	Ability to creatively use of Cloud Computing in different educational contexts.				
	Disposition to research, innovation and technology transfer networks in Cloud Computing.				
	Disposition to express creative ideas, experiences and emotions in Cloud Computing.				
Professional development	Construction and reflective practice of the professional digital self-identity.				
	Disposition to Incorporate teaching innovations based on Cloud Computing.				

	Ability to active participation in educational research and practitioner networks, virtual learning communities and professional development in Cloud Computing.				
	Disposition to participate in Cloud Computing Professional Development programmes (CPD).				
	Promoting reflexive practice and professional development focused on engagement, responsibility, teaching, learning and leadership, and keeping abreast of change.				
Leadership, ethics and responsibility	Knowledge on how to effectively and ethically use of the different types of Cloud Computing (public, private and hybrid) and their services, tools and functionalities (SaaS, PaaS and IaaS).				
	Knowledge on how to integrate Cloud Computing and resources to enhance learning objectives.				
	Knowledge on legal issues about safety, data protection, privacy and healthy use of Cloud Computing.				
	Knowledge to solve complex problem solving in Cloud Computing.				
	Negotiation skills (social and political interactions) with multiple educational stakeholders, actors and contexts, and decision making in Cloud Computing.				
	Ability to manage personal emotions.				
	Ability to critically assess your own practice as leaders and develop their understanding of effective and sustainable leadership.				
	Disposition to accept responsibilities to planning and implementing Cloud Computing in education.				
	Disposition to Identifying and removing barriers to create/maintain a cloud-computing infrastructure.				
	Disposition to motivating, encouraging, trusting and valuing colleagues to create and use Cloud Computing in their contexts				
	Disposition to social and global awareness and responsibility in relation to Cloud Computing				
	Disposition to become aware of the ethical dimensions of leadership in Cloud Computing.				

Social and intercultural relationship and internalization	Knowledge on how to build and maintain effective relationships with the educational community through Cloud Computing.				
	Skills on how to work effectively with the community, partners and stakeholders of Cloud Computing.				
	Ability to promote mobility, entrepreneurship, training and cooperation in Europe on Cloud Computing.				
	Disposition to respecting and being aware of the diversity of learners' cultures and identifying common values.				
	Disposition to foster a commitment to inclusion, cross-cultural skills and equal opportunity.				
	Disposition to promote and build an adequate digital identity in Cloud Computing.				
Pedagogical and Organizational	Knowledge on how to access, analyze, validate, reflect on knowledge in a variety of Cloud Computing environments.				
	Knowledge on class management, assessment and feedback processes in Cloud Computing.				
	Pedagogical content knowledge in Cloud Computing in relation to different subjects, its content and structure.				
	Knowledge on using, developing, creating and management of Cloud Computing, including applications, devices, and networks.				
	Skills to identify students' learning needs, and learning progress in the cloud.				
	Skills to creating, organizing, sharing and publishing digital resources taking into account different Cloud Computing learning environments.				
Suggestion:					

ANNEX 9: EVENT EVALUATION QUESTIONNAIRE

Developing Tomorrow's Cloud Education Leaders": Event Evaluation Questionnaire

1. Please rate the quality of the workshop in terms of:

• Duration	1	2	3	4	5
• Location	1	2	3	4	5
• Infrastructure	1	2	3	4	5
• Overall organization	1	2	3	4	5
• Relevance of the topics to your contexts	1	2	3	4	5
• Contents	1	2	3	4	5
• Presentation given	1	2	3	4	5
• Provided materials	1	2	3	4	5
• Opportunities to interact with participants	1	2	3	4	5
• What is your overall assessment of the workshop?	1	2	3	4	5

1: improvable - 5: excellent

2. What are your expectations in participating the L-CLOUD project?

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3. Further comments:

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Thank you for your participation!

ANNEX 10: REPORTING TEMPLATE

"Developing Tomorrow's Cloud Education Leaders": Reporting template

1. WORKSHOP ORGANIZATION	
Country	
Organizing partner	
Date	
Settings: address, room and equipment	
Duration	
Number of participants	
Description of participants: positions, institutions, etc.	
Facilitators: name and position	
Agenda: different stages of the event	
2. L-CLOUD COMPETENCE FRAMEWORK	
Participants' perspectives on whether and up to what degree the proposed framework addresses the pre- defined criteria.	
Participants' perspectives on the relevance of the framework elements (i.e. competences, knowledge, skills and dispositions)	
Participants' perspectives on the assessment of the educational leaders' competences	
3. RECOMMENDATIONS TO THE L-CLOUD PARTNERSHIP	
As an outcome of the analysis of participants' feedback, please craft a list of recommendations for the refinement of	

the framework.	
4. RESULTS OF THE EVALUATION QUESTIONNAIRE	
Participants' satisfaction with the event (mean values) • **Duration** • **Location** • **Infrastructure** • **Overall organization** • **Relevance of the topics** • **Contents** • **Presentation given** • **Provided materials** • **Opportunities to interact with participants** • **Overall assessment of the workshop**	
Summary of participants' perspectives towards: • **Expectations in participating in the project** • **Further comments**	
Conclusions and general comments	

Annexes to be attached to this report:

- List of participants.
- Pictures.

ANNEX 11: PPT PROJECT' PRESENTATION AND CONSULTATION & VALIDATION


DEFINING EDUCATIONAL LEADERSHIP
PURPOSE
PEOPLE


PHASE 1: STATE OF THE ART

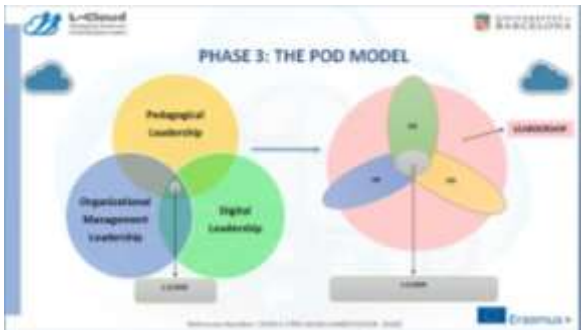

PHASE 1: STATE OF THE ART


PHASE 1: STATE OF THE ART
STRUCTURING AND REFINING AREAS, DIMENSIONS AND COMPETENCES


PHASE 2: IDENTIFICATION DIMESIONS AND COMPETENCES


PHASE 2: IDENTIFICATION DIMESIONS AND COMPETENCES
Digital Literacy
Educational Leadership
Cloud computing


THINKING
✓ Which competences should a leader in cloud computing have?
✓ What would be the most important areas or dimensions of these competences?
✓ What elements should the competency framework of a leader in cloud computing have?


PHASE 3: THE POD MODEL
Pedagogical Leadership
Organizational Management Leadership
Digital Leadership


PHASE 3: THE POD MODEL
Two-by-two intersections
AXES
AREAS
PEDAGOGICAL & ORGANIZATIONAL
1. Flexibility and Adaptability
2. Knowledge
3. Teaching
4. Learning to learn
5. Social, civic and intercultural inclusion
ORGANIZATIONAL & DIGITAL
1. Organizational and management digital resources
2. Relationship and interrelation
DIGITAL & PEDAGOGICAL
1. Design, planning and didactics
2. Creative and development
3. Ethics and responsibility digital


PHASE 3: THE POD MODEL
Transversal axis
1. Communication
2. Collaboration and participation
3. Innovation and creativity
4. Professional Development
5. Leadership and responsibility


PHASE 3: THE POD MODEL


PHASE 3: THE POD MODEL


PHASE 3: THE POD MODEL


CONSULTATION AND VALIDATION


CONSULTATION AND VALIDATION
Individual task (indicative time: 15 min.)
1. Each attendee will answer the following questions:
1.1. Which competences should a leader in cloud computing have?
1.2. What would be the most important areas or dimensions of these competences?
1.3. What elements should the competency framework of a leader in cloud computing have?

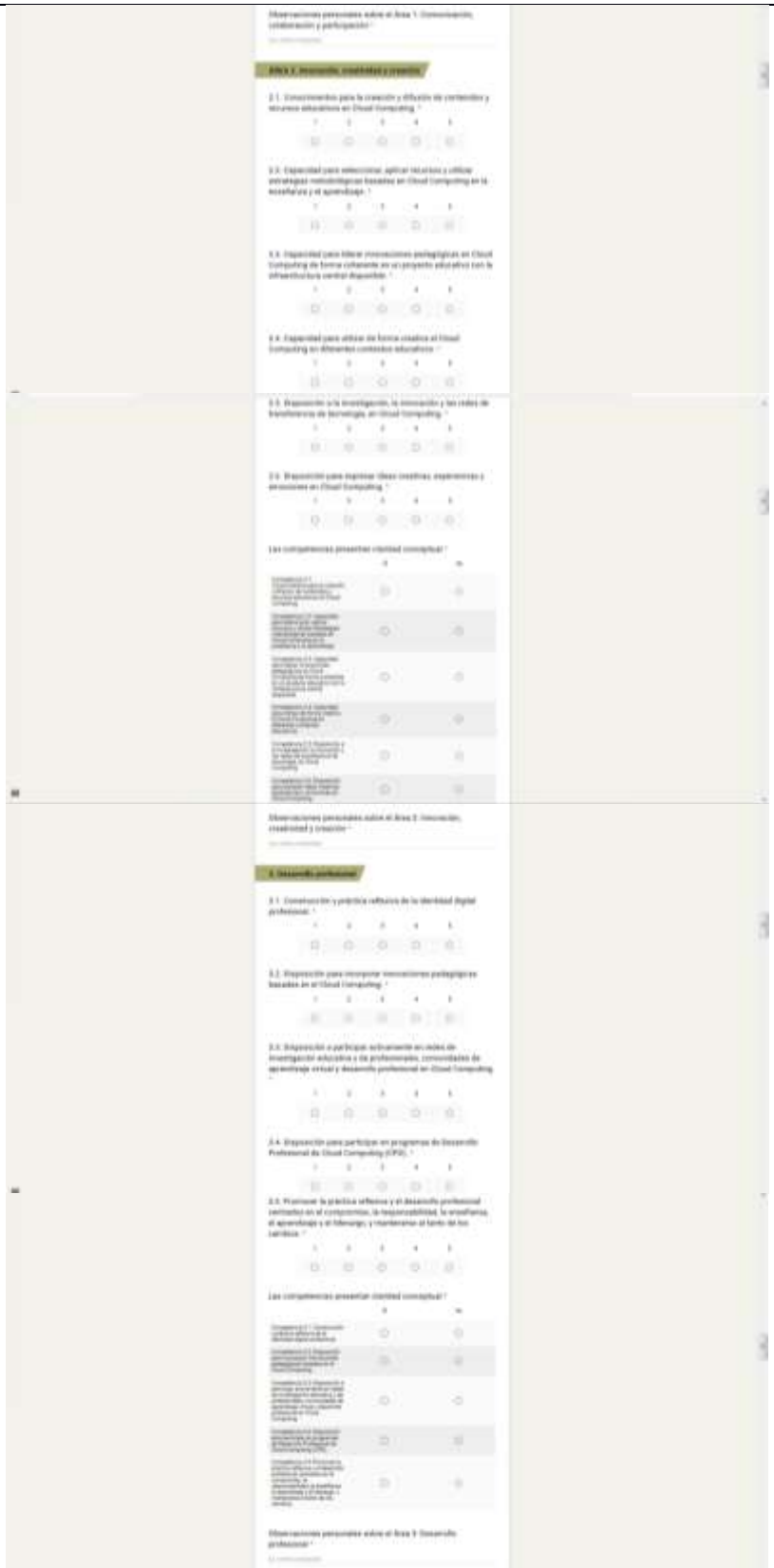

CONSULTATION AND VALIDATION
Group work (indicative time: 15 min.)
2. Divide participants into three or four heterogeneous groups (depending on the number of participants), i.e., mixed groups of teachers, educational managers, decision makers, research stakeholders, representatives of local associations, etc. Present the discussion topics to each group:
2.1. How well do you think that the proposed framework addresses the criteria under which it has been developed? In what respects it might need improvement?
2.2. Is/Are the descriptor(s) included the most relevant one(s) per area? Which other descriptor(s) might be also included?
2.3. How appropriate are they for allowing assessment of the educational leaders' competences (as can-do-statements)? In what respects they can be improved?

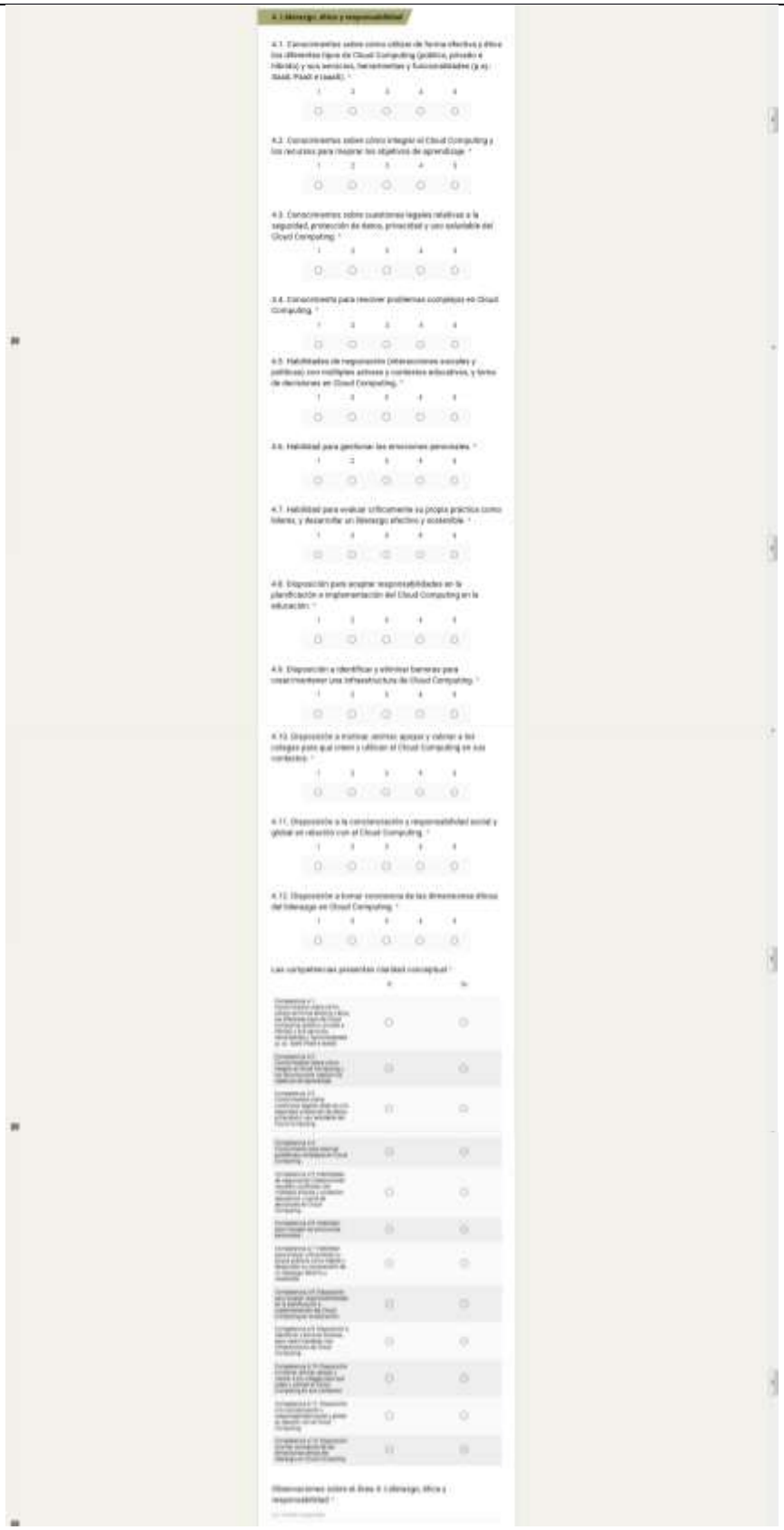

CONSULTATION AND VALIDATION
Group discussion (indicative time: 90 min.)
3. Each group presents outcomes of discussions by sharing their perspectives on the relevance of the framework elements (i.e. competences, knowledge, skills and dispositions). The facilitator will stimulate discussion among participants. Consider additional topics for discussion if needed (e.g., other things that participants would like to add?).

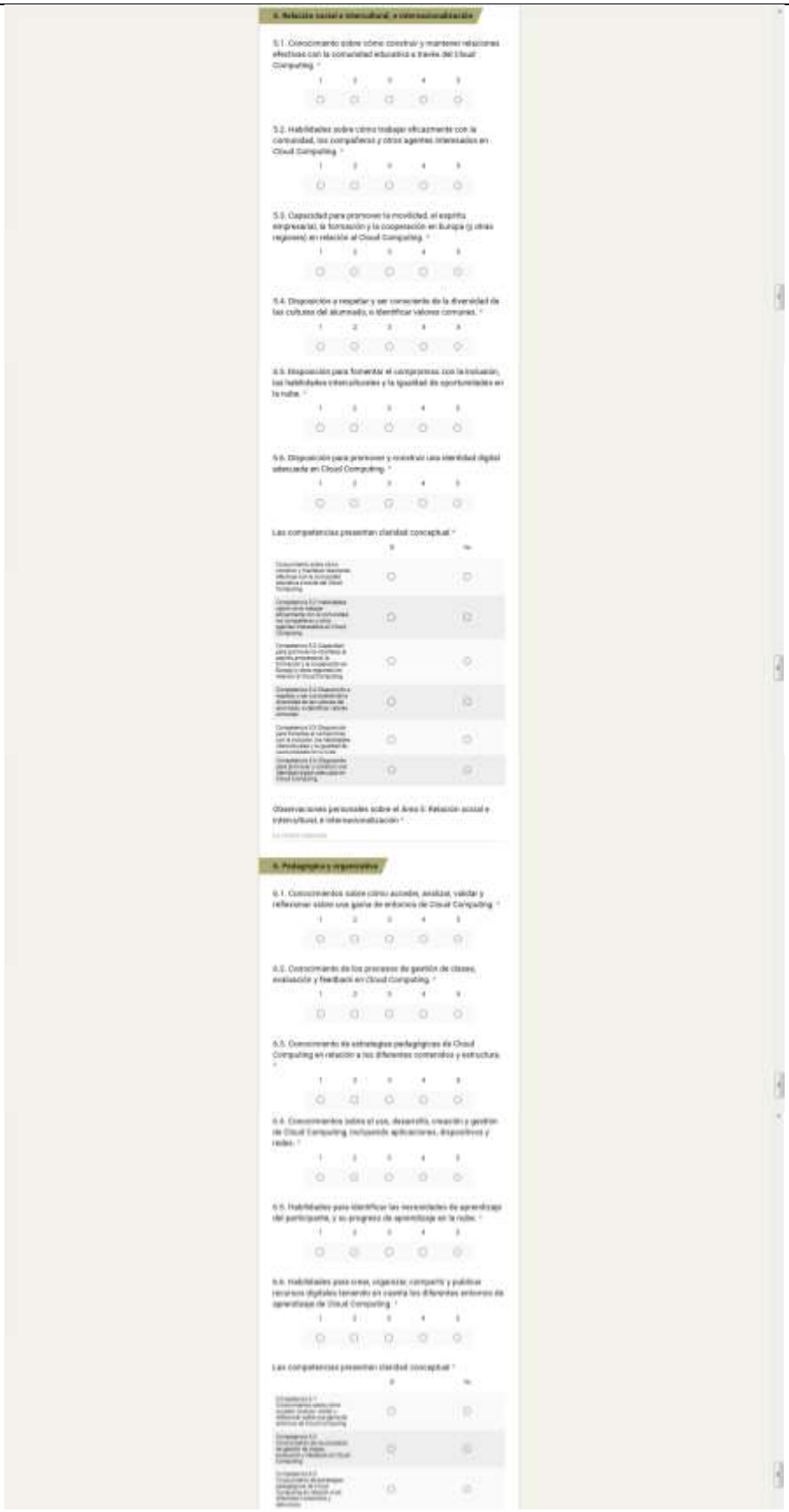

SUM UP, CLOSE AND END THE MEETING
Sum up and close the event (10'):
1. The main ideas of the session will be summarized.
2. explain what will be done with the data collected, as well as elicit the next steps of the project.
3. Will be explain what will be done with the data collected.
4. Participants will fill in the event evaluation questionnaire

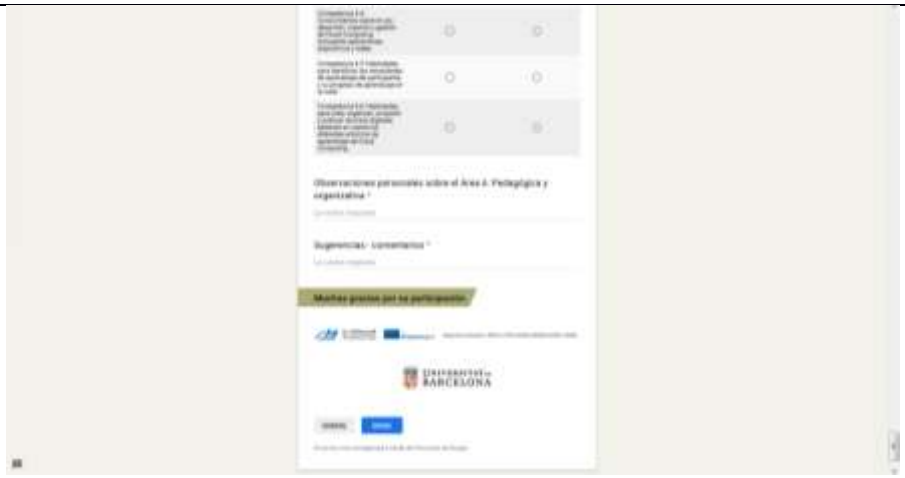

THANK YOU VERY MUCH
Partner Organization
City, Date

ANNEX 12: VIRTUAL' FOCUS GROUP









L-Cloud

Developing Tomorrow's
Cloud Education Leaders

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