INCLUsive Disaster Education

(INCLUDE)

Output 6 – Initial Competence Framework

University of Huddersfield

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Introduction

The transformation of education in the post-Covid era emphasised the need to rethink what it means for Disaster Risk Reduction (DRR) educators to be digitally competent. Particularly with the unique characteristics of the DRR discipline, defining the digital competence of DRR educators goes beyond the usual. This report, developed as part of the INCLUDE Output 6 summarise a discussion around the digital competence framework for DRR educators. This framework intends to provide a set of knowledge, skills and attitudes that enable the use of digital technologies and systems ethically, safely and productively in DRR education. The report is structured under 7 sections. The first two sections include a literature review of the study's key concepts and the key dimensions of the digital technologies. The third section is dedicated to the methodology on which the competence framework was developed. The fourth section reveals the main themes that were derived from the content analysis and the literature review. The final three sections are based on the initially developed framework. These three sections have been divided as per the main principles of the framework, layers of the framework and finally its way forward. This competence framework would be one of the very first that would integrate online education and the field of DRR.

1. Introduction to the Digital competence of DRR educators

1.1. Competence

The notion of competence has been defined from several points of view yet is mostly centred on the individual. When the results are known as the worthy outcomes of an individual's behaviour, the state of being competent could be defined as that individual's ability to produce results in a constant manner (Teodorescu, 2006). However, the concept of competencies is multi-faceted and its definition is determined by the rationale for the use of competencies (Hoffmann, 1999). The typology of competence is dominantly represented under 3 approaches. Firstly, the traditional American approach is focused on individual characteristics and understands behavioural competence as a means to develop superior performance while the UK approach deals with (occupationally defined standards of) functional competence and how they are implemented in the workplace (Le Deist & Winterton, 2005). Le Deist and Winterton (2005) further construed the France and German approach as an approach that highlights the potential of a more analytical and multi-dimensional explanation of competence and argued the need for a more holistic framework that complements the KSA (Knowledge, Skills and Attitudes) worldview which considers knowledge, skills, and behaviours as dimensions of competence.

1.2. Digital competence

Digital competence is often intertwined and interchangeably used with terms such as internet competence, digital literacy, e-competence, technology literacy, e-literacy, e-skills, media and information literacy (Ferrari et al., 2012). Mota and Cilento (2020) defined internet competence as a collection of skills, knowledge, and attitudes towards internet use. Likewise, digital competence is frequently defined using the 3 attributes knowledge, skills, and attitudes that helps an individual to effectively use digital technologies to achieve goals in various life contexts (Baartman & de Bruijn, 2011).

1.3. Digital competence in DRR teaching

Technological transformation bring challenges to the teaching profession at two different levels: firstly, it necessitate the educators to develop their own digital competences; and secondly, it expect the educators to develop instructional activities that endow their students with the competences essential to succeed in the digitalised education environment (Hämäläinen et al., 2021). According to ElSayary (2023) in the context of education, digital competence is about

teaching in a manner to facilitate students' active engagement with digital technologies in their work, lives, and careers. Literature mainly highlights the pedagogical digital competence also relating to skills, knowledge and attitudes. According to From (2017), an educator possessing pedagogical digital competence not only is able to better support their students in achieving expected learning outcomes, but also can understand how the learning process works and its relationship with regulating principles.

2. Knowledge, skills, and attitudes that enable the use of the digital technologies

2.1. Knowledge

Competency involves putting conceptual and procedural knowledge into action (Perrenoud, 2005). The widely used framework to understand the knowledge educators need in order to effectively integrate technology into the usual teaching practice, is called TPACK (Technological Pedagogical Content Knowledge) framework (Voogt et al., 2013). It describes the teacher knowledge as a holistic complex interaction among the three bodies of knowledge namely pedagogy (knowledge about teaching/ learning processes, educational theories, instructional design, etc.), content (knowledge about the taught subject matter) and technology (knowledge about technologies and their use in the educational settings)(Koehler & Mishra, 2009; Koehler et al., 2013). A major dimension of knowledge highlights the educators' ability to design/develop courses , in a way they are mobilized to support students' learning with the effective ICT use/support (From, 2017).

2.2. Skills

While digital competence is sometimes interchangeably used as digital skills, Tuamsuk and Subramaniam (2017)'s definition of digital literacy entails 3 main skills; technical skill (to handle digital devices and applications), cognitive skill (to discern and evaluate data and distinguish between accurate, false and biased data) and emotional-social skills (to understand the impact of the data). Literature further highlights 21st-century digital skills which focuses on the skills that are for the knowledge-based workforce and for employees to be in charge of their own learning (van Laar et al., 2017). The skills that integrate technology into teaching is referred to as techno-pedagogical skills and it includes sub-skills such as basic technological skills, technology usage skills for personal development and knowledge acquisition, technology usage skills for planning and preparation with lesson plans (Lyonga et al., 2021). Moreover, the literature discourses on skills are in line with the following thematic areas of digital literacy by Hall et al. (2014);

- Being safe in the digital environment.
- Finding, evaluating and applying information.
- Using digital tools/ hardware/software.
- Understanding the social responsibility.
- Showcasing achievements
- Awareness of digital identity.
- Collaborating community education, and work life.

2.3. Attitudes

Naturally the educators may develop negative and/or positive beliefs towards the use of technology and their self-efficacy of their changed role in the digital teaching environment, especially if the shift is unprecedented like it was in the post Covid era; and the attitude of an educator towards integrating technology in the teaching will be based on those positive or negative beliefs (Instefjord & Munthe, 2017). Attitudes as one dimension of the digital competence influence the actions of educator and eventually plays an important role in the entire learning process (Funkhouser & Mouza, 2013). Research identified technology attitude under 3 core areas including general attitudes towards ICT, attitudes towards ICT in education, and ease of educational use of technology (Scherer et al., 2018). At the individual level, the intention to use technology in due course can be determined by levels of educators' self-efficacy, perceived usefulness of technology and perceived ease of use (Joo et al., 2018). Studies have shown that educators' positive attitude towards using technology in support of collaboration, learning, and productivity, result in developing their digital competence and eventually leads to the development of their students' digital competencies (ElSayary, 2023).

3. Methodology

The methodology that was adopted in developing the main framework could be explained in three main stages as follows:

3.1. Stage 1 – Literature review to recognise

A detailed literature review was conducted to trace the main types of digital pedagogical competencies that have been recognised in related studies. The review was conducted based on journal articles and already developed competence frameworks that have been developed for the contexts of digital teaching. As per the reference points the following two competence frameworks were utilised:

1. Educators' Digital Competency Framework - UNICEF Regional Office for Europe and Central Asia, 2022
2. DIGCOMP: A Framework for Developing and Understanding Digital Competence in Europe - Joint Research Centre of the European Commission, 2013

3.2. Stage 2 - Reviewing existing project output reports to trace competencies

As the second stage of developing the initial competence framework, the existing output reports were evaluated to investigate the relevant digital competencies the DRR educators require. The reviewed reports were:

1. Output 1 - A survey of online, distance learning strategies used in DRR education and their effectiveness to identify their success factors and associated issues and problems
2. Output 2 - A framework to reimagine online distance learning education
3. Output 3 - An inclusive University-Industry digital learning platform
4. Output 4 - Case studies with the use of disruptive technologies for disaster risk reduction

The content analysis was helpful in realising both the pedagogical and technological aspects that are relevant for online DRR education. The evaluation of these reports in fact showed the importance of the coherence among the outputs as the Output 2's framework was developed from Output 1 and the overall framework of Output 4 has been developed from the findings of the previous outputs.

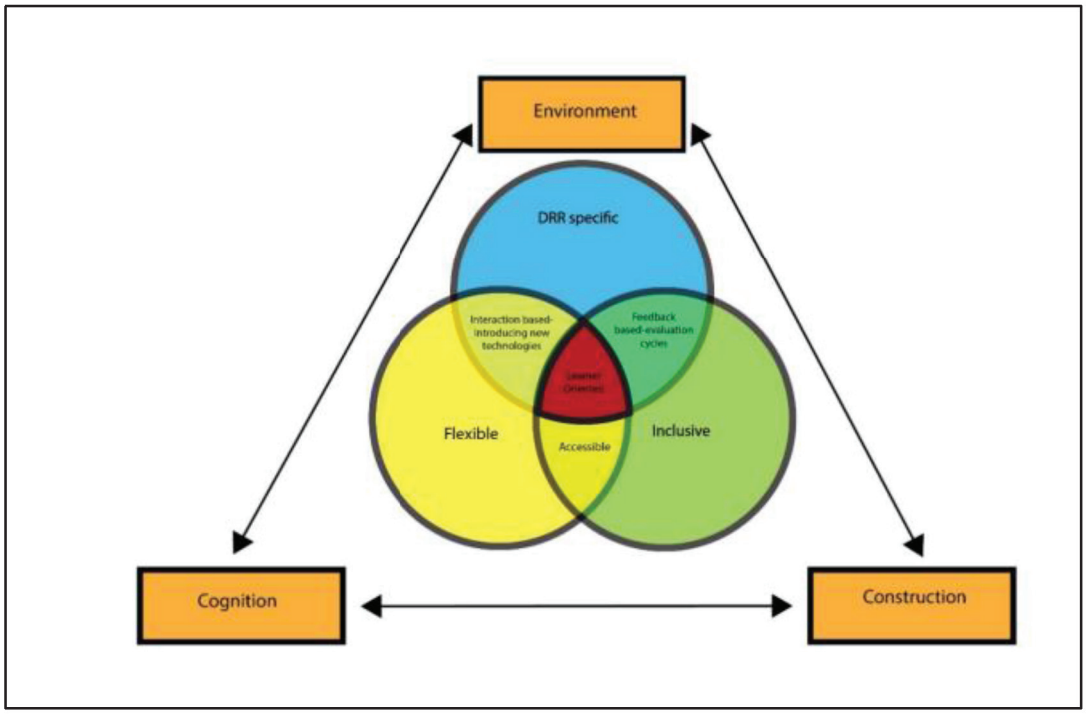

Figure 1: A framework to reimagine online distance learning education – Output 2

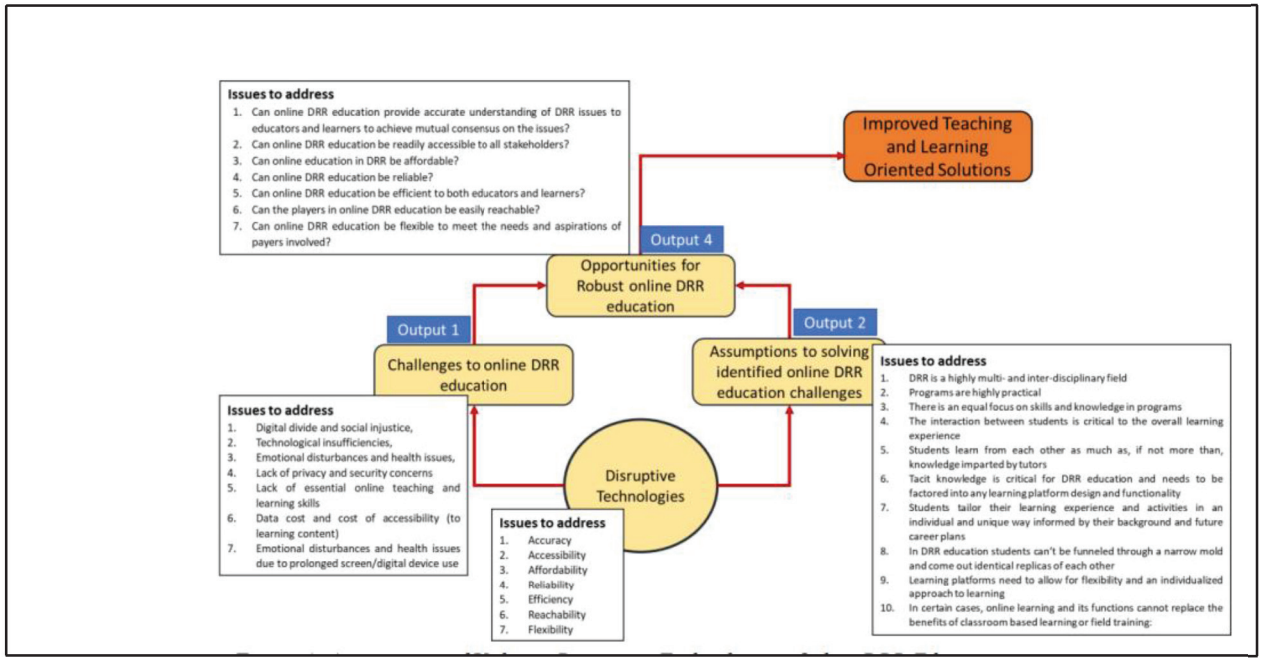

Figure 2: Assumptions of Utilizing Disruptive Technology in Online DRR Education – Output 4

The content analysis of the above reports was conducted using Nvivo Plus (V.12). In the process of the content analysis the derived themes were coded with further refinement and redefinition within the process. The overall content analysis vis Nvivo could be summarised using the following image where the codes have been mapped based on the words similarities:

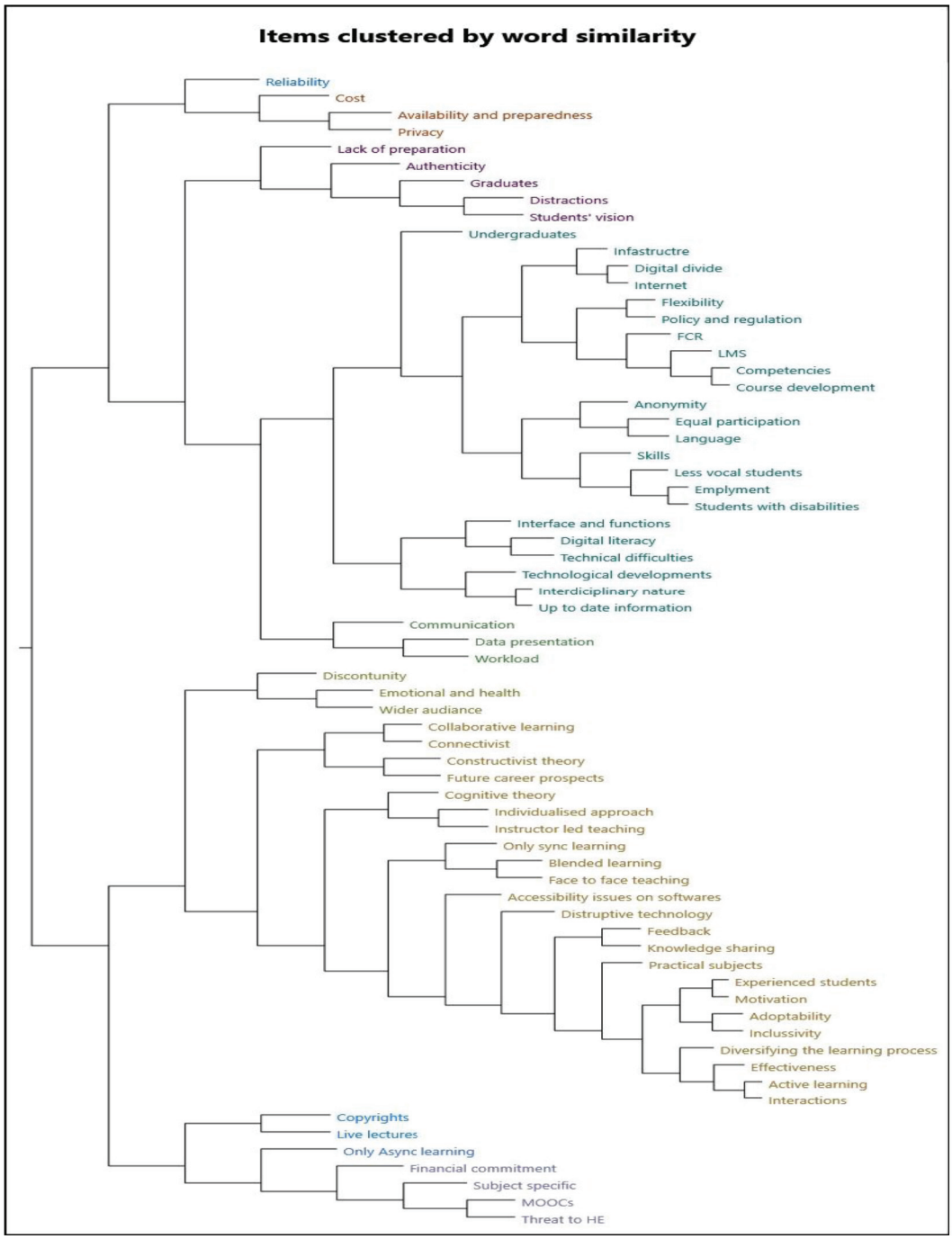

Figure 3: Mapping based on word similarities

3.3. Stage 3 – The validation

Following the development of the initial competence framework the final stage would be the validation. The validation will be conducted in the following phases:

1. Internal validation – as the first phase of the validation the initial framework was validated by the feedback of the partners.
2. External validation – following the feedback from the partners, the refined framework was presented for selected experts in the field for feedback who are experienced educators in the field of DRR.

4. Insights from the Literature Review and the Content Analysis – Towards the Competence Framework

Knowledge, skills and attitudes have been recognised as one of the key dimensions in terms of developing a competence framework in digital contexts (Ferrari, 2013). Further, the importance of knowledge has been emphasised in the aspects of development, application, sharing and communication (Siina, 2022). In the context of skills, the importance of developing skills in educators has been emphasised in various related studies (Funkhouser & Mouza, 2013) and it has specifically recognised as a key barrier in the field of education (Hew & Brush, 2007). Hence, this section will present the key insights of the context analysis pattern matched with the literature review under themes of knowledge, skills and attitudes.

4.1. Knowledge

This section includes the views of experts captured through the Output 1 interview round. Interviews were conducted with 48 educators in higher education sector in the 4 countries where the partner universities are located (United Kingdom, Japan, Sweden, and Lithuania) and further extended to explore the perspectives of educators from different other countries like Sri Lanka, Thailand, Australia, Bangladesh, China, India, Indonesia, Japan, Philippines, etc. (A detail explanation on research methodology is included in the Output 1 report and please see annexure I for the interviewee details). Interview findings can be organised the 3 dimensions in the above discussed TPACK (Technological Pedagogical Content Knowledge) framework as follows.

4.1.1. Pedagogical Knowledge

The online environment allows educators to explore and practice different teaching techniques that could help them build a positive connection with different types of students, especially the students

who are overwhelmed by meeting people in person or the students who perform better in an anonymous learning environment. In fact, one of the highlighted struggles during online teaching for the educators was to understand their student cohort without being able to see them. This demands them developing innovative pedagogical styles that help them to appreciate and respect differences in students. The innovativeness of such pedagogical styles ranges in a broad spectrum, for instance they should overcome or minimise the challenges of teaching lab based/ equipment focused sessions. Educators who taught DRR module using equipment highlighted the challenge to access important equipment during online learning and difficulty to explain their use. It has been also observed that students from different cultures respond differently and especially in DRR programmes the educators should refine their pedagogical knowledge to perform better and inclusive in a culturally diverse student body. It is also important for educators to self-evaluate their competencies to identify their own training/ learning needs (Baran et al., 2013), which helps them to enhance their pedagogical knowledge in the online teaching environment.

4.1.2. Content knowledge

While the DRR educators should have a deep understanding of the DRR theories, concepts, and practices, the interview findings reflected on several areas which DRR educators should also be updated, and which are sometimes underrepresented. These could be essentially included in developing future DRR courses and the educators should pose the knowledge. A repeated aspect that needs to be reflected in the DRR curriculum and hence through the educators' content knowledge is the technological development (for example industry 5.0, society 5.0, smart cities, etc.). Moreover, having a complete understanding means they are being aware of the limitations of technology use as well. Not only technology, but the educators also need to be updated in general with all new cases, legislation, standards, best practices, etc. related to DRR. This also includes the knowledge about progress made towards different development agendas related to DRR: while the DRR curriculum usually covers several development agendas including the SENDAI framework, the state-of-the-art developments are not sufficiently communicated to the DRR learners through a taught series. It is important for educators to ensure that the information they are sharing with students is up to date, and that they are using materials from 2023, although they should still reflect on the past. Positioning disasters in the systematic equilibrium and reflecting on all the cascading effects and ripple effects they could have on different components in the urban ecosystems is another aspect that needs to be taught to the DRR learners yet is

underrepresented. Moreover, DRR is a team effort and the team consist of stakeholders from different disciplines. Therefore, it is vital for DRR learners to understand the interdisciplinarity in DRR and hence the educators should have an understanding about the interconnected thinking/ IT system thinking, willingness to reach out into other ways of working and should be knowledgeable not only about the straightforward relationships but also the extended value adding networks/ interdisciplinarity. DRR discipline deals a lot with data and hence understanding data includes not only analysing and forecasting but also discerning their limitations of them. Therefore, it is essential that DRR educators have a completely correct understanding of the data DRR professionals handle to make students explain the full picture.

4.1.3. Technological knowledge

The online teaching help educators to better teach (and present) with the use of different online teaching materials. This includes the resources like videos, podcasts, documentaries, etc. as well as data visualisation methods and representations. The interviewee ID UK_HUD_9 explained this as "present data in a variety of different ways and to cater the different learning styles, learning needs and learning plans." It also important to acquire knowledge about handling online resources and preparation strategies for instance, uploading or creating high-quality videos, demonstrations, video editing as there have been observations regarding the improved student attention and engagement when the online resources are of high quality and in user friendly interfaces. Similarly, some educators find accommodating changes to online content as a complex task for which they should sharpen their technological know-how. Technology may bring advantages to create inclusivity in classrooms especially for students with disabilities. A critical limitation for such DRR students with mobility issues would be field trips and with educators' technology knowledge those students still can have an immersive experience, which is more convincing than a video of that field visit. It is also important to have sufficient database management and analytics for collecting and processing vast amounts of data to come up with the different types of DRR scenarios in teaching/research.

Based on the above interview results below diagram can be illustrated to summarise the DRR educators' knowledge requirements in digital environment.

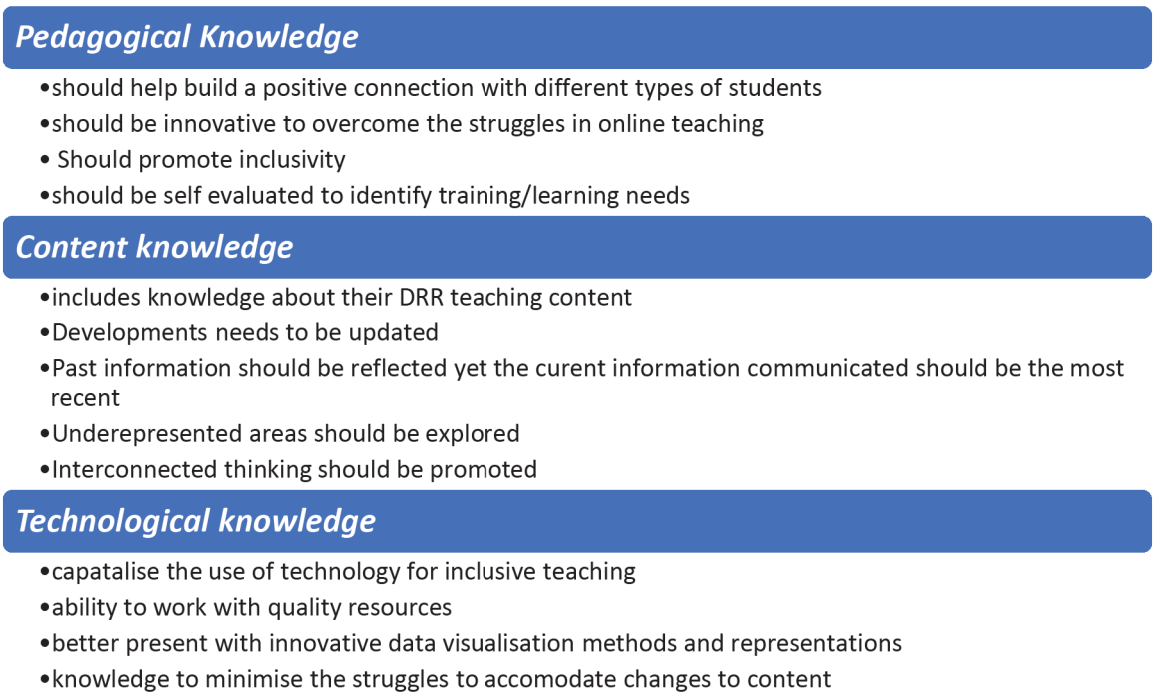

Figure 4: Knowledge attributes for DRR educators to develop digital pedagogical competences.

4.2. Skills

When presenting the aspects of skills that was evolved during the content analysis and the literature review, it could be discussed in the following thematic orientations.

4.2.1. The Pedagogical and Technological categorisation

The first output of the project was dedicated towards recognising distance learning strategies used in DRR education and their effectiveness to identify their success factors and associated issues and problems. Based on the recognised strategies and challenges, a framework was developed to re-imagining online DRR education. On the other hand, output 3 and 4 are dedicated towards the technological aspect of online DRR education. While output 3 was dedicated towards developing a connectivist MOOCs and output 4 evaluated the use of disruptive technology in DRR. Based on the content of these reports themes derived that are dedicated towards educational strategies and challenges and technological aspects. In terms of connecting these themes with the digital educator competencies, related studies have recognised that online teaching competencies falling into the larger umbrella themes of pedagogical skills and technical skills (Sopegina et al., 2016).

4.2.2. The Role of Pedagogy on the Online Space – Digital Pedagogical Skills

In terms of competencies for online education, pedagogy has been considered as one of the main skills that is required (Baran & Correia, 2014; Dobbin et al., 2009; Habibi, 2021; Koehler et al., 2013). In terms of the pedagogy the output 2 report relies on the theories of constructivist and cognitive learning theories. The constructivist theory perceives the knowledge as something that is constructed through the learners' previous experience and the collaboration among the learners and the educators (Koohang et al., 2009; Reid-Martinez & Grooms, 2018). On the other hand, the cognitive theory emphasises the interactions on the learner and the content (Malik, 2021). The output three lays the foundation on developing connectivist MOOC, it relies on the importance of open education and collaboration between higher education and industry.

Use of appropriate online pedagogical strategies is another viral aspect in terms of digital skills in online education (Bigatel et al., 2012; Kattoua et al., 2016). While Learning Management System (LMS) is one of the most popular online learning strategies (Bigatel et al., 2012; Farmer & Ramsdale, 2016), the findings of the output one claim that blended learning, only synchronous learning, only asynchronous learning, flipped classroom and live lectures were recognised as common online learning strategies. It is also important to set up protocols in managing the online classroom in terms of rules, students' progress and time management (Craddock & Gunzelman, 2013; Munoz Carril et al., 2013).

The content analysis also raised the theme of the importance of handling distractions (via chat, unauthorized log ins, unauthorized removal and not switching on vides) and conflicts that may occur during the online class. This was in fact recognised as an online educator skill in related studies (Carril et al., 2013). Effectiveness in teaching online was another theme that was emerged and students' performance in online assessments is an important factor to be considered (Habibi, 2021). Therefore, the ability to develop online rubrics, journals and logs is vital (Kattoua et al., 2016). Use of active learning strategies to enhance is another main aspect that was evolved from the content analysis which in fact is recognised in available literature (Bigatel et al., 2012). The need to adapt active learning strategies to get diverse types of learners such as less vocal students was further highlighted in the content analysis. The output 1 and 2 findings claim that the educators use various technological strategies such as chat, Zoom polls and Zoom break out rooms to keep students engaged within the online space. Further, as the educators are faced with the challenge of

keeping not very vocally active students in the online class, the educators believe that the anonymity options such as the private chat option and polls can be used as a benefit to get then engaged.

However, the content analysis further highlights that the development of online pedagogy is based on several factors such as the level of students (undergraduate/post-graduate), the experience of the students, motivation of the students based on their interactions within the online space, other commitments of the students (professional/personal). In terms of inclusivity within the classroom, the content analysis further emphasised the importance of having content available within the local language of the learners, presenting data that is accessible to anyone and that promotes equal participation within the class.

4.2.3. The designing of the online teaching content – Design Skills and Content Skills

The themes that were derived from the content analysis also addressed the importance of proper designing of the online teaching content. It is a competence that has been vastly recognised in studies related to online teaching competence (Baran & Correia, 2014; Guasch et al., 2010; Habibi, 2021; Palloff & Pratt, 2011). The literature also highlights on the importance of proper designing of suitable online assessments (Dobbin et al., 2009; Habibi, 2021).

In terms of designing the course content it is vital that the content is as of quality and up to date (Koehler et al., 2013). The content analysis specifically emphasise the content of a DRR course should consider its interdisciplinary as well as the practical aspects of the subject. Further, it was pointed out that the latest development in the DRR field should be reflected in the content. In addition, the reliability and authenticity of the content are also vital factors. The findings also emphasise the importance of the educator exploring the under-presented areas in DRR and promoting interconnected thinking with the use of quality content. The findings of output 1 and the validation of output 2 further claim the importance of constructive alignment in designing the online courses keeping in mind of the intended learning outcomes. The findings further claim the importance of the educators to consider the workload of both the educator and the learners and the time frame at hand in designing and planning of the teaching content to make sure that they are not over-burdening the either parties. The diversification of the teaching strategies was another key highlight that was revealed in the output 1 report where the educators in the opinion that such diversification will assist flexibility and adoptability of the course content based on the context the

course is offered. Further, the keeping in mind the future unpredictable risks the world is yet to face, the content analysis emphasises the importance of having content available and prepared to be converted into various forms.

On the other hand, the educators who specifically teach undergraduate or early career learners, it is vital that the educators develop content considering the future career prospectus of the learners.

Online classes allow accommodating more learners compared to physical classes (Jena, 2020). Online learning tools expand the scalability of courses makes personalization of education is easy (Mäkelä et al., 2020). In this context, it is vital that the educators to consider the wider context in designing the courses. The content analysis claims the importance of considering geographical contexts, language and disabilities and other learning needs.

4.2.4. The social and communicational set ups in online classrooms – Social and Communication Skills and Classroom Management Skills

An online educator should have social and communication skills (Bigatel et al., 2012; Salam et al., 2011). The interaction during online lessons is a vital point highlighted in the content analysis (Bigatel et al., 2012). Feedback on the other is another vital point which is two-ways of getting feedback from the students for further development (Bigatel et al., 2012) and giving feedback to the students (Albrahim, 2020). The content analysis further emphasized the importance of enhancing the inclusivity within the class and having a greater knowledge on the backgrounds of the students such as students with disabilities, not so talkative students, students that come from impoverishment backgrounds and the students that are at the verge of discontinuing their studies die to various personal and professional commitments (Fuller & Yu, 2014; Munoz Carril et al., 2013). Further, the content analysis further emphasised in order for the educators to recognise the several contexts of his/her learners within the online class, it is vital to enhance communication throughout the learning process (pre, during and post).

On the other hand classroom management is a skills that is required for educators in online space (Albrahim, 2020). Therefore, it is vital for the educators to set up rules to maintain the code of conduct within the classroom, to monitor students' progress, time management and maintain mentorship and coaching.

4.2.5. The role of technology within education – Technological Skills

As an educator who is involved within online education, technological skills are vital (Guasch et al., 2010; Koehler et al., 2013). It has been further recognised that in terms of technological skills, basic IT skills and multimedia skills are recognised as vital (Bigatel et al., 2012; Kattoua et al., 2016). Output 1 also claim the importance of the educators familiarise with the interface of Learning Management Systems and other online learning tools. The content analysis further addressed the need of handling unforeseen technological difficulties that could take place within online space and the need of preparing individualised experience to the students on virtual space (Albrahim, 2020; Kattoua et al., 2016). In the context of DRR, Output 4 refers to various disruptive technologies (such as drone, virtual reality and artificial intelligence) that are being used within the DRR sector and it is vital that the DRR educators are up-to-date with these technological advancement. Output 1 report claim one of the main challenges the educators and the learners are facing in online DRR education is the issues related relevant IT infrastructures such as internet connection and computers. Hence, the educators require to make an intervention in his regard when needed.

4.2.6. The role of the institution in online education

The institutional set up plays a major role when it comes to online education (Baran & Correia, 2014; Palloff & Pratt, 2011). The content analysis emphasises the importance of addressing privacy matters within the online space (Habibi, 2021) specifically in instances such as online assessment feedback (Bigatel et al., 2012; Farmer & Ramsdale, 2016). Further, the related studies also consider the need of having a proper legal and policy backgrounds to govern the online learning and teaching process (Bigatel et al., 2012; Habibi, 2021).

4.3. Attitudes

The interviewees participated in the study carried the view that equal participation of students in online learning appertains to the educators' approach. They asserted that it is the educators' responsibility to ensure equal participation and the onus is on them to improve the students' engagement in different online teaching strategies. UK_HUD_11 stated, “It depends on how the lecturers deal with their students”. Stating a supporting view UK_HUD_7 mentioned “I think the onus is on me to make sure that I've structured the questions that I ask them in such a way that I show them that we're getting the most out of them as opposed to putting the onus on them to answer

the questions." And she further added "This is all about relationship building and so I try to encourage this group in this way. It's an encouragement for everyone to have something important to say and promote that in such a positive way and an openness on my part as well. Telling them when I screw up and I think that that gives them the opportunity to feel that it's OK if they share their opinion or they share their position or argument." One aspect of educators being responsible towards ensuring equal participation is understanding the difficulties the students face. For instance, UK_HUD_9 highlighted a question that educators should answer before designing an activity/ assignment/ homework "whether they have the kind of support, capability and confidence to do what you ask students to do in their own time?".

The interviewees who agreed that they are responsible to promote equal participation of students mentioned some of their good practice. According to 111, "You get students with visual impairments, non-native speakers. There's so many things that we got to be careful of, even font size and font colour, use of complex languages.". For instance, UK_UCLAN_ 6 remarked that they have used software called Ally that allows students to change the language during an online lecture, which is very helpful for international students as well as software that can read aloud written information and change the font to make the material more inclusive and accessible. UK_HUD_7 who strongly believe that educator has a lot to contribute in promoting equality and inclusivity in students' participation explained one of her strategies "I start off all classes telling them that no matter what anybody says, I'm going to tell them that they're wrong. It doesn't matter what you say. I could agree with you 1000%. I could have the exact same position, but I'm going to tell you you're wrong and this is my tool to make sure that you can respond to criticism. So, it's promoting critical analysis. So, I explain it to them as a pedagogical tool and then they know ahead of time that they're going to be told they're wrong no matter what. So, it's OK if they actually get it wrong because no one's going to know that they actually got it wrong."

UK_HUD_7 who supported the power of anonymity as a mechanism to give every student a voice further stated "with the online, no one has to turn their camera on but me". According to her "Some students are self-conscious of their living environment. Some students are doing their work from random places, and so the equal participation is, well, no one's going to be judged and no one has to be worried about having all of that recorded as far as different perspectives." This is similar to

UK_UCLAN_5's suggestion on adopting flexibility and fostering students to have more control over the time and work at their own paces.

UK_HUD_3 as an educator representing a degree programme that offers teaching bilingually in a multilingual country raised attention to the difficulties for monolingual students (students who do not speak/understand the languages the programme is being taught). He further stated the difficulty to find material in different languages "language barrier was there because we conduct lectures bilingually and if we upload a document documentary in English, it is very difficult for us to find its Sinhala or Tamil (majority of the students enrolled in the programme speak/ understand these 2 languages) versions or Sinhala or Tamil documentaries in general". However, it can be argued that this incident presents largely the cultural impacts on education and therefore cannot be generalised (almost impossible to the UK scenario). Yet this brings attention to the idea that culture gaps are prominent and they may misinterpret student behaviour in classes as well. Although educators work hard to understand their students from different cultural backgrounds, these situations could take place possibly until the educator-learner relationship matures. Therefore, openness is a key attribute to be practised from the initial days and UK_HUD_7 presented her views on a healthy educator-learner relationship as "Presenting her concise post-structuralist views UK_HUD_7 argued, "So openness, conversation, and encouragement that everybody's position and argument is relevant.". Meanwhile there were also concern over the fact that the flexibility of online sessions would be abused by educators who, according to UK_UCLAN_8 "don't want to come to work" as it can be easier to work at home rather than "coming up and facing the students and being challenged by the students". Similarly, SW_LU_9 highlighted the importance of the ability to adapt to different working environments and learn fast, as well as being critical in performing better in the DRR discipline.

Typically, some DRR courses/ programmes/ modules are known to be a niche in higher education, particularly in some countries. Therefore, there are only a few experts capable to teach those areas and understandably this could give rise to problems related to copyrights (for lecture material or recorded lecturers). Without a sufficient understanding of copyrights, some of the lecturers refused to allow their lectures to be recorded; in a context where the recordings were the only choice for the majority of students who had internet-related issues. UK_HUD_3 described this experience as a head of the department "some lecturers did not want to share other recordings because what they

said was, what would happen if student uploads their recording illegally in other channels or YouTube and who is going to take that responsibility? So, in that context, what happened was some lecturers said they will conduct the live lecture, but they will not share the recording and we were not in a position to force the lecturers to record". This draws the attention to educating the lecturers on aspects like copyrights on material as well as exercising professional due diligence.

The interview results can be summarised under the following points:

- Willingness to adapt
- Flexibility to meet evolving needs and respond smoothly to unprecedented external changes
- Willingness to learn and self-evaluate
- Openness
- Growth mindset
- Observance and being responsible
- Being ethical
- Teamwork and networking

5. The principles of the digital competence framework for DRR educators to develop digital pedagogical competences

Based on the aforementioned insights of the content analysis and the literature review, the following principles were developed. The principles here are the key building blocks of the framework.

Principle 1: Based on the main virtues

- Responsiveness: The framework will be responsive for the needs of the DRR education and the diverse DRR community.
- Adaptability: The framework is developed in such a way that it can be adaptable to different educational context in Europe and in the global setting.
- Flexibility: The framework is sufficiently flexible for the prospective users to make necessary adjustments to suit their institutional and country specific requirements.

Principle 2: Based on the key dimensions of digital competence

- Knowledge
    - Pedagogical knowledge
    - Content knowledge
    - Technological knowledge (Koehler and Mishra, 2009)
- Skills
    - Digital pedagogical
    - Design
    - Content
    - Class room management
    - Technological
    - Reflecting (Albrahim, 2020)
- Attitudes
    - Receiving
    - Responding
    - Valuing
    - Organisation
    - Characterisation (Wu et al., 2019).

Principle 3: Based on the stages of online teaching

a. Before-teaching - preparing, planning, and designing.
b. During the teaching - facilitating, interacting, and providing and seeking feedback competencies
c. After teaching – reflecting on teaching and feedback (Abdous, 2011).

Principle 4: Based on the main principles that reimagine online distance DRR education

- Inclusivity
- Flexibility
- Accessibility
- Interactions
- Feedback based
- Use of technology

- Privacy concerns

Based on the above principles, the main three layers of the competence framework was divided into knowledge, skills and attitude. Under each dimension the relevant competencies were derived based on the content analysis and the literature review. As the existing competence frameworks are based on digital education the novelty of this framework is its dedication towards the online DRR education. Hence, under the dimension of skills, the competencies were developed in considering the nature of DRR as a subject.

6. The initial digital competence framework for DRR educators to develop digital pedagogical competences

	A. Preparation and development	B. Application	C. Reflection
Knowledge	***Knowledge development*** 1. Develop knowledge of appropriate* digital learning theories/pedagogical styles on online teaching strategies **Appropriate to build a positive connection with different types of learners and circumstances* 2. Plan the use of technology and tools for the online teaching 3. Plan the teaching content and assessments in a manner that caters for the needs of different types of learners (create inclusivity through content knowledge) 4. Update the knowledge on developments in the DRR content	***Knowledge application*** 1. Promote collaboration 2. Enhance active learning/ student engagement 3. Handling distractions and manage dominating ideas 4. Secure and responsible use of digital resources	1. Identify the existing challenges with previous online student cohorts 2. Self-evaluations to identify training/learning needs 3. Identify what facilitations to be proposed to the institution ***4.*** Peer feedback/review

Skills	***Digital Pedagogical skills –*** 5. Develop skills to utilize appropriate learning theories on online teaching strategies. 6. Develop skills on appropriate online techniques and learning strategies 7. Explore under-presented areas 8. Promote interconnected thinking ***Design skills*** 1. Have a thorough preparation of the course in terms of its a. Learning outcomes b. Time frame c. Workload management of the educator and the learner 2. Design courses in way where teaching strategies could be diversified so that the content is flexible and adoptable as per the context of the course is offered 3. Consider a wider audience in terms of designing the course 4. Consider the practical aspect of Disaster Risk Reduction Education 5. Consider the interdisciplinary aspect of Disaster Risk Reduction Education 6. Knowledge between the educator and the learner should be duly shared	***Pedagogical skills*** 9. Use of appropriate learning theories into account in terms of deciding on the online teaching strategies 10. Use of appropriate techniques and learning strategies 11. Ability to work with quality resources 12. Evaluating the context of your online class in terms of the following factors when finalizing your pedagogical strategies a. The level of students – undergraduate/post-graduate b. The past experiences of the students c. Motivation of the students d. Other commitments of the students – employment and social responsibilities 13. Plan out to make sure that all types students are included within the learning process 14. Handle distractions that may occur online 15. Effective teaching in terms of a. Achieving intended learning outcomes	***Reflecting skills*** 1. Reflecting on the feedback received from the students for further development 2. Self-evaluation 3. Peer evaluation

	7. Consider the future career prospects of the learners 8. Design appropriate assessments ***Content skills*** 1. Content Available and prepared to be converted into various forms at a time of emergencies 2. Reliable content in terms of the context the course is offered 3. Authentic content in terms of the context the course is offered 4. Up to date content in terms of latest of developments in the field of Disaster Risk Reduction 5. Address the interdisciplinary aspect of Disaster Risk Reduction 9. Address the practical aspect of Disaster Risk Reduction Education 10. The content should be accessible to a wider audience in terms of a. Geographical context b. Language c. Disabilities and other learning needs ***Technological skills*** 1. Relevant trainings and knowledge on the relevant digital literacy in terms of online teaching a. Basic IT skills b. Multimedia skills 2. Relevant infrastructure is available and if not, to report to relevant authorities:	b. Time managements c. Student performance in assessments d. Retrieval and retention of knowledge 16. Active learning strategies to keep students engaged. 17. Flexible strategies that could accommodate in any of the changes of the above-mentioned facts 18. Use of anonymity as a benefit in the online space to get the less vocal students engaged ***Social and communication skills -*** 1. Resolve distractions and grievances that could take place within an online classroom 2. Gather information of the class to recognize the students who are affected by the digital divide and strategize teaching to get them involved 3. Make teaching material and lectures available in common and local languages 4. Ensure the equal participation within the class in terms of communication 5. Use of the benefit of anonymity within digital space to get more students engaged	

	a. Stable internet connection b. Computer c. Relevant software 3. Familiarizing with the interface and functions of the learning management systems and other online teaching tools 4. Familiarizing with new technological developments that are taking place in the Disaster Risk Reduction field.	6. Recognize the students that are at the verge of discontinuing the course for various reasons and connect them with relevant authorities 7. Present the data and teaching content in a way that is accessible to everyone 8. Enhance communication and interactions during and after class via digital space to understand the contexts of the students 9. Gain feedback from students in terms of teaching and content for further development Giving feedback for students 10. Enhancing inclusivity within the online classroom in terms of a. Students with disabilities b. Students with professional commitments c. Students with emotional and health concerns d. Students that come from impoverishment backgrounds ***Classroom Management skills***	

		1. Set up the rules that should govern the classroom 2. Constant monitoring of students' progress 3. Efficient management of time 4. Maintain leadership, mentorship and coaching within the online classroom ***Technological skills*** 1. Use disruptive technologies within teaching to give students field work experience within a digital space. E.g.: Virtual reality glasses. 2. Make note of the unforeseen technological difficulties that class face and take necessary steps 3. Use of various technological aspects to enhance the learner centric learning 4. Use of relevant technologies to develop an individualized experience to the students	
Attitudes	• Flexibility to meet evolving needs • Openness • Growth mindset • Adaptability • Readiness and preparedness	• Inclusivity (respecting the diversity) • Willingness to adapt • Swift responsiveness to unprecedented external changes	• Willingness to learn and self evaluate • Observance • Teamwork and networking • Openness • Growth mindset

		• Responsibility and accountability • Being ethical • Teamwork and networking • Accessibility to students	

7. Validation Round 1 – Feedback from the Partners

Following the development of the initial framework, the report was shared among the project partners for their feedback. The feedback was requested based the following four questions:

1. What are your views on the presentation of the framework? How do all the output findings come together and thematising?
2. What improvements would you suggest to the content of the framework Please give your suggestions under the dimensions (knowledge, skills, attitudes) of the main themes (development, application and reflection) of the framework.
3. Do you think digital DRR competencies can be classified as mandatory or optional? Please explain the reasons.
4. Do you think the framework is self-explanatory and sufficient to operate the cMOOC platform (from Output 3), repository (from Output 5), and align with the principles and proposals developed for Output 2 and Output 4? Please explain from the perspective of your own output first and the general view at the end.

The following table reflects the summary of the feedback received from the partners:

Partner	Overall	Content	Mandatory/optional	Adequacy to operate other outputs
LUND	Clarifying how all the principles feed into the framework.	Reflections: What could be inserted here is the chance for further collaboration with students for improving the learning experience co-creation theme from Output 02) Knowledge application: Maybe further elaborate on how the different points can be succeeded.	Competencies cannot be considered as optional	Output 2 - Inclusion of the concept co-creation

		Technological skills: "Relevant infrastructure is available and if not, to report to relevant authorities"- Not sure how this would help in various contexts. *The vital role played by the institution		
Keio	1. Pedagogical competences could be further summarized/simplified , and possibly classified according to Principle 4: 1) Inclusivity, 2) Flexibility, 3) Accessibility, 4) Interactions, 5) Feedback-based, 6) Use of technology, and 7) Privacy concerns. This could 2. c) The numbers of the points run into two digits and go beyond a single page. That makes it hard to grasp at a glance. 3. Reflect on the tangible outcomes – comment came under mandatory and optional requirements	1. Collaboration, engagement, and participation: how these could be evaluated may be suggested, indicated, or given some guidelines/measuring points. – need clarification 2. Preparation – checking up on logistical set up related to technological preparation (the role of the institution) 3. How He stakeholders can impact the role of the educator		
UCLan	1. Reflecting principles within the framework	1. Under Knowledge, the three categories	All the components under attitudes	CMoocs could be implemente

	2. Enhancing the justification for the development of the framework	identified in Section 4 are Pedagogical Knowledge, Content Knowledge and Technical Knowledge. However, in Principle 2 and the framework, these categories change to Preparedness and development, Application and Reflection without any explanation why. 2. Under Skills, Principle 2 and the framework highlight digital pedagogical, design, content, classroom management, technological and reflecting skills. However, there is no clear explanation as to where these key skills come from in Section 4. 3. Attitudes – explain the overlapping with principle 4 4. Knowledge – clarify the categorization 5. Explain the stage of online teaching 6.Map the insights with the skills in the table	should be mandatory. Components under skills and knowledge could flexible to be either mandatory or optional	d based on this

VGTU		The importance of developing competencies to recognise assessments that have been developed using AIs.		

Based on the aforementioned feedback, the framework was amended as follows:

	A. Preparation and development – Prior to teaching	**B. Application – During teaching**	**C. Reflection – After teaching**
Knowledge	***Pedagogical knowledge*** 1. Develop knowledge of appropriate* digital learning theories/pedagogical styles on online teaching strategies *Appropriate to build a positive connection with different types of learners and circumstances ***Content knowledge*** 1. Plan the teaching content and assessments in a manner that caters for the needs of different types of learners (create inclusivity through content knowledge) 2. Update the knowledge on developments in the DRR content ***Technological knowledge*** 1. Plan the use of technology and tools for the online teaching	***Pedagogical knowledge*** 1. Promote collaboration 2. Enhance active learning/ student engagement 3. Handling distractions and manage dominating ideas ***Content knowledge*** 1. Improve the knowledge on area being taught ***Technological knowledge*** 1. Secure and responsible use of digital resources	***Pedagogical knowledge*** 1. Identify the existing challenges with previous online student cohorts 2. Self-evaluations to identify training/learning needs 3. Peer feedback/review ***Content knowledge*** 1. Evaluating the information used to teach to make sure if the most up to date information has been used 2. Reflecting if the underrepresented and relevant information has been used in the teaching content ***Technological knowledge*** 1. Identify what facilitations to be proposed to the institution 2. Evaluating the technologies that

			were used in the teaching process

Skills	***Digital Pedagogical skills –*** 1. Develop skills to utilize appropriate learning theories on online teaching strategies. 2. Develop skills on appropriate online techniques and learning strategies 3. Explore under-presented areas 4. Promote interconnected thinking ***Design skills*** 1. Have a thorough preparation of the course in terms of its a. Learning outcomes b. Time frame c. Workload management of the educator and the learner 2. Design courses in way where teaching strategies could be diversified so that the content is flexible and adoptable as per the context of the course is offered 3. Consider a wider audience in terms of designing the course 4. Consider the practical aspect of Disaster Risk Reduction Education 5. Consider the interdisciplinary aspect of Disaster Risk Reduction Education	***Pedagogical skills*** 1. Use of appropriate learning theories into account in terms of deciding on the online teaching strategies 2. Use of appropriate techniques and learning strategies 3. Ability to work with quality resources 4. Evaluating the context of your online class in terms of the following factors when finalizing your pedagogical strategies a. The level of students – undergraduate/post-graduate b. The past experiences of the students c. Motivation of the students d. Other commitments of the students – employment and social responsibilities 5. Plan out to make sure that all types students are included within the learning process 6. Handle distractions that may occur online 7. Effective teaching in terms of a. Achieving intended learning outcomes	***Reflecting skills*** 1. Reflecting on the feedback received from the students for further development 2. Self-evaluation 3. Peer evaluation

	6. Knowledge between the educator and the learner should be duly shared 7. Consider the future career prospects of the learners 8. Design appropriate assessments that address diverse student needs and workable to differentiate machine (AI) generated work with human/student generated work ***Content skills*** 1. Content Available and prepared to be converted into various forms at a time of emergencies 2. Reliable content in terms of the context the course is offered 3. Authentic content in terms of the context the course is offered 4. Up to date content in terms of latest of developments in the field of Disaster Risk Reduction 5. Address the interdisciplinary aspect of Disaster Risk Reduction 9. Address the practical aspect of Disaster Risk Reduction Education 10. The content should be accessible to a wider audience in terms of a. Geographical context b. Language c. Disabilities and other learning needs	b. Time managements c. Student performance in assessments d. Retrieval and retention of knowledge 8. Active learning strategies to keep students engaged. 9. Flexible strategies that could accommodate in any of the changes of the above-mentioned facts 10. Use of anonymity as a benefit in the online space to get the less vocal students engaged ***Social and communication skills*** 1. Resolve distractions and grievances that could take place within an online classroom 2. Gather information of the class to recognize the students who are affected by the digital divide and strategize teaching to get them involved 3. Make teaching material and lectures available in common and local languages 4. Ensure the equal participation within the class in terms of communication	

	Technological skills 1. Relevant trainings and knowledge on the relevant digital literacy in terms of online teaching a. Basic IT skills b. Multimedia skills 2. Relevant infrastructure is available and if not, to report to relevant authorities: a. Stable internet connection b. Computer c. Relevant software 3. Familiarizing with the interface and functions of the learning management systems and other online teaching tools 4. Familiarizing with new technological developments that are taking place in the Disaster Risk Reduction field.	5. Use of the benefit of anonymity within digital space to get more students engaged 6. Recognize the students that are at the verge of discontinuing the course for various reasons and connect them with relevant authorities 7. Present the data and teaching content in a way that is accessible to everyone 8. Enhance communication and interactions during and after class via digital space to understand the contexts of the students 9. Gain feedback from students in terms of teaching and content for further development Giving feedback for students 10. Enhancing inclusivity within the online classroom in terms of a. Students with disabilities b. Students with professional commitments c. Students with emotional and health concerns	

		d. Students that come from impoverishment backgrounds ***Classroom Management skills*** 1. Set up the rules that should govern the classroom 2. Constant monitoring of students' progress 3. Efficient management of time 4. Maintain leadership, mentorship and coaching within the online classroom ***Technological skills*** 1. Use disruptive technologies within teaching to give students field work experience within a digital space. E.g.: Virtual reality glasses. 2. Make note of the unforeseen technological difficulties that class face and take necessary steps 3. Use of various technological aspects to enhance the learner centric learning 4. Use of relevant technologies to develop an individualized experience to the students	
Attitudes	***Cognitive belief*** • Openness • Adaptability	***Cognitive belief*** • Inclusivity (respecting the diversity)	***Cognitive belief*** • Willingness to learn and self evaluate

	Affective states • Growth mindset ***Perceived control*** • Flexibility to meet evolving needs • Readiness and preparedness	• Responsibility and accountability • Teamwork and networking • Accessibility to students ***Affective states*** • Being ethical ***Perceived control*** • Willingness to adapt • Swift responsiveness to unprecedented external changes	• Observance • Teamwork and networking • Openness ***Affective states*** • Growth mindset ***Perceived control*** • Flexibility to meet evolving needs • Readiness and preparedness

8. Validation Round 2 – Focus Group interview with DRR Educators

Following the amendment of the framework an external validation was held with the participation of seven DRR educators. The profiles of the educators could be summarised as follows:

Interviewee	Areas of expertise	Years of experiences
1	Urban planning/designing and DRR	9
2	Geography and DRR	8
3	Geography and DRR	7
4	Sociology and DRR	16
5	Geography and DRR	6
6	Urban planning/designing and DRR	6
7	Construction management and DRR	6

The interviewees were given the amended framework and was given the opportunity to clarify any factors the needed further information on. They were put forward with questions in terms of the main domains (knowledge, skills and attitudes) of the framework and the operationalisation of the framework. The summary of the feedback received from the educators are:

1. Development of a short infographic of the framework to enhance the readability of the framework
2. The framework is more towards the what to be done and how to be done. Better to add examples on certain factors to make it easier for an educator to use it as a reference point
3. Enhance the inclusivity element within the framework
4. Allow an aspect where educators learn the previous experience of the students in terms of disasters
5. Emphasise the active learning element further
6. Add an assessment tool for the educators to use as a self-evaluating tool to use this framework in their online teaching

7. Use psycho motor model to categorise attitudes and not to divide it based on the stages of learning.

11. The Final Competence Framework

Who can use this framework?

DRR education is multidisciplinary, it could range from crisis management, and emergency medicine to cost management in disaster reconstruction. Hence, the role of a DRR educator is broad and involves a broad conceptualising. This framework is limited to the DRR educators' role in delivering educational content (teaching) compared to designing DRR programmes/ modules.

How can one can use this competence framework?

Evidently, the competences required of DRR educators in different contexts vary depending on the context-specific needs/challenges. In such situations, this framework needs to be customised, identifying should be highlighted context-specific mandatory and optional competences. To do the needful, the following virtues were followed to make it convenient for the users of the framework:

Virtue 1 – Responsiveness

The life in the contemporary world is in fact unpredictable. While we are slowly moving towards a post COVID-19 era, we never known what holds for us in the future. Hence, the needs and priorities in the DRR community are subjective to change as and when the need arises. This framework is developed in such way where you can design your online teaching to be responsive towards those changes.

Virtue 2 – Adaptability

Even though this framework was developed based on the findings of Asia Pacific, Lithuania, Sweden and United Kingdom, the framework has been developed in a such a way where you can adapt is as per the country context you are based on. Based on your country context, you may decide what is optional and mandatory for you.

Virtue 3 – Flexibility

We understand that based on your country context as well as the institutional context may require you to make changes to the competences we have recognised. Hence, this framework has been developed upon the virtue of flexibility where you can make necessary amendments as per your country and institutional contexts.

	A. Preparation and development – Prior to teaching	**B. Application – During teaching**	**C. Reflection – After teaching**
Knowledge	***Pedagogical knowledge*** 5. Develop knowledge of appropriate* digital learning theories/pedagogical styles on online teaching strategies. E.g. Constructivist and cognitive learning theories *Appropriate to build a positive connection with different types of learners and circumstances ***Content knowledge*** 3. Plan the teaching content and assessments in a manner that caters for the needs of different types of learners (create inclusivity through content knowledge) 4. Update the knowledge on developments in the DRR content ***Technological knowledge*** 2. Plan the use of technology and tools for the online teaching	***Pedagogical knowledge*** 4. Promote collaboration 5. Enhance active learning/ student engagement 6. Handling distractions and manage dominating ideas ***Content knowledge*** 2. Improve the knowledge on area being taught ***Technological knowledge*** 2. Secure and responsible use of digital resources	***Pedagogical knowledge*** 4. Identify the existing challenges with previous online student cohorts 5. Self-evaluations to identify training/learning needs 6. Peer feedback/review ***Content knowledge*** 3. Evaluating the information used to teach to make sure if the most up to date information has been used 4. Reflecting if the underrepresented and relevant information has been used in the teaching content ***Technological knowledge*** 3. Identify what facilitations to be

			proposed to the institution 4. Evaluating the technologies that were used in the teaching process

Skills	***Digital Pedagogical skills –*** 1. Develop skills to utilize appropriate learning theories on online teaching strategies. E.g. Constructivist and cognitive learning theories 2. Develop skills on appropriate online techniques and learning strategies E.g. LMS, blended learning, only synchronous learning, only asynchronous learning, flipped classroom and live lectures 3. Explore under-presented areas 4. Promote interconnected thinking ***Design skills*** 11. Have a thorough preparation of the course in terms of its a. Learning outcomes b. Time frame c. Workload management of the educator and the learner 12. Design courses in way where teaching strategies could be diversified so that the content is flexible and adoptable as per the context of the course is offered. E.g. Use of both synchronous learning and asynchronous learning	***Digital Pedagogical skills*** 11. Use of appropriate learning theories into account in terms of deciding on the online teaching strategies. E.g. Constructivist and cognitive learning theories 12. Use of appropriate techniques and learning strategies. E.g. LMS, blended learning, only synchronous learning, only asynchronous learning, flipped classroom and live lectures 13. Ability to work with quality resources 14. Evaluating the context of your online class when finalizing your pedagogical strategies. E.g. a. The level of students – undergraduate/post-graduate b. The past experiences of the students c. Motivation of the students based on their interactions and performance d. Other commitments of the students – employment and social responsibilities	***Reflecting skills*** 4. Reflecting on the feedback received from the students for further development 5. Self-evaluation 6. Peer evaluation

	13. Consider a wider audience in terms of designing the course. E.g. Geographical context, language and disabilities. 14. Consider the practical aspect of Disaster Risk Reduction Education. E.g. filed visits, field work and placements. 15. Consider the interdisciplinary aspect of Disaster Risk Reduction Education. E.g. natural sciences, engineering and Social Sciences. 16. Consider the future career prospects of the learners. 17. Design appropriate assessments that address diverse student needs and workable to differentiate machine (AI) generated work with human/student generated work ***Content skills*** 6. Content Available and prepared to be converted into various forms at a time of emergencies. E.g. content to be conveniently converted to online content. 7. Reliable content in terms of the context the course is offered	15. Plan out to make sure that all types students are included within the learning process. E.g. Less vocal students, dominating students, students with physical and learning disabilities. 16. Handle distractions that may occur online. E.g. Unauthorised admission and removal, unnecessary comments visa chat. 17. Effective teaching in terms of a. Achieving intended learning outcomes b. Time managements c. Student performance in assessments d. Retrieval and retention of knowledge 18. Active learning strategies to keep students engaged. E.g. Zoom polls, chat, Spotify challenge, kahoots. 19. Flexible strategies that could accommodate in any of the changes of the above-mentioned facts. 20. Use of anonymity as a benefit in the online space to get the less vocal students engaged. E.g. use of the chat option.	

	8. Authentic content in terms of the context the course is offered 9. Up to date content in terms of latest of developments in the field of Disaster Risk Reduction 10. Address the interdisciplinary aspect of Disaster Risk Reduction 18. Address the practical aspect of Disaster Risk Reduction Education 19. The content should be accessible to a wider audience in terms of. E.g. Geographical context, Language, and Disabilities and other learning needs ***Technological skills*** 5. Relevant trainings and knowledge on the relevant digital literacy in terms of online teaching. E.g. a. Basic IT skills b. Multimedia skills 6. Relevant infrastructure is available and if not, to report to relevant authorities. E.g. a. Stable internet connection b. Computer c. Relevant software 7. Familiarizing with the interface and functions of the learning management systems and other online teaching tools	21. Knowledge between the educator and the learner should be duly shared. E.g. Co-creation of knowledge through feedback ***Social and communication skills*** 22. Resolve distractions and grievances that could take place within an online classroom. E.g. Unauthorised admission and removal, unnecessary comments visa chat. 23. Gather information of the class to recognize the students who are affected by the digital divide and strategize teaching to get them involved. 24. Make teaching material and lectures available in common and local languages. 25. Ensure the equal participation within the class in terms of communication. 26. Use of the benefit of anonymity within digital space to get more students engaged. E.g. use of the chat option. 27. Recognize the students that are at the verge of discontinuing the course for various reasons	

	8. Familiarizing with new technological developments that are taking place in the Disaster Risk Reduction field. E.g. drones, AI and virtual reality.	and connect them with relevant authorities 28. Present the data and teaching content in a way that is accessible to everyone 29. Enhance communication and interactions during and after class via digital space to understand the contexts of the students 30. Gain feedback from students in terms of teaching and content for further development Giving feedback for students 31. Enhancing inclusivity within the online classroom in terms of a. Students with disabilities b. Students with professional commitments c. Students with emotional and health concerns d. Students that come from impoverishment backgrounds ***Classroom Management skills*** 32. Set up the rules that should govern the classroom	

		33. Constant monitoring of students' progress 34. Efficient management of time 35. Maintain leadership, mentorship and coaching within the online classroom ***Technological skills*** 36. Use disruptive technologies within teaching to give students field work experience within a digital space. E.g.: Virtual reality glasses. 37. Make note of the unforeseen technological difficulties that class face and take necessary steps. 38. Use of various technological aspects to enhance the learner centric learning. E.g. cMOOCs. Repositories. 39. Use of relevant technologies to develop an individualized experience to the students. E.g. cMOOCs	
Attitudes	***Receiving*** • Openness • Growth mindset • Observance ***Responding***		

	• Teamwork and networking • Flexibility to meet evolving needs • Readiness and preparedness • Willingness to adapt • Swift responsiveness to unprecedented external changes ***Valuing*** • Inclusivity (respecting the diversity) • Willingness to learn and self-evaluate ***Organization*** • Adaptability ***Characterization*** • Being ethical • Responsibility and accountability

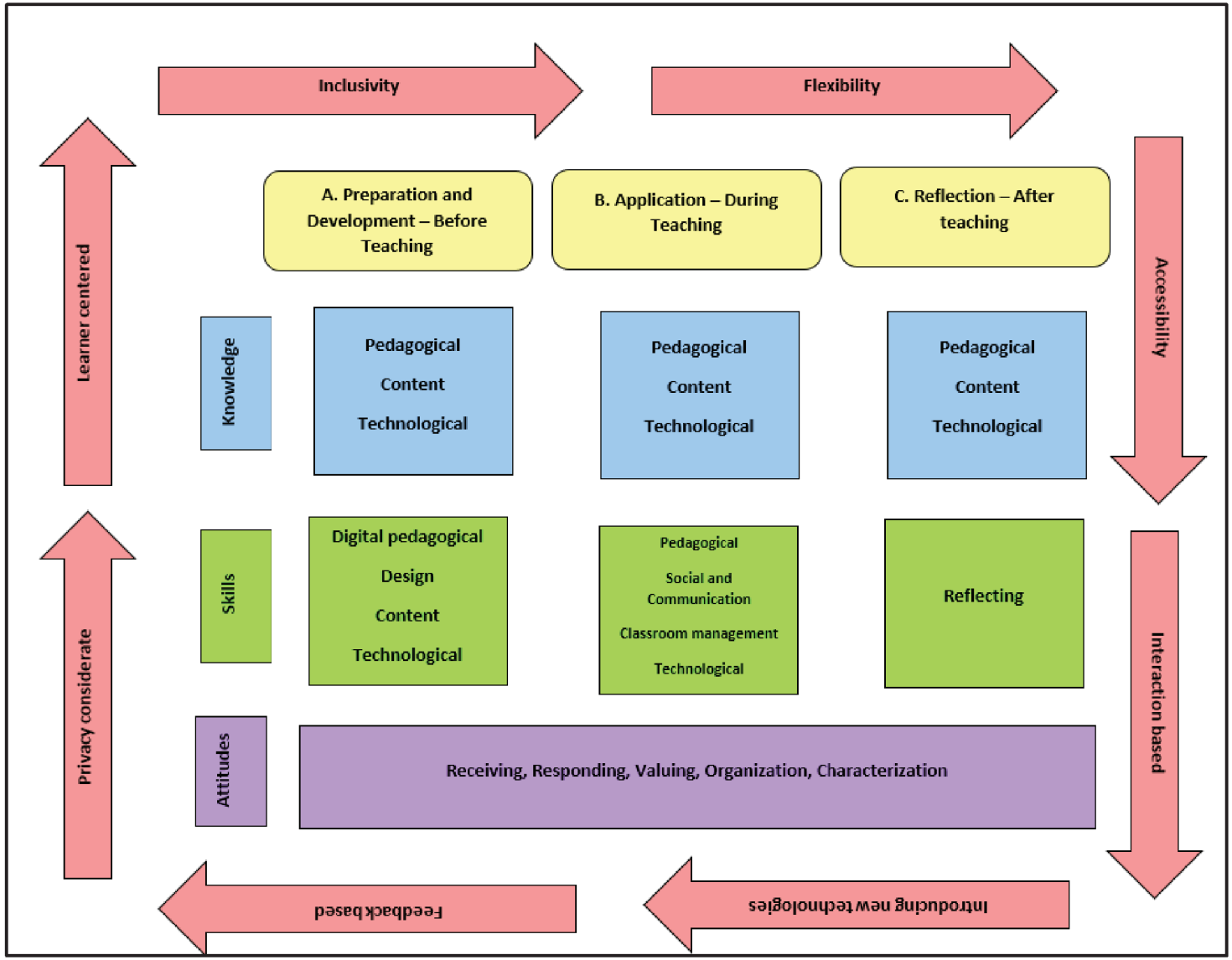

Figure 5: Final Digital competence framework for DRR educators to develop digital pedagogical competences

10. Way forward – Beyond the Competence Framework

10.1. The Role of Stakeholders

Despite the framework has been developed solely for the purpose of providing a guiding tool for DRR educators to develop their own competence in the field of online DRR education, the content analysis and the literature review further highlighted the vital role played by the institutional settings in providing online DRR education. As a way forward to this initial framework, the research team recommends considering the following aspects for a successful execution of online DRR education in a wider institutional set up:

1. Taking necessary actions to protect the privacy of the educators and the learners within an online space
    a. Institutional access
        i. Enrolment to courses
    b. Content securing
        i. Uploading content
        ii. Personal information that require to enroll to the courses
    c. Course management
        i. Commenting
        ii. Assessments and feedback
2. Having policy and regulatory framework in place in terms of the functionality of the platforms
3. Making sure that the relevant infrastructure is available for both educators and students
4. Having a sustainable strategy in terms of the maintenance of the platforms and facilities specifically in the context of financial management
5. Taking necessary actions to project the copy rights of the platform
6. Making sure the relevant access is given for the online resources on Disaster Risk Reduction related resources to both the educators and students following the relevant intellectual property guidelines
7. Assigning relevant roles in terms of the platform and training the relevant parties
    a. Administrators

    b. Facilitators
    c. Students
8. Having a guideline and policy framework in place in terms of the online learning space within the higher education and its way forward
9. Developing a guide that could be referred to by the users of the platform
10. Taking necessary steps to enhance the accessibility and the reachability of the platform
    a. Fact access
    b. Multilingual
    c. Scalability
    d. Cross-platform
    e. Good UI/UX

10.2. Operationalisation of the Framework

For this framework to be used as the guiding tool for the DRR educators in online teaching, the following assessment tool could be utilised as a check list through out the teaching process. This could in deed be a used as a tool to reflect on their teaching within the online space and to develop your digital teaching competence based on the feedback received.

Domain of the DRR educator's role	Pre-teaching	During teaching	Post teaching
Knowledge			
Knowledge on digital pedagogical skills			
Creating inclusivity through content knowledge			
Plan to use technological tools			
Promote collaboration			
Knowledge on active learning			
Handling distractions			
Improve knowledge on the area teaching			
Reflecting on teaching			
Feedback			
Skills			
Development of digital pedagogy			
Designing of the course use of technical tools/strategies			
Use of authentic, up to date content			
Use of appropriate technology			
Handling grievances			
Enhance active learning			
Promoting inclusivity within classroom			
Feedback			
Evaluating teaching			
Attitudes			
Willingness to hear other opinions			
Willingness to respond to various contexts			
Internalising various values			
Being ethical			
Establishment of values that control behaviour			

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Interviewee information

No	Interviewee ID	Current job title/role	Years of experience	Experience in teaching/ delivering DRR courses/modules	Experience in designing DRR courses/modules
1	E_UK_HUD_1	Senior tutor	7 years	Yes	Yes
2	E_UK_HUD_2	Associate Professor/ Senior lecturer	15 years+	Yes	No
3	E_UK_HUD_3	Professor	24 years	Yes	No
4	E_UK_HUD_4	Senior lecturer	12 years	Yes	Yes
5	E_UK_HUD_5	Professor	32 years	Yes	Yes
6	E_UK_HUD_6	Professor	42 years	Yes	Yes
7	E_UK_HUD_7	Senior lecturer	12 years	Yes	Yes
8	E_UK_HUD_8	Senior lecturer	9 years	Yes	No
9	E_UK_HUD_9	Lecturer	4 years+	Yes	Yes
10	E_UK_HUD_10	Reader and Director of Equity, Diversity, and inclusion	15 years	Yes	Yes
11	E_UK_HUD_11	Senior lecturer	15 years	Yes	Yes
12	E_UK_UCLAN_1	Deputy head	17 years	Yes	Yes
13	E_UK_UCLAN_2	Senior lecturer	7 years	Yes	Yes

14	E_UK_UCLAN_3	Professor	20+ years	Yes	Yes
15	E_UK_UCLAN_4	Senior lecturer	9 years	Yes	Yes
16	E_UK_UCLAN_5	Lecturer	14 years	Yes	Yes
17	E_UK_UCLAN_6	Senior lecturer	22 years	Yes	Yes
18	E_UK_UCLAN_7	Senior lecturer	29 years	Yes	Yes
19	E_UK_UCLAN_8	Senior lecturer	19 years	Yes	Yes
20	E_J_KEIO_1	Associate Professor	10 years	Yes	Yes
21	E_J_KEIO_2	Associate Professor	15 years	Yes	Yes
22	E_J_KEIO_3	Associate Professor	8 years	Yes	No
23	E_J_KEIO_4	Associate Professor-	20 years	Yes	Yes
24	E_J_KEIO_5	Associate Professor	16 years	Yes	Yes
25	E_J_KEIO_6	Professor	18 years	Yes	Yes
26	E_J_KEIO_7	Assistant Professor	7 years	Yes	Yes
27	E_J_KEIO_8	Professor	20 years	Yes	Yes
28	E_J_KEIO_9	Professor	17 years	Yes	Yes

29	E_J_KEIO_10	Professor	23 years	Yes	Yes
30	E_SW_LU_1	PHD student	4 years	Yes	Yes
31	E_SW_LU_2	Associate professor	9 years	Yes	Yes
32	E_SW_LU_3	Training coordinator	3 years	Yes	Yes
33	E_SW_LU_4	Associate Professor-	20 years	Yes	Yes
34	E_SW_LU_5	Training coordinator	3 years as an educator	Yes	Yes
35	E_SW_LU_6	Capacity development and Learning Development expert	10 years	Yes	Yes
36	E_SW_LU_7	Programme officer	14 years	Yes	Yes
37	E_SW_LU_8	Associate Professor	17 years	Yes	Yes
38	E_SW_LU_9	Associate Professor	14 years	Yes	Yes
39	E_SW_LU_10	Associate Professor, Scientific advisor	15 years	Yes	Yes
40	E_SW_LU_11	PhD student	9 years	Yes	Yes
41	E_LI_VGTU_1	Professor	35 years	Yes	Yes
42	E_LI_VGTU_2	Professor	30 years	Yes	Yes

43	E_LI_VGTU_3	Professor	25 years		
44	E_LI_VGTU_4	Associate professor	20 years	Yes	Yes
45	E_LI_VGTU_5	Associate Professor	23 years	Yes	Yes
46	E_LI_VGTU_6	Associate Professor	18 years	Yes	Yes
47	E_LI_VGTU_7	Associate Professor	21 years	Yes	Yes
48	E_LI_VGTU_8	Associate Professor	19 years	Yes	Yes