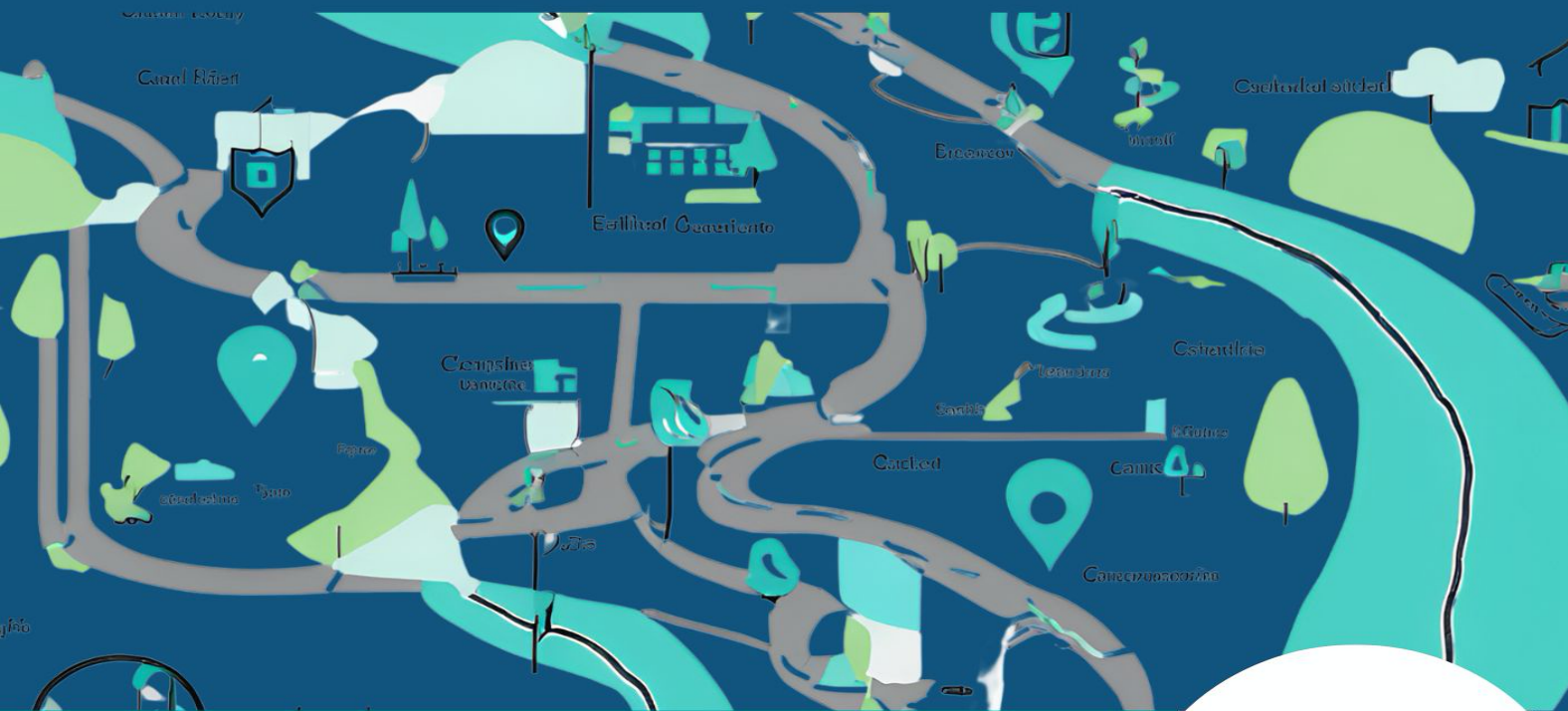# A pedagogical model to support digital transformation

## An IDEAL FUTURE POSITION PAPER

**IDEAL FUTURE**
Integrated Digital Educational Leadership for the Future

# IDEAL FUTURE

## A Pedagogical Framework to support professional learning in digital educational leadership

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# Contents

# 1   Introduction

This work package is aligned to the empathise stage of the IDEAL Future project methodology (see figure 1 below). The project partners worked with pre-service and in-service educators and educational leaders to explore how to leverage from professional learning to support them to transform their practice at individual, school, and inter-organisational levels. This report details on the findings and recommends a multi-level pedagogical model that supports transformative dialogue and leads to a co-operative and integrated approach to developing solutions to the challenges facing education in the area of digital pedagogical leadership.
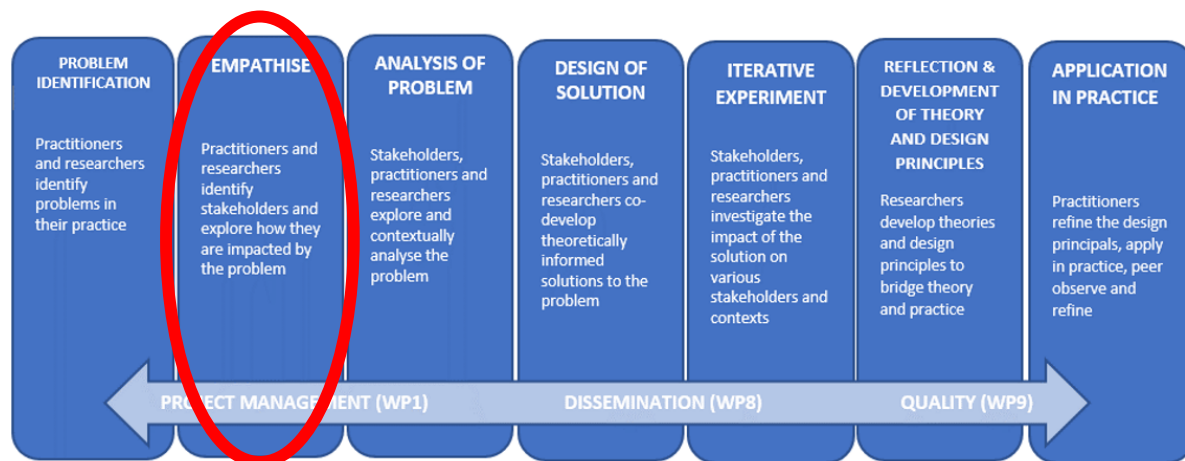


**Figure 1: IDEAL Future Project Methodology**

The work package rigorously analysed current research regarding digital transformation and professional learning using a systematic approach, the report on the findings of the integrated literature review is available separately but the output will be used to inform the pedagogical model described in this document and is discussed in section 6: Discussion.

This report details the basis of the pedagogical framework that will underpin the development of the learning content, learning activities and digital hub design. **Key outputs** of the work package include:

1. An integrated literature review on the use of digital technology to support transformative dialogical approaches to Professional Development. This is available as a separate report (see *Professional learning approaches that support digital transformation, enable change or impact practice: An integrated literature review*).
2. Development of a pedagogical model and position paper. This report discusses the associated research and literature that informed the pedagogical model and outlines a pedagogical model for IDEAL future. This will be leveraged in the design of the learning material, activities, and digital hub to support the delivery of professional learning in the area of digital leadership in education.

## 1.1   Objectives and Associated Research Questions

This work package aims to meet project objective three outlined in the proposal:

**Objective 3**: Develop and evaluate a high quality, multi-level, pedagogical model that supports transformative dialogue and leads to a co-operative and integrated approach to addressing issues facing education in the area of digital pedagogical leadership (WP3, WP6 and WP9*).*
As a result, the below objectives have been outlined as well as the associated research questions (see table 1).

| Objective | Question |
|---|---|
| Completion of a systematic literature review on transformative approaches to professional development using digital technologies (cross sectoral, international - exploring the various models, the impact on practice, key success factors and the successful use of technology to support such) | What are the most effective models, methods, approaches *(Comparison)* of professional learning *(Intervention)* that professionals *(Population)* engage with to support digital transformation *(outcomes), enable change (outcome), or impact the micro, meso or macro context (outcome)?* <br> How can these be adapted to meet the needs of educational leaders, educators, and those in education? |
| Empathise with pre-service and in-service teachers through survey and interviews - Identify and understand the difficulties pre-service, in-service, and educational leaders face in engaging in PD (Professional Development) and how to support them in developing their digital educational leadership skills | What are preservice, in-service, and educational leaders experience in leading digital transformation in schools? <br> What skills do they feel that they need to lead digital learning in their individual contexts? <br> What are their experiences of engaging in professional development and how can this be applied in the teaching academy? <br> How do pre-service, in-service, and educational leaders perceive successful pedagogical models to support skills development in the area of digital transformation and digital leadership? |
| Development of a pedagogical model and position paper | How can we support pre-service, in-service, and educational leaders to engage in professional development and develop their digital leader skills to succeed in a digital era? |

**Table 1: Research objectives and Associated questions**

# 2   Digital competency frameworks a standardised approach to professional learning

There are ongoing European efforts to increase the digital skills of those internationally, a clear focus of which is supporting the digital competence of educators. In March 2021, the EU commission outlined their vision to dedicate 2020-2030 the digital decade, committing to preparing Europe to transition to a digital economy by 2030. It is guided by a digital compass which has four guiding points skills, infrastructure, government, and business. Digital rights and principles are at the core of this vision, encouraging a people centred, rights-based approach to digital transformation and transition. Central to supporting people's rights is the development of critical digital literacies and skills. Consequently, t*he European digital skills coalition* highlights the need for skills at four levels.

1. *Digital skills for all: developing digital skills to enable all citizens to be active in our digital society.*
2. *Digital skills for the labour force: developing digital skills for the digital economy, e.g. upskilling and reskilling workers and jobseekers, and actions on career advice and guidance.*
3. *Digital skills for ICT (Information and Communication Technology) professionals: developing high level digital skills for ICT professionals in all industry sectors.*

4. *Digital skills in education: transforming teaching and learning of digital skills in a lifelong learning perspective, including the training of teachers .*

Key to this is to *'modernise education and training to provide all students and teachers with the opportunity to use digital tools and materials in their teaching and learning activities and to develop and upgrade their digital skills.' (EU, N.d.).*

The EIT, 2022 highlighted that there are several gaps and barriers to achieving this vision and objective throughout European. There is a lack of a cohesive approach to developing digital competencies in education at primary and second level. Teachers lack the professional development to enable them to teach digital skills and educational systems are slow at reforming their curricula (EIT, 2022), this was also highlighted in the challenges discussed in our work package 2 (wp2) report. In Europe they highlighted the urgent need for.

*The entire European public education system, from primary schools up to universities, needs to urgently modernize the outdated digital education programs. The public offering must reform its curricula both at primary and secondary level, and at university level, by making them more responsive to the changing technologies and labour market needs. This requires organisational and governance reforms to open the systems to partnerships with civil society. As well as tangible investments in connectivity and in new training for both teachers and professors.* (EIT, 2022).

Considering such initiatives there have been efforts to standardise professional learning in digital education via competency models. Such competency models detail the skills and levels of proficiency required for educators and citizens in a digital society. It is important to note that digital competencies, kills, knowledge, literacies are all used interchangeably context across policy documentation including the EU DEAP, UNESCO policy document etc. (Godhe, 2019).

Competency indicates a broader skillset is required than just literacy and content. Within our research we argue that not only digital skills are required but skills to support learners and educators to adapt to digital environments in addition to transversal skills and attitudes. Which aligns to the findings of our research particularly that of WP2.

The EU commission classifies their Digcomp framework based on attitudes, knowledge, and skills with a variety of competencies ranging from professional engagement, digital resources, teaching and learning, assessment, empowering learners and facilitating students' digital competence. In addition, UNESCO classify digital competence as technical, soft skills and industry based as well as focusing on the use of technology. (Lee et al, 2018). Digcompedu does not refer to soft/transversal skills in their framework however it could be argued that these are embedded in some of the proficiency descriptors.

Other frameworks include the Canadian digital competency framework.  In Canada digital competency, '*is defined as a set of skills necessary to the confident, critical and creative use of digital technologies to achieve objectives with regard to learning, work, leisure, and inclusion or participation in society*.' (Ministère de l'Éducation et de l'Enseignement supérieur, 2019).

*They have argued that it is unrealistic 'to attempt to foresee all possible applications given the daily occurrence of technological developments'* (Ministère de l'Éducation et de l'Enseignement supérieur, 2019). Therefore, competency frameworks need be specific enough so it can be applied and broad enough to not limit itself to specific technologies. In line with post digital thinking, it must be focused on technology use in a human, critical and ethical manner to ensure they are future proof.

As a result, the Canadian framework integrates ethical and technical dimensions and elements across several transversal skills to ensure that digital skills remain human centred. Transversal skills are the focus with technology and ethical elements integrated. However, it is to be noted that these relate to digital competencies in a broad context not an educational context.
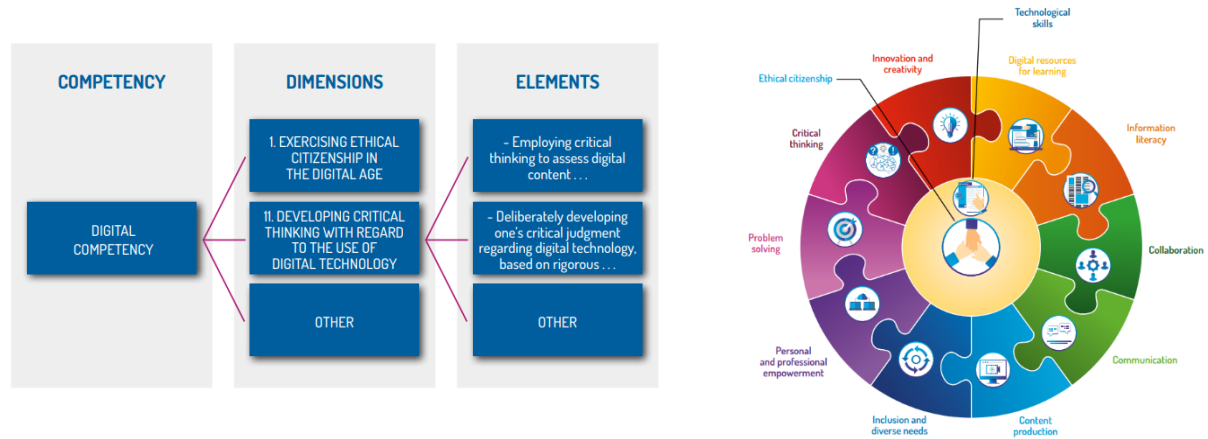


**Figure 2: Canadian Digital competency framework (Ministere de L'Education Quebec 2019)[1]**

However, it was noted by Villar-Onrubia et al, 2022 on review of 24 competency frameworks found that many did not include a critical focus. Other research has highlighted the need to focus on adapting competency models these to consider '*broader and more inclusive concepts of digital literacy and digital fluency.*' (Marín & Castañeda, 2022).

Considering such criticisms the DETECT project developed the Critical digital literacies framework (see figure 3) that integrated soft skills, technical skills, and data literacies regarding digital learning.[2]



*Figure 2:* The dimensions and sub-dimensions of the Critical Digital Literacies framework.

**Figure 3: Critical Digital Literacies framework (DETECT Project, 2021)**

[1] Ministère de l'Éducation et de l'Enseignement supérieur, 2019, Digital Competency Framework
[2] DETECT – Developing Teachers' Critical Digital Literacies

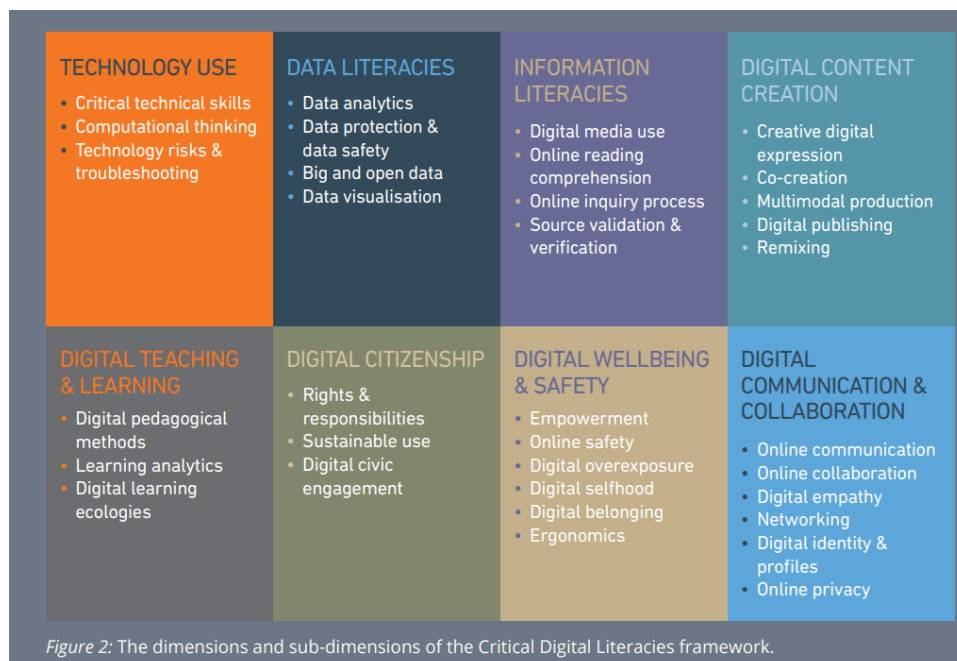The competency-based approach (CBE) has been identified as a way of addressing the emerging 21$^{st}$ century skills deficit (Surr & Redding, 2016). By offering a broad set of core competencies comprising of professional learning participants demonstrate a wide range of discipline specific and transversal skills.

Emphasis is not on seat time or didactic hours but on the application of learning (Kelchen, 2015) CBE is seen as a flexible form of learning that balances flexibility with structure. It allows learners to become autonomous learners, they decide how they would like to acquire and demonstrate the application of the learning associated with each competence (that is within a structure or frame). It offers a personalised self-paced methodology (Le et al 2014; Surr & Rasumussen, 2015). It not only offers flexibility in delivery of content but also the learning activities and assessment the learner engages in. Therefore, it aligns closely with all three UDL (Universal Design for LEArning) principles discussed in previous modules. Furthermore, it emphasises the multimodality of learning recommending a combination of instruction, peer learning, evidence based, applied and self-regulated learning (DeLorenzo et al, 2009).

This adopts an integrated approach to education in that the focus is on not just skills but knowledge and application of such. The competency framework provides a guide to allow the participant to self-assess their mastery at a specific competency and make choices about the content which they learn and how to apply it opening dialog between educators and students.

Providing competency models for professional learning can offer a structure to provided informed choice to participants of what they need to learn and how can apply Furthermore, Digitalisierung, 2017 highlights that ' competency tests and follow up preparatory courses can identify gaps in knowledge among prospective students before the course begins and help the to close these gaps.' This empowers individuals to take ownership of their learning and competency level - availing of open resources to ensure equitable access to education and facilitating informal and self-directed learning.

In the IDEAL Future WP2 report on challenges regarding leading digital learning, it was noted that there are disparate digital skills levels between teachers. This aligns to Van Dijk, 2005 digital divide schema who argues that the potential for exclusion occurs at four levels of access – Phase 1: Motivation, attitude, intention, and social support access; Phase 2 Physical access; Phase 3 skills access and Phase 4 Usage access (different ways in which the individual can use and apply the technology).

Consideration of all four phases of access be integrated into competency frameworks ad so digital competency frameworks need to be structured in terms of both design and delivery to reflect social divisions. For example, it is not enough for one to have the digital skills to develop multimodal content, they must consider the users motivation to access, how the user may access such content based on their social context, so access is equal. (Antheron et al, 2019[3]) By incorporating these into competency frameworks it ensures that digital practice is equitable and contextual. This also ensures that frameworks align to the post digital environment and that it is human rather than technic centred.

Many of the proposed competence frameworks are matrix based in which there is a skill, piece of knowledge or attitude listed and associated with this is a continuum of levels these can based on proficiency of use, increased user independents, or increased criticality.

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[3] [UNESCO (n.d.) Digital competence frameworks for teachers, learners and citizens](#)

For the purposes of professional learning competency frameworks can be used in several ways.

- Measurement – for determining an individual's digital competency and identifying opportunities for enhancement or improvement, balancing autonomy, and structure.
- Self-reflection – at individual level that provides opportunities to consider what competences they may require to plan professional learning.
- Professional learning design – to determine areas and levels of proficiency to focus on for designing professional learning.
- Assessment/Certification – to certify someone for employment or provide opportunities for assessment.
- Determine progress- enable participants to measure their progress along a continuum or proficiency level.

Most competency frameworks have associated measurement tools to facilitate planning. One of the main tools used in schools is the SELFIE tool developed by the European commission. It is mapped to the Digi Comp and Dig Comp Edu framework.

A study conducted by Cabero-Almenara et al, 2020 highlighted that the DigCompEdu was the most reliable competency framework followed by the Common Spanish Framework of Digital Competence for Teachers of the "Spanish Institute of Educational Technology and Teacher Training" (INTEF). Therefore, the pedagogical model proposed will make recommendations to which adapt this framework to meet the needs identified in the IDEAL future project.

# 3 Methodology

## 3.1 Research Design

This work package adopted an exploratory sequential mixed methods research design to develop an evidence based pedagogical model that empathises with the needs of educators and educational leaders. Qualitative narrative interviews facilitated a deeper understanding of professional learning experiences, current and desired of potential teacher academy participants, this enabled the partners to empathise and understand the overall experience desired. The Quantitative survey enabled the partners to understand the scale of the needs to assist the rigorous development of a pedagogical model. The integrated literature review (IRL) is available as a separate report but will be referred to within the pedagogical model enable the researchers to ensure that it leverages evidence-based models.

Significant research has already been conducted on professional development within the teaching profession, so it is important to consolidate and build on this in the context of supporting transformation and transformative learning. Consequently, the research team felt that adopting a mixed methods approach that consolidates and criticises existing literature, understands experiences in professional learning and conducts a quantitative analysis of the professional learning needs of educators and educational leaders will provide a representative view of the current and future status to enable the development of a pedagogical model. Therefore, the following data collection approaches were used:

- Integrated literature review on transformative approaches to professional development using digital technologies. (see *Professional learning approaches that support digital transformation, enable change or impact practice: An integrated review*).

- Interviews were conducted with 10 to 15 pre-service, 10 to 15 in-service teachers and 5-10 educational leaders in each partner country on their experiences of leading digital transformation, engaging in professional development and perceptions of a successful pedagogical model.
- Surveys were be conducted with 100 to 150 pre-service teachers 100 to 150 in-service teachers and 40-50 educational leaders in each country on the skills they need and how to support the development of such skills.

## 3.2   Data collection

For the interviews between December 2023 and February 2024 an invitation was emailed to educators and educational leaders in pre-service, primary, and post primary settings regarding understanding their experiences in digital learning. Participants were asked to describe the current and future challenges they face regarding embedding digital learning in their practice as well as their professional learning needs. In addition to email, invitations were posted on social media.

In total 164 educators and educational leaders volunteered to participate. There were two interview guides one for educators and a second for educational leaders.

In the interviews participants were asked about their past and desired professional learning experiences. Interviews took between 15-30 minutes and were recorded and transcribed.
For the surveys, an invitation to complete a 10-minute survey was circulated to all partner networks and made available via social media between March and April 2024.The survey explored the professional learning needs of participants in terms of delivery, accreditation, and preference type Ethical clearance was sought from the Mary Immaculate College Research Ethics Committee (MIREC).

## 3.3   Analysis and Coding

For the report thematic analysis was used.  After transcription, two rounds of coding were competed using Braun and Clarkes Thematic analysis framework. See figure 4.
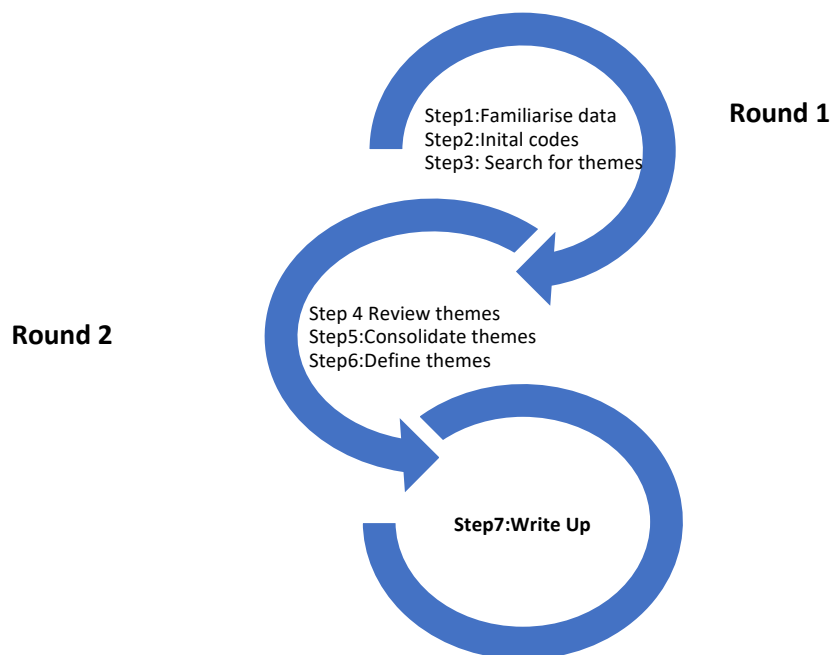


**Figure 4 Thematic Coding Process: IDEAL Future Interviews**

Below is a summary of the number of themes and sub themes in each round. Coding was completed using inductive analysis, the researcher used open coding, each line was not coded but each line of the transcript was reviewed and those lines to which there was meaning for the overall research objectives was attached a coded.

- In round one of coding 25 codes were generated and these were grouped into 4 themes
- In round two of coding these were reviewed and consolidated into 4 themes with 13 sub themes.

Any codes that have less than one reference or mention, that did not align to other themes/codes were removed.

# 4   Findings of interviews and survey

## 4.1   Demographic information

In total 164 participants volunteered to be interviewed. Of these 21% were educational leaders, 54% in-service teachers and 23% pre-service teachers (see figure 5). In some countries, due to the low response rate of pre-service teachers it was decided to interview teacher educators in initial teacher education to try to get a representative view of this demographic. Teacher educators, provide initial teacher education to pre-service teachers in addition to on campus classes they would observe their experiences in the classroom about teaching and learning. The teacher educators had expertise in digital education, they were dispersed across different levels of education.
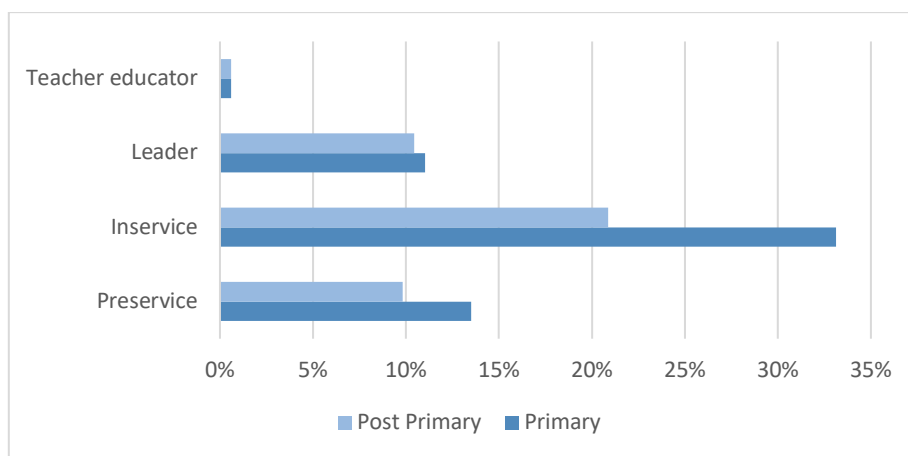


**Figure 5: An overview of the role of the interviewees**

In addition, there was representation from primary and post primary; 58% primary and 42% from post primary. There was only one interviewee from the pre-school sector despite invitations being circulated to this sector.

In the survey most of the respondents were from Ireland and Latvia with 18% from French speaking countries and 15% from Spain (see figure 6). In addition, educational leaders were the demographic most widely represented (28%), followed by teacher educators (26), Inservice teachers (23%), preservice teachers (10%) and others (13%).
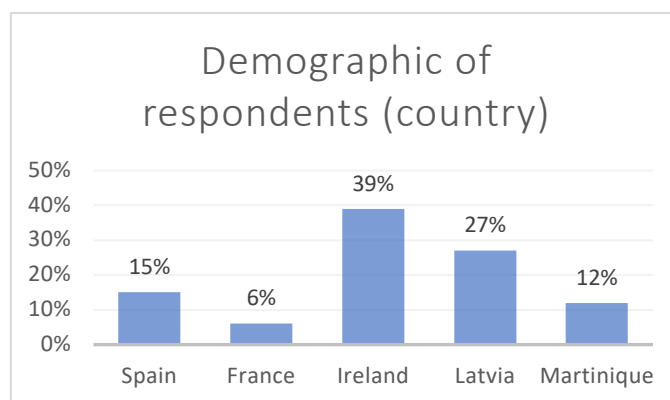
**Figure 6: Respondents by Country**

There seemed to be a misunderstanding about teacher educators as when educators were asked about what sector they worked in, second level was the represented by 43% of participants, primary 24%, early years 14% and other was 10% (see figure 7).
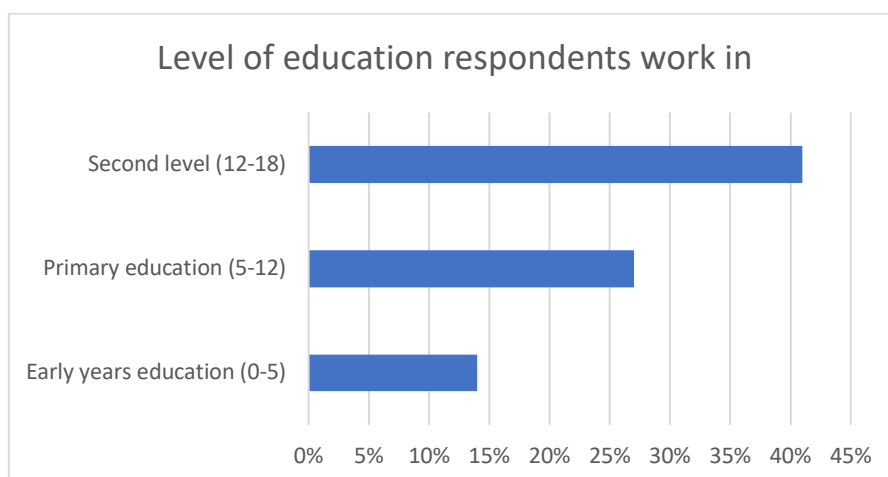


**Figure 7: Respondents by level of Education**

## 4.2   Professional learning: Past Experiences

Interviewees were asked to describe professional learning that they had engaged in that had impacted their practice. Many participants described experiences that consisted of a variety of different types of professional learning activities, these ranged for formal accredited, formal unaccredited and informal.

In terms of formal accredited learning many of the participants had engaged in some element of formal accredited learning. However, there was no narrative around their experiences in these programmes. In addition, several people had engaged in formal unaccredited training. These ranged from programmes offered by tech companies to government funded professional learning bodies.

*"And teachers also need the support of institutions and the educational system to guarantee them quality courses in this area." (Sp P6)*

*"First of all, I would love to have access to a wide range of resources of high-quality learning, this includes online courses, practical workshops, interactive websites, seminars, sessions with experts in educational change." (Sp P17)*

*"They can be online courses that are more dynamic and have more information so that teachers can acquire that knowledge that they do not have." (Sp P29)*

*There are lots of free webinars, lectures, and international seminars. I have attended webinars on artificial intelligence, robotics, and I am also very interested in topics on psychology. Overall, it is a very broad offer. (LV future teacher 22)*

*A Microsoft a certification in TY, My God, it was so good (IE P15)*

*So, XXX those days were so invaluable. Yeah, but they were excellent, and they stopped the funding that it's all gone. (IE P15)*

*The courses that I have done would just be with the education centre in terms of. In terms of teaching and the XXX was a really good one that I did. (IE P13)*

*She has attended courses introducing the basics of different technologists. Each lecture was given by a different expert, who introduced the different tools, technologies and how they can be used at work and in everyday life. Overall, the respondent appreciates that there are many courses available, both paid and free. (LV future teacher 23)*

As mentioned, Informal learning was part of many of the participants professional learning experience, the spoke a lot more passionately about these types of experience as in many cases they can see the impact of their learning on practice. There was a wide range of informal learning activities including experimentation, collaborations, school meetings, on the job, mentors, and self-study.

Interviewees described the impact of trial and error or experimentation and how they enjoyed trying new things.

*I love experimenting with the students then as well and I get them using it and seeing like does this work? How do we do this? Kind of problem solving as well, because kids will be like oh, this isn't working. (IE P7)*

*personally, for me it's an experience and time has given me that confidence in myself to either try something or abandon something …… I've kind of learned myself and I'm very open saying that …. (IE P21)*

*Teachers need to be able to assess which technologies will be used and at what point in the learning process. Be able to navigate the range of technologies on offer. The teacher must be able to learn on his/her own. Ability to be unafraid to try and explore for oneself rather than waiting for an outsider to show. Must be able to collaborate with each other, e.g. using the same tool in all subjects. (LV in-service teacher 7 years)*

In several instances people were involved in collaborations with other educators and universities. Many spoke of how they enjoyed working with others and sharing practice.

*"And in addition to participating in free workshops, courses and conferences given by experts in the area, I highly value the possibility of collaborating closely with other educators who are enthusiastic about innovation in education." (Sp P26)*

*I would like the courses to offer various practical tips/tutorials on "how" to develop/use something, followed by the development of the participants' own materials in cooperation with each other. It would prepare a base of widely available materials in the Latvian language, to be used in the learning process in the field of study (LV, in-service teacher, 7 years)*

*And there's a teacher share space where they can collaborate together, and then they'll provide the resources as well for you know, QA such like. UM and then. When the teachers ask us for extra resources like they wanted to be able to give feedback (IE P8)*

*Yeah, we collaborated together. It was great and even like we'd have zoom meetings because it was mostly online. So, when we'd come … and I was getting ideas from the others (IE P10)*

School meetings were mentioned several times, they were seen as a good opportunity to learn and share practice, the account again was often quite positive and facilitated collaboration, this may support the development of a learning community or culture as it is a low stakes and informal mode of building relationships and encouraging sharing.

> *What we do a lot of in our staff meetings is we do carousels. So, it was something that we had done on a training day as well. Where basically we might do an e-learning carousel at a staff meeting. So, if there's a lot of information that we want to feedback on rather than somebody speaking at the staff meeting and some people not hearing it or some people might be distracted, we basically do a carousel where there might be 6 stations with a team. So, mine could be let's say resources. So, when staff come to me and they're small bunch, they can tell me what resources they need, what's working, what needs to be fixed (IE P2)*

> *We did an intro and staff meeting that brought everybody to the computer rooms to log in, to download their OneDrive profile and get using it and give them a chance to ask questions. So, we use the three labs and there's a teacher in each lab (IE P5)*

In addition, participants spoke about the transformative nature of on-the-job training and how it can reach those who traditionally would not be open to digital learning. These interactions provide opportunities for colleagues to learn from each other in an informal context and try new things without committing to formal programmes in which they may feel isolated, or learning might be out of contexts.

> *Exchange of experience between teachers - seeing the teachers' methods, others may also be motivated to implement them in their subject (lv, in-service teacher, 2 years).*

> *She would be a bit allergic to it …. I just showed how to screen mirror because she had she smart. Support and then she told me a week later she the screen mirroring his class and other six class teachers. You must show me this. So, I tried to generally build on this. (IE P14)*

> *A couple of my colleagues would come over to me. Even if you're working in the staff room and they see me, like, writing on my Chromebook they are, Oh God. Like, what are you doing and like to take those few minutes to go, this is what I'm doing. (IE P3)*

Mentoring was also a quite popular model of informal professional learning however it was a category that was mentioned but not discussed in much detail, many interviewees were mentors themselves.

> *"I would like to have a highly qualified and experienced mentor or coach to guide me." (Sp P2)*

> *Technology mentors in school are essential, as are a tolerant and supportive attitude, and the opportunity for the teacher to put himself in the student's shoes.*
> *The most timid colleagues should be given individual attention, taking psychological aspects into account. (LV 9 years as school leader)*

> *we set up a digital buddy system. We had loads of teachers who IT (Information Technology) savvy, that immediately came on board right away. I am in charge of four or five teachers, and everyone then had a buddy to work with and it is reading. (IE P4)*

A few participants spoke about self-study resources such as you tube, websites, and in some cases, mentors created self-study resources to support staff within their own educational institute.

> *give them the resources that that I've used in class and like I created booklets over the years of resources (IE P5)*

From the data it is evident that in terms of professional learning educators and educational leaders draw on a variety of professional learning experiences and that there is no one ideal approach, the combination of formal and informal learning provides opportunities to acquire external knowledge (within formal courses) and adapt and apply them within their own context (through informal

learning). Informal learning provides contextualised learning opportunities. The interplay between formal and informal learning, and internal and external knowledge increases the body of knowledge within the educational organisation. In addition, informal learning provides opportunities for collaboration and knowledge exchange leading to a culture of learning and collaboration.

## 4.3 Professional learning: Desired experiences

When asked to describe their ideal desired professional learning experiences, participants again described a broad range of type of professional learning with a variety of characteristics. In terms of types of professional learning interviewees described the mode as well as types such as situated learning, peer learning, communities of practice, mentoring/coaching, problem based and independent learning.

Regarding the characteristics of professional learning participants described experiences that were Practical, Dialogical/Collaborative, inclusive. Interesting the timing of professional learning formed a part of the discussion.

### 4.3.1 Types of learning
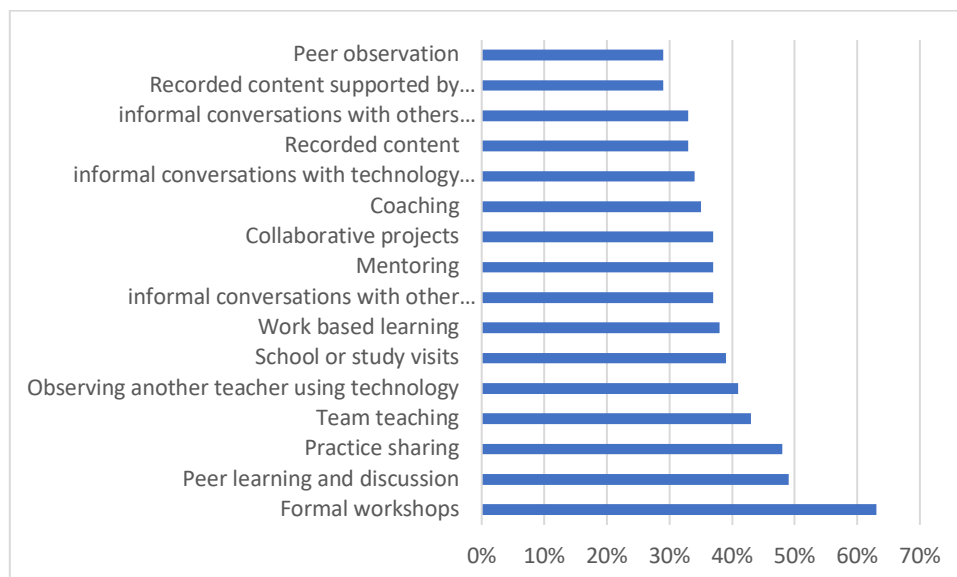


**Figure 8: Preferred type of professional learning (select all relevant)**

Those in the interviews spoke about different types of learning they would like to engage in. They favoured the more collaborative and contextual types of learning in which they were engaged with one or more people.

| Mode | Situated learning | Peer learning | Community of practice | Mentor/Coach | Problem based | Independent |
|------|-------------------|---------------|-----------------------|--------------|---------------|-------------|

**Table 2: Types of learning desired as expressed by participants**

They spoke about the mode with the majority having preference for some face-to-face element to their desired learning experience.

> Obviously, the face to face is a lot better because you're actually meeting people and you're bouncing ideas off people. It doesn't have to be all face to face a mix.  Maybe face to face is 2 days a month, and some days online. (IE P5)

*In an ideal world, professional development would include both the practical side and networking where specialists from different fields come together. Professional development should include more than listening to presentations - it should also include practical testing (LV, leader).*
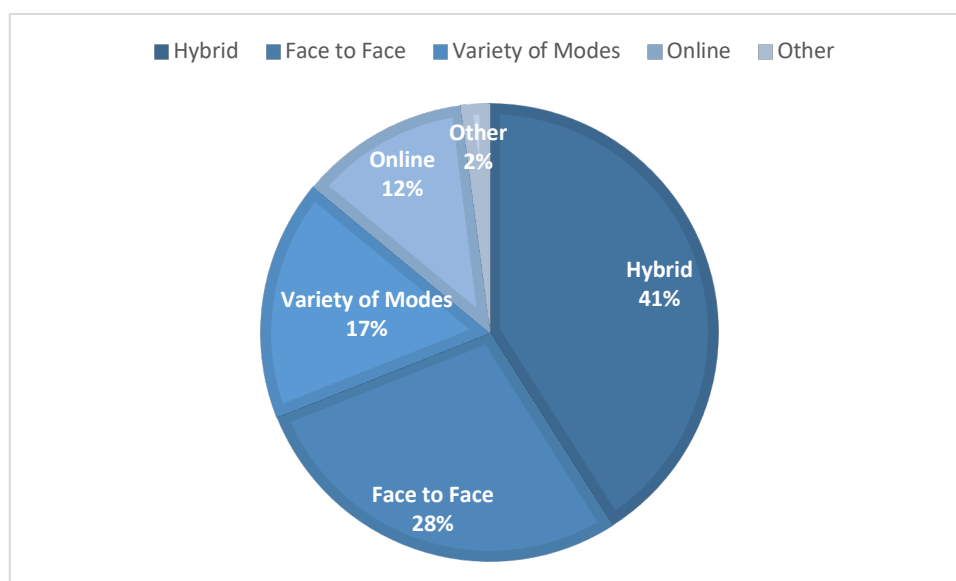


**Figure 9: Preferred mode of professional learning**

Situated learning was described in many narratives, opportunities for school visits, team/co-teaching was seen as a transformative way of contextualised learning in practice. Interviewees were particularly interested in visiting schools either locally or internationally – seeing teachers teach and learning from them.

*Imagine that like I would go and shadow a teacher or digital learner in another school where I could go and get ideas and come back and actually see them working in place (IE P2)*

*Some people want to go maybe, for a week, go to another school. You know, to kind of, learn more from other people or other teachers, like (IE P6)*

Others spoke about how they would like to co-teach or team teach with people. Interestingly participants were more interested in working with people from other schools rather than their own. This might be related to the cultural concerns raised in the challenges section.

*In the courses, time should be set aside for opportunities to exchange experiences - with the understanding that training participants have time to show their skills and knowledge, as often they are very rich and diverse, and the participants could gain a lot from each other (LV, in-service teacher, 7 years).*

*I'd love to, you know, like yeah, go into another school and have someone team teaching me, you know, for a year or something…. share my time between here and other school like. It could be the extra time that I get now I could go down and visit the primary school and do coding with them. (IE P5)*

This was sometimes used instead of peer observation as teachers can replicate practice, coteaching would provide opportunities for both to contribute to a lesson while learning from each other. It would also allow them to collaborate on the planning process not just the delivery.

*There needs to be a lot of work done beforehand that can work well. The only problem is I feel they just go to and replicate your lesson. So, unless I have them up there teaching with me and they do*

*sections of the lesson. So, we've talked through, and I've planned it with them. Then they do a great job. (IE P27)*

Peer learning was also described quite extensively, methods ranging from peer observation, peer learning and collaboration were threaded through this narrative.

*With peer observation I think you can learn so much from it, even if it's not in your own subject, you can just take ideas. Try them and if they don't work, they don't work, but then you're like ohh well, it's in my pile of ideas or stuff. Maybe with a different class at might work whereas. (IE P15)*

*So, all straight away you're observing, and people are observing you. You'll learn that way. Like. (IE P20)*

Again, there was more interest in engaging in peer observation teachers from other schools and contexts rather than their own.

*So, an outside teacher would have taught classes using digital learning tech and maybe three or four teachers observe a lesson with a debrief session for teachers after. (IE P25)*

However, in the survey participants were interested in in school collaboration see figure 10. This also aligns to the findings of the integrated literature review which point to the fact that many of those engaging in professional learning do so within their own school context. However, those with wider external networks are more likely to be innovative.
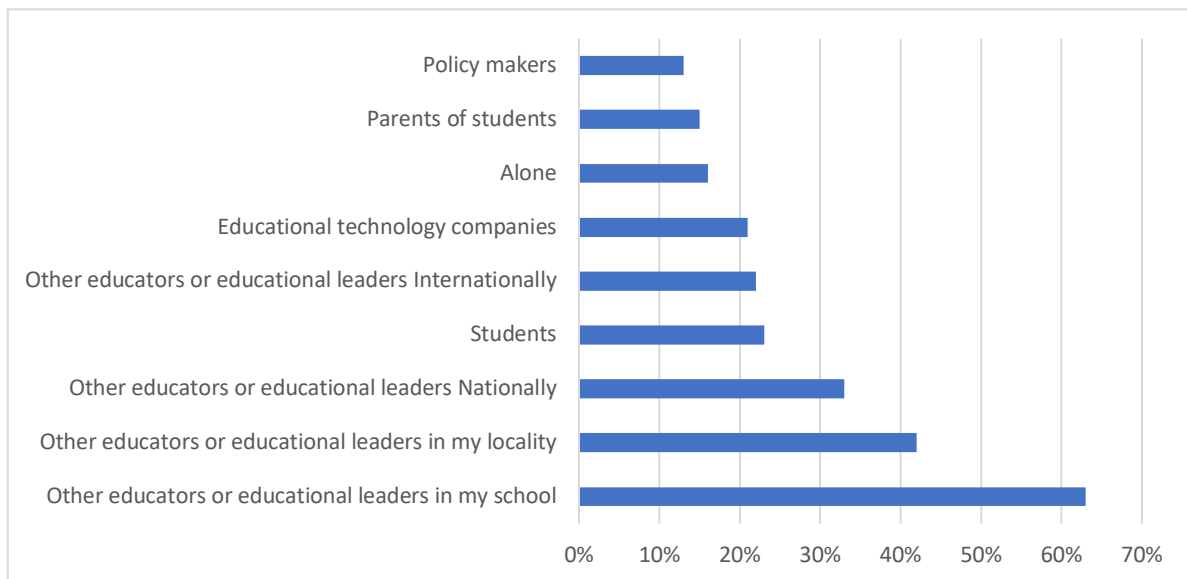


**Figure 10: Preferred collaborators**

Interestingly in the interviews, there was significant interest in collaborating again with those from other schools and interviewers spoke quite positively about this mode of professional learning.

*I suppose, collaboration with other schools and other digital leaders to see what's going on out there and what can I use. And a lot of like work experience basically for digital leaders would be fantastic (IE P2)*

*hearing maybe what is happening in a different school and how it's working, and you know they would come to me then and say can we try this or that and I would definitely always say please do like if you if we think this will work, we'll try this. (IE P27)*

The lack of interest in collaborating with colleagues and those locally was noted in the narrative and again relates to the earlier section on challenges with regard to collaborative culture in the area of education. This is inherent in not only primary and post primary but also third level.

*Principals or rural leaders, often much prefer to help the school above in the middle of Donegal and collaborate that way, then actually collaborate with your neighbours. Which is interesting. (IE P14)*

*They saw the benefits of cross institutional. Conversations around practice and you know, that's why it works quite well. So, I think, yeah, I think there would be fantastic because I do think sometimes in schools as well, they are much more willing to talk about their practice with people from another school than perhaps their colleague. (IE P30)*

Referring to collaboration within schools several participants spoke of more informal collaborations such as drop ins or teach meets to share ideas. However, these collaborations seemed to be more technocentric than teaching and did not involve observation or meaningful collaboration. They were more about sharing technological knowledge.

*Opportunity just to drop in like a drop-in clinic maybe for half an hour there during lunch break, whatever they come in and check in and ask questions. (IE P16)*

*So, like at every staff meeting, a staff member is picked that has to give a presentation on like an app or a program that they use in their class and like teaches the other class teachers how to use it and what they use it for. (IE P24)*

In the survey participants were asked to describe how they would work with others in their professional learning. IN total there were 236 open ended responses and 1, 867 words. Respondents described collaborating on joint projects/problems with others either nationally or internationally.

*Creating small trial projects within which digital strategies/digital solutions/novelties could be tested in lessons. (survey comment)*

*Learning together creating projects together with colleagues and students (survey comment)*

*As part of a project. In a team! (survey comment)*

*Establish a network of practitioners to work together on the project. It could be part of an Erasmus project or just a collaboration of professionals. (survey comment)*

*We have a very committed staff, who are always willing to help each other learn any new approaches that they have found effective or help each other troubleshoot when difficulties arise. This I feel that working on a project together would help us develop our skills and our vision for digital learning (survey comment)*

In addition, time was mentioned quite a bit in the comments and participants wanted regular workshops in particular practice sharing sessions or opportunities to share experiences.

*I think that sharing practices and seeing how we function in the department but also internationally would allow us to develop new skills (survey comment)*

*Working group and group of trainers. In physical meetings, each sharing their experience and pooling what usually works with our students (survey comment)*

*Experience exchange They would provide training Those who have learned and are working would show practice (survey comment)*

In addition, participants wanted to see learning in practice and expressed interest in visits to other schools and observations of practice.

*Mutually sharing experiences or listening to their experience stories observing classes participating in their courses. (survey comment)*

*visiting training lectures practical classes where the use of technology is taught (survey comment)*

*Initially they would provide a workshop to give background and to teach some of the basics. This would be followed up with school visits to see it all in action followed by another face-to-face workshop to see what questions have come up and to plan for the next steps. (survey comment)*

Participants also favoured the Community of practice model of professional learning, however the types of learning and structured varied from informal discussions to formal practices to being more embedded in the wider school culture and a part of the whole school ethos.

*"These communities would provide a space for knowledge exchange, joint reflection and the creation of innovative solutions." (Sp P2)*

*Establish a network to collaborate with regional schools and teachers, allowing them to share experiences, knowledge, materials, and support, while promoting open communication. Additionally, create a centralized technology hub for schools to exchange resources. To ensure success, the community must adopt a more open and responsible approach to shared technology, with clear rules for its use and maintenance (LV, in-service teacher, 6 years).*

*I would do if I was to go back in the morning, I set up a community of practice around us. If you had like communities of practice within the school and you had people like reflect on where they are at… and they would attend share advice that way and supports those that way. (P16)*

*I suppose, a community of practice development where you know, there's a practice that there's a suppose an environment in a culture, in the school that people are willing to share, practice. (P25)*

The impact of these on change, transformation and digital learning is unclear however it may be a basis to develop relationships and trust in schools with a view to progressing to a more collaborative culture. This was noted in the comments of the survey also. See below.

*An educational community should be created where educators' educational leaders and policymakers can establish communication and share learning to develop a collaborative educational community in the field of digital transformation (survey comment)*

Participants also mentioned mentoring and coaching either directly or indirectly. Mentoring and coaching terms were both used in different contexts. They mentioned the importance of the coach or the mentor remaining in the role of teacher or educator so they can provide more support and be up to date on proactive based issues.

*As part of the courses, each teacher would have a mentor who would come to observe the lessons, how they manage to implement what they learned in the courses and use digital technologies, help and provide feedback, not just to tell the information in the courses and then leaving everything up to the teacher himself (LV, in-service teacher, 4 years).*

*You're given, we'll say. Another principle. You know, you were kind of a mentor, mentee, kind of a system (IE P14)*

*The ideal scenario I think that should be usually have a coach in an area.  So, say someone with experience. And they are two days in the classroom/ school and 3 days out on the road, going around to different schools and just helping them out. Like that's the ideal version of it, like and the reason I'm saying you're still two days in the classroom, but you're still keeping that practical side of your knowledge, you know. (IE P18)*

Others described mentoring without referring to it directly. They described the need for individualised tailored support whereby another person could act as a sounding board, facilitator or one who questions and encourages you to reflect.

*I do think professional development where there's continuous check in and like if you were to be doing like let's try out. Here's ideas of how you're going to teach maths in the classroom. Go and try this out next week with your class. Come back next week. Tell us what worked. What didn't work? Did you try*

*it in another way? I think that type is far more supportive than a one off 2 hours taught at them and hope something sticks and they go away with something. (IE P23)*

*So, when people personally call out to you or to your school and work with you and your fellow teachers, that's really where I would learn the most. (IE P19)*

The concept of problem-based learning was alluded to in the descriptions of the ideal professional learning experience. Although not referenced directly, people spoke about working with others to solve problems or come up with solutions, it was mentioned this should be over a period and sustained. This indicates the desire for collaborative, contextualised professional learning.

*I would like to learn how a large institution creates information circulation, how to cooperate in a large team, which could be done with the help of artificial intelligence, how to get more time with the help of digital tools (LV, leader, 18 years).*

*I think the problem solving with the viewing and then looking at it through the lines is probably a really good way because people come up with really good ideas. But they have to be in safe spaces because I know I've seen that with tutorial groups. Unless you feel safe and supported, people won't give their honest opinions. (IE P15)*

*So, then you can just start to talk about the solutions instead of the problem discussing the problems. You can just focus on the solutions so that that mindset change is not easy and it's it cannot be achieved through one week or two-week trainings. (IE P28)*

Many of the narratives of the ideal learning experiences involved some element of collaboration, some also referred to independent learning or self-study resources. Often this was in complement to other types of training. In the interviews it was indicated that such independent study and self-study resources may be most appropriate for technical or theoretical knowledge.

*It is important to learn what is immediately useful to people - the opportunity to immediately try it and apply it in your work. The second important aspect is to teach calmly and slowly, as well as start with the simple and gradually go to the complex (LV, in-service teacher, 7 years)*

*I suppose it's kind of that mixed modal approach is, as you were saying, is the kind of best way to get anything across. So that's why when you stuff online like, it can be re-watched, you know, or you can put up an article because I know people that way rather read an article than they will about watch a video, so you know, so like you can have your mixed up online which you know really does help as well as that as well. (IE P18)*

*so, they can then learn all of the theory and science in their own time, and they can come back, and you can get them to practise what they learned (IE P18)*

In the coding of the transcripts, it was noted that there were not only specific types of professional learning but characteristics that an ideal model of professional learning should consist of. The next section will explore these in detail.

### 4.3.2   Characteristics of learning

In the interviews participants described several characteristics for their preferred professional learning experience, these characteristics were dialogical/collaborative, practical, inclusive, temporal and mindset related (see table 3).

| Practical | Dialogical /Collaborative | Temporal | Mindset | Inclusive | Explorative |
|-----------|---------------------------|----------|---------|-----------|-------------|

**Table 3: Characteristics of professional learning desired by participants**

When describing dialogical or collaborative experiences people spoke enthusiastically about interacting with others to either, just connect locally, share experiences, or collaboratively develop resources.

> *"On the other hand, I believe that online collaboration with people from different places can also benefit, a fact that is important to also include a factor of cultural exchange and diversity of perspectives." (Sp P1)*

> *"It is essential to work collaboratively with all stakeholders to overcome these barriers and promote an inclusive and equitable educational environment." (Sp P2)*

> *"Communication and collaboration skills, such as the ability to communicate effectively and collaborate with other members of the educational team and with students and families is essential in a digital learning environment. This includes skills in facilitating online discussions, providing constructive feedback virtually, and promoting a culture of collaboration via the Internet." (Sp P2)*

> *"Another competency would be leadership, distributed by increasing online collaboration and virtual teamwork. It will be important to develop distributed leadership skills to facilitate effective collaboration and teamwork in geographically dispersed digital environments." (Sp P2)*

> *"I want to be well trained in educational leadership and that means knowing the techniques of collaboration and creative problem solving. In short, I want to be fully equipped to lead the digital transformation." (Sp P17)*

> *"Personally, I would love to collaborate with digital experts and even creators of content." (Sp P21)*

> *"And I would love to collaborate with experts in educational technology to work on projects so that children can adapt to technologies and get innovative classes." (Sp P43)*

> *There have been both positive and negative experiences working with colleagues. Some are receptive and ready to share their experiences and materials, while others are not ready to do so and tend to refuse (LV, in-service teacher, 4 years).*

> *I would like to collaborate with just anybody and everybody and yeah. (IE P7)*

> *Just meeting people and collaborating, talking, asking questions, learning one or two new to new things, you can come back and feedback to staff (IE P2)*

> *Yeah, like it would be like working in groups coming up with like activities together that we can do. (IE P20)*

In addition, there was an acknowledgement of the role of collaborations in building professional learning network particularly physically connecting with people.

> *Like you know, it's those small the connections you make with people. And you they branch out like, you know, and it gets the people to buy in. I do think that the those in person Connections and meetings are very important, so I think that they do need to be some of them at least. (IE P26)*

> *You're meeting people from other schools is important collaborating and you're building professional networks that way as well I think it's. It's something that they've kind of cast aside. Give teachers the time to and to meet others to other teachers that are bringing it into them. Schools as well (IE P5)*

There was also a recognition that it is impossible for educators and educational leaders to have all the expertise and collaborations and connections were important. It was also noted the role of learning in the profession was important.

> *The realisation that in IT, you never know everything. Confidence, modesty, curiosity, foreign language skills, especially English. (LV, 9 years school principal)*

*very quickly, you have to realise you definitely aren't just the one person, it's it. It is working with the team of experts that are. And you, I would say as a learner, you have to, I suppose work with someone (IE P4)*

Clusters were cited as being a successful way to engage in collaborative learning, some of these have already been established such as that of the small school initiative or the Enterprise and Training boards.

*I think that it would need to be on whole school level and perhaps in clusters because again, you learn more from other people. (IE P22)*

*The XXX cluster Leaders group has been brilliant for that because like they are brilliant to send out any new information …. and then you're more likely to engage with it because you're getting something back from them. And even any of the cluster days we've had online. (IE P2)*

Within the theme of collaboration, the concept of reciprocity and mutual benefit was discussed. Without this it is difficult to sustain successful collaboration.

*Group works, creating mutual cooperation, would be an opportunity as feedback to each other (LV, pre-service teacher).*

*And is that mutual benefit something that evolved, one says, or it was an established, also very important. (IE P25)*

*It's bidirectional, it works both ways and but unfortunately, I don't think it's to the fore of a teacher's mind, but that's my own opinion (IE P27)*

In addition, interviewees spoke of the need to have different perspectives involved in professional learning provision. Including guest speakers, industry, and smaller more democratic learning opportunities so everyone can share practice.

*In an ideal world, ……. Learning focused on innovation. There would be school collaborations with universities, innovation centres, researchers, various laboratories, and companies that keep up with the latest research and can bring this knowledge to school. (LV In-service teacher with 3 years of experience)*

*guest speakers talking about any developments and being that year or and they'd have people come in and talk (IE P2)*

*Smaller groups where everybody's sharing what works or big mistake you made,*
*Learning based on it like that's how you change, that's how you improve and you know somebody else have done something worse than you anyway, and you know, they are honest with you. (IE P23)*

Those in leadership positions spoke about the need to have interdisciplinary approaches to professional learning to provide opportunities for participants in professional learning to engage with a variety of expertise and perspectives.

*In general, collaboration with digital tools and collaboration with other subjects would be great. If there were all kinds of platforms or digital devices, materials that we could transfer from one hour to another. Digital tools promote critical thinking, use of resources and critical perception of resources, and this would be useful in any subject. Teachers would also cooperate much more successfully, instead of each sitting in their own classroom (LV, in-service teacher, 5 years).*

*sometimes the speech and language therapist will record how to use the device and sends the class feature, and we'll sit down with them and with the special needs assistant present and we go through that and refer to the relevant professional learning with other groups (IE P16)*

*industry involvement and that is the dream like I suppose it just. Being able to create like I suppose creating a lab that has all the technology has everything, everything but that you have experts coming in on a regular basis to kind of show you what's new in technology, what's happening now and then*

*and then like then allow allowing you the time then to implement it so that you can teach it to teachers (IE P25)*

The need for practical learning was a theme that emerged quite extensively in our analysis. The use of example and practical advice within professional learning was seen as a way to enable teachers to apply to practice.

*The key to professional development success:*

*- practical experience and very concrete examples of how the tool/method can be implemented directly in your teaching;*

*- professional development leaders are people who have real experience in the educational institution/understanding of the learning process at a particular stage, not just theoretical knowledge. (LV 7 in-service teacher)*

*Yeah, it has to be something that. Is it's easy to adopt it and where you could see a real-life example of it being used and how then you can say, right (IE P11)*

*I suppose it was and practical. It wasn't, you know, purely based. And she used lots of examples from her own schools. So yeah, it was. It was just a very realistic course. (IE P13)*

*For a professional development course to count, it would be compulsory for the teacher to try it out in practice in their own school, in their own lessons. The teacher would then have the opportunity to share his/her experience, although if the teacher concluded that the tool could not be used in the school, the reason would have to be clarified. (LV future teacher 28, with one year of teaching experience)*

The provision of resources for educators to try was seen as positive, however as mentioned in the previous section care must be taken to encourage educators to adapt these for their own context in a critical manner rather than replicating, hence the need for critical digital pedagogy. And so perhaps providing opportunities to critique practical approaches, examples or resources may be effective.

*"It was also very useful to make a resource bank where we used videos, activities, interactive sheets, games, songs and I participated in it, I did not lead it, but I did collaborate." (Sp P34)*

*Teacher shares the observation, that sometimes lecturers and teachers overdo it with the inclusion of digital solutions, there should be a balance, replacing their primary teacher functions, for example, if the teacher does not demonstrate in the classroom how to perform a task, but instead shows the students a video of the performance of this task or giving students a digital tool and asking them to learn the material on their own. Technologies should be a teacher's support, not a substitute, otherwise the meaning of communication may be lost, students' socialization skills may decline, the importance of the teaching profession may decrease (LV, in-service teacher, 6 years).*

*We find with the with the seminar is the feedback is generally positive when they're given resources, they like to go away with a bank resources. (IE P16)*

*come away with it and feedback to your screen and you get you get a USB full of resources. this is actually genuinely going to improve teaching and learning. I didn't just go listen to something for 40 minutes for the sake of saying I attended something. (IE P2)*

*We were given and exemplars and something else that I can't remember from the curriculum we were given that, and we would work with that, and then she would come back and see how we get on with it. It's not a big mystery like everybody can do something and build on what you know, exemplars. (IE P22)*

In addition, hands on experience where those learning were provided with opportunities to try digital learning activities or resources physically was welcomed.

> *"I would participate in customized training programs designed to develop my technological, pedagogical and leadership skills in the specific context of digital transformation. And I would like those programs to provide me with opportunities for hands-on learning, collaboration with experts, and continuous feedback. I would also like to have mentoring and coaching." (Sp P2)*

> *In professional development, she would like to gain not only knowledge, but general confidence in the use of technology in the learning process, which, the student believes, can only be obtained by trying and acting practically during training (LV, pre-service teacher).*

> *But the idea of something being very hands on and physical   and you'd go, and you'd get so many resources to bring back to your own class (IE P5)*

> *But doing the practical like it's something I think anything to do with like computers and you have to do it. It's not enough just to watch it, but you actually have to practise and do it (IE P7)*

Interviewees spoke about the need to not just be provided with examples but to see good practice.

> *It is most interesting to learn from professionals in the field, experts who teach what they actually practice on a daily basis (LV, in-service teacher, 3 years).*

> *Are you going to show you what it could look like or what a digital lesson can look like? Nobody has ever shown anyone of us what to do like (IE P23)*

The modelling of good practice in delivering professional learning as seen as an ideal way of supporting this.

> *Its absolute modelling like you know and improve skills like we don't use those words like, yeah. We try keeping informed and then modelling too. They need both. (IE P26)*

Within the interviews, time was also referred to a lot, particularly the length of time of professional learning or the period for which professional learning was offered. Interviewees felt dedicated blocks over a continual period was the best way of providing professional learning. This provided educators and educational leaders with the knowledge, resources, and expertise to apply something in their practice and to return and reflect on it over time.

Many had experiences of engaging in dedicated blocks of professional learning and found it quite effective, this ranged from in school, weekend, or summer blocks of professional learning. This was also found in the integrated literature review whereby formal dedicated blocks were adopted.

> *Summer course that time was when he really kind of opened, opened my eyes to the diversity of things within professional learning as well. So, I did it. Definitely impacted it, made my teaching a lot more interesting for myself. (IE P14)*

> *Is brilliant in that the association for PE teachers now and they hold a conference every year kind of around end of September, I think that's something that would be huge if there was a say like a version for digital. If like an annual conference that people, whether you were digitally in school or you have an interest in digital learning that you could sign up to go to this weekend (IE P2)*

> *So, I would like to see maybe half day closures where somebody might come in to you was returned again into your four weeks to see what you have done and how you have managed with it. (IE P22)*

In addition, people spoke about the need for learning to be continual and over time to enable people to implement change and reflect on practice, in addition this embeds the perspective within the sector that change is not just a once off, it is revised constantly revised and adapted helping.

> *In an ideal world, there would be a specific time for professional development during working hours - once a week or twice a month.*

*Each region or county would have an institution dedicated to professional development - it would be shared, with a common goal.*
*Appropriate environment - when learning about technology, it is accessible. E.g. if about VR (Virtual Reality), then it is available, not just theoretical learning about what it could be used for.*
*Leadership that motivates professional development. (LV in-service teacher 7 years)*

*Developing it and changing it over time as you yourself as an education, maybe gain more overall knowledge and that you become more comfortable with the students in your class or the students in your school. Because if you're learning, your students are learning and don't gate keep, keep sharing with your peers as teacher is on your students because it just makes everyone better in the long run. (IE P15)*

*So, we used a school hour, but then it was like a sustained model, where like 6 weeks later we do a check in and then a session Lastly following on to the having the option of attending to view practice. ….. I suppose linking that at the next step is bringing to the professional learning community, which encourages research around it. (IE P16)*

*So, it has to be continuous …. and they need to understand that. (IE P22)*

The discussions also highlighted that the professional learning experiences needs to promote a 'can do mindset' descriptions implied that it should be positive, empower staff, and inspire them to change their practice.

Due to the lack of confidence some educators face encouraging positivity and inspiring them was described as a key characteristic. This would enable educators to build confidence to make change.

*"Uhm, yes, in this matter I think we need to have a slightly more strategic vision, perhaps to be able to ensure that all teachers implement this in the classroom and in the organization of the school." (Sp P31)*

*The main thing is to have a desire to learn new things and keep up with the times. It can be observed that there is often a lack of appreciation for technology among colleagues. People tend to be afraid of strangers, of making mistakes (LV, in-service teacher, 3 years).*

*So, I think there's a lot in terms of the self-belief and like communicating to them that they can, and you know be activists were if you like for positive change in their own. (IE P30)*

*I need to educate my student teachers here and I need to create a kind of mindset that there we need to get familiar, and we need to be friends with the technology and the new recent development so they can be effective teachers in their profession. (IE P28)*

Also discussed was the need for professional learning to empower them to make change, giving teachers ownership of their own learning was critical and this could model good practice.

*"I would like to have the opportunity to participate in research projects in collaboration with educational institutions and experts in the field of educational technology. And those projects will allow me to explore new ideas, develop innovative solutions, and contribute to the advancement of knowledge in the field." (Sp P2)*

*Courses would take place on a free day/week when there are no other jobs in parallel. In a beautiful environment where all technical support is available. Excellent specialists who demonstrate not only the practical application, but also explain the pedagogical value.*

*Courses could include case studies. Explanations in plain language. It is also important to receive encouragement, for example, to learn about the top 20 most current apps, tools, and what part of the lesson they can be used for (LV, in-service teacher, 2 years).*

*So, you kind of have to upskill and put CPD (Continuing Professional Development) in place. It might be informal, yeah, but that's still CPD..*

*So, like whoever's in leadership in school does need to be aware that if we are bringing in change, we have to involve people, listen to their ideas, and upskill them…. You know, it's really important and it has to be kind of a team effort I think anyway (IE P26)*

*So, we actually used to decide with the group, which school would like to host. So, we take turns. They have the agenda prepared by the end and they decide what we focus on, what resources we use and how long it will be was usually one hour or whether it was during the day or sometimes after school. That worked really well. (IE P16)*

This indicates the need for professional learning to appeal to the affective mindset of people as well as the practical skills. In addition, supporting ownership of learning relates to inclusive approaches to professional learning. Interestingly inclusion also arose as one of the sub themes. Participants described professional learning experiences that were tailored, reflective, had multiple ways of engaging and facilitated independent/self-paced learning.

*Like you need to talk to teachers and do a learning needs analysis. For me I think it was a Google form and I was, yeah, and that was populated when I spoke to trainer and us kind of devised something that would suit them, and we are basically it is a mixture (IE P25)*

Reflective activities were also described as a way to enable more inclusive approaches to professional learning so participants could decide at what level they want to engage in professional learning, in addition it enabled them to set learning goals for themselves.

*"I have attended some conferences on innovative methodologies, I have collaborated with my colleagues in multiple jobs, where technology has been an essential piece and in addition different innovative methodologies and resources have been used as a camp monitor that I have been and as well as in support classes that I teach and these experiences have given me an opportunity to explore new ideas, pedagogical approaches, as well as to reflect on my own teaching practice." (Sp P8)*

*"A few years ago, I had the opportunity to participate in a professional development workshop that was focused on active learning and the effective use of technology in the classroom. This workshop was facilitated by education and technology experts, who introduced us to the various digital tools and innovative pedagogical strategies. Afterwards we had a debate in which we presented our ideas, shared them and later an expert told us about the media future that awaited us. I found it attractive and interesting." (Sp P26)*

*You have people like reflect on where they are at, am I beginning or intermediate or, you know…. Then decide which group they would attend and share advice that way and supports those that way…. They actually sit down with their individual targets and their whole school targets and then look at what the next step forward. (IE P16)*

The need to provide multiple pathways for participants to engage in based on their level of confidence of individual needs was also identified as important, this relates to the UDL principle multiple means of engagement.

*It is important to understand what the content and level of the specific courses will be in order to choose the appropriate professional development offer for you, and not to waste time on courses whose content does not meet the needs and the existing level of knowledge and skills. (LV, leader, 9 years)*

*I suppose that it needs to be tiered, I think because everybody's at different levels and I don't think you can just put every teacher into the one program and teach them from there. I suppose you do need to try and figure out and even if somebody is confident with technology, they may not know what they need to know either. As well, they might be confident in certain parts and not in others, so it's even trying to split it up into where their confidence lies and in what areas. (IE P1)*

*So, you know, I think when we're teaching them, we try and always kind of show them to options. So, here's the high tech and for low tech, and here's what you can do. (IE P30)*

In some cases, people actually referred to the UDL model of inclusion and the need to model this within professional learning for teachers.

> *Regarding attention to diversity, we understand that there are people who have specific educational needs, which is why the use of technology is very interesting. The universal learning design takes advantage of technology to perfectly contextualize and adapt to the needs of each person so that they can advance at their own pace and with the content that best suits what they need." (Sp P33)*

> *So, like that universal design learning model like you know what I mean, so like so say like you have a video on a thing, you can also have an article on it like, you know what I mean? So, you're not giving them 100 choices, you're just giving them nice one or two choices like, but it is that like that? The plus one I suppose modelled there is probably the best one. (IE P18)*

The last characteristic sub theme that emerged was that of exploration and the need to give those participating in professional learning opportunities to experience technology themselves, rather than telling them about technology. It was felt that this characteristic would enable them to understand the potential of technology and give them more confidence to try it in practice.

> *"I think that immersive experiences or virtual reality will be included much more, that is, a very active practice that involves the exploration of different environments and makes students participate in different interactive educational experiences." (Sp P1)*

> *There are various opportunities to learn, so the content of the courses and also their leaders should be critically evaluated. Often, the courses tell general information, but the desire is to learn in depth various technologies that can be useful in everyday work, at school (LV, in-service teacher, 6 years).*

> *You know you're not telling them that works and you're giving them a chance to experience. (IE P18)*

> *think though like getting a chance to try things out is always the best kind of thing in, ...., I think like the stuff that I was able to actually do myself is the stuff I remembered and was able to kind of do more of. (IE P24)*

> *actually, explore with technology (IE P2)*

### 4.3.3   Recognition of learning

Interestingly the recognition of learning was not something that was discussed as part of the interviews, when speaking about desired experiences for professional learning, it was more descriptive with regards to the learning environment, collaboration and skills acquired. This is mirrored in the survey where only 27% of respondents expressed an interest in formal accreditation. Most had preference for a certificate of completion (33%) or career progression (34%) (see figure 11). This indicates the need for professional learning to have multiple ways of recognising learning, for some it may be simply a certificate upon engaging in learning activities for others seeking accreditation it will require some means of assessing learning to award credits or a programme award.

*A variety of modes of recognition would be valued depending on the level of work involved and the time commitment.* (survey comment)

Considering the need for career progression relating professional learning more closely with opportunities for promotion is key.
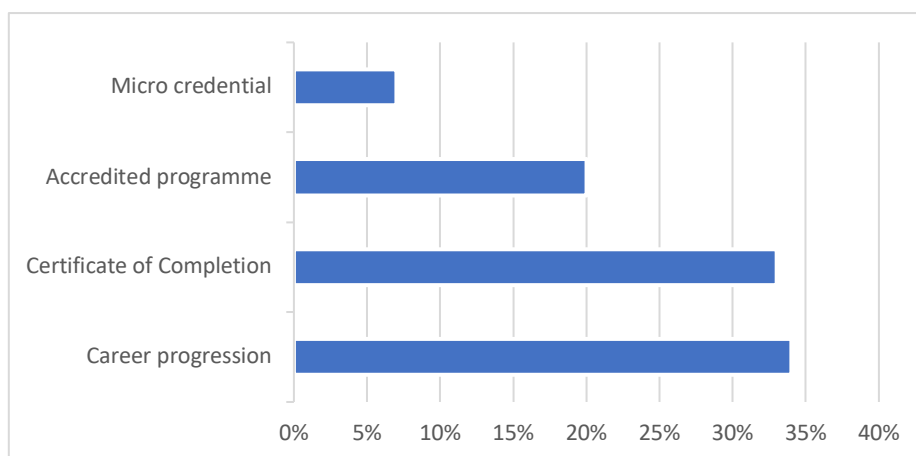
**Figure 11: Respondents Preferences for recognising professional learning**

The data describes a complex context for digital education across Europe Educators highlight the difficulties they face in supporting changes to practice, some of this is related to fear, others to time and workload. Many have highlighted the role of professional learning in supporting educators. However, these needs be situated in practice, sustained, continuous and facilitate collaboration and sharing of practice. It creates strong argument for the development of a multifaceted model of professional learning that meets the emotional, practical, and cultural needs of educators and educational leaders throughout the sector and meets people where they are. Furthermore, the narrative regarding digital learning alludes to disruption and transformation but this takes time and is incremental, progressive, reflective, and not a finite destination, more a journey of which professional learning individual and collaborative engages participants in critical dialog to balance the complexities and nuances the sector faces.

# 5 Discussion

The interviews and surveys provided an overview of the professional learning experiences of educators and educational leaders. In most cases past experiences professional learning experiences have been sporadic and informal or once off formal courses, informal practices including experimental approaches; trial and error, and school meetings featured widely. The narratives describing a lack of continuous, sustained and goal -orientated professional learning is in stark contrast to the research on effective professional learning approaches identified in the integrated literature review. The lack of sustained models also relates to some of the challenges outlined in work package 2 concerning the challenges educators and educational leaders face, particularly with regard to support and disparate skills. This is a major barrier to supporting digital transformation and change across the sector.

Regarding the desired learning experiences, individuals spoke in general about their idealised views of professional learning many of which aligned to that of the findings of the integrated literature review (ILR). However, within the interviews and surveys this is not nuanced by the level of proficiency, and so it is necessary to use the integrated literature review to inform the pedagogical model.

Within the interviews there was a significant demand for formal learning, this is similar to that identified in the ILR in which formal learning formed was an element of professional learning at all levels of proficiency. Regarding mode of delivery in the interviews and surveys participants had

preference for a hybrid of online and face to face learning. In addition, collaboration formed a significant part of the narrative of many of the discussions.

Although participants described collaborations between schools and organisations beyond their own local area, within the survey they expressed preference for more localised collaborations. In the literature it was cited that those with a larger social learning network were more likely to be innovative[4], interestingly those at knowledge awareness and leadership levels were more likely to collaborate outside of their own organisations. Widening one's social learning network at the knowledge awareness stage could broaden their experiences and support participants to understand practices beyond their immediate context and so may be beneficial, a critical consideration for the pedagogical model. At leadership level to influence systematic change, collaboration at all levels is required. Whereas within the knowledge deepening there is more localised collaboration as it is about adapting practice and measuring impact within one's own context prior to broadening to systematic change.

Regarding collaboration types of collaboration participants described discussion, communities of practice, school visits and practice sharing. The literature again cited similar learning activities at different levels, for example discussion and practice sharing was common in knowledge awareness whereas communities of practice were more prevalent in knowledge deepening.

Within the interviews participants mentioned various characteristics of professional learning, one of the most frequent characteristics was the need for professional learning to be practical. Enabling the participants to try out, apply or adapt learning. Again, this was a common theme within the ILR; with try-out sessions being popular at knowledge awareness level, practical application of learning at both knowledge awareness and deepening and creating or co-design[5] activities at knowledge deepening.

Other types of professional learning described were projects, problem based or inquiry-based collaboration. Which were also implied the need for professional learning to be exploratory and experimental. Again, this was ubiquitous within the ILR particularly at knowledge deepening levels and leadership. Although the descriptions of projects were nuanced in the literature, with more design focused projects described within knowledge deepening and research or evidence-based projects at leadership levels. Furthermore, in the ILR it was evident leadership levels were more likely to collaborate with students and external partners on projects.

Interviewees portrayed the importance of the time characteristic in professional learning particular the need for dedicated blocks and continual professional learning over time. This was significant in the integrated literature review (ILR) not only in the analysis but within the overall discussion of the theoretical frames and the importance of time as a factor to support change and innovation. In addition, the importance of professional learning in developing confidence was illustrated in the

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[4] Kim, J., Pak, S. and Cho, Y.H., 2021. The role of teachers' social networks in ICT-based instruction. *The Asia-Pacific Education Researcher*, pp.1-10.

[4] Cangialosi, N., Odoardi, C., Peña-Jimenez, M. and Antino, M., 2023. Diversity of social ties and employee innovation: the importance of informal learning and reciprocity. *Revista de Psicología del Trabajo y de las Organizaciones*, *39*(2), pp.65-74.

[4] Konstantinidou, E. and Scherer, R., 2022. Teaching with technology: A large-scale, international, and multilevel study of the roles of teacher and school characteristics. *Computers & Education*, *179*, p.104424.

[5] In the context of the integrated literature review

Co design can be between teachers or with students, can be adapting or creating something together/collaboratively

Create is to develop, adapt or redevelop alone

narratives which alludes to the need to broaden competency frameworks to consider transversal skills.

The recognition of professional learning did not feature within the interviews or ILR, this is reinforced in the surveys where formal accreditation was not deemed as necessary for professional learning.

Lastly the interviews pointed to the need for inclusive professional learning that catered for a variety of levels of proficiency and learning preferences. This illustrates the complexity of professional learning that aligns to the theories of change and its non-linear nature within the ILR.[6] Providing flexible, multilevel approaches to professional learning is therefore critical within the pedagogical model.

# 6 Proposed Pedagogical model

## 6.1 Overview of the pedagogical model

The IDEAL Future pedagogical model is outlined in figure 12. Based on the ILR, surveys and interviews it sets out a multi-level, continuous, competency focused approach to sustained professional learning for educators and educational leaders. At the centre of the pedagogical model is the various actors in professional learning; which can be an individual, or participants who collaborate either with those in their organisation or across organisations (education, industry or interdisciplinary. This structure is derived from theories of learning culture which advocate for learning to take place at multiple levels including interorganisational so they are not restricted or bound by internal knowledge, inter-organisational facilitates the flow of new knowledge into the organisation [7]. This is reinforced by within the ILR, interviews and surveys when participants described the various collaborators they envisage in their ideal professional learning environment identified. Associated with each actor are professional learning activities that support the actors to engage in critical learning, or dialog with the self or others inside or outside their organisation.

[6] Sansom, D.W., 2020. Investigating processes of change in beliefs and practice following professional development: multiple change models among in-service teachers in China. Professional development in education, 46(3), pp.467-481.
[7] Tam, S. and Gray, D.E., 2016. Organisational learning and the organisational life cycle: the differential aspects of an integrated relationship in SMEs. *European Journal of Training and Development*.
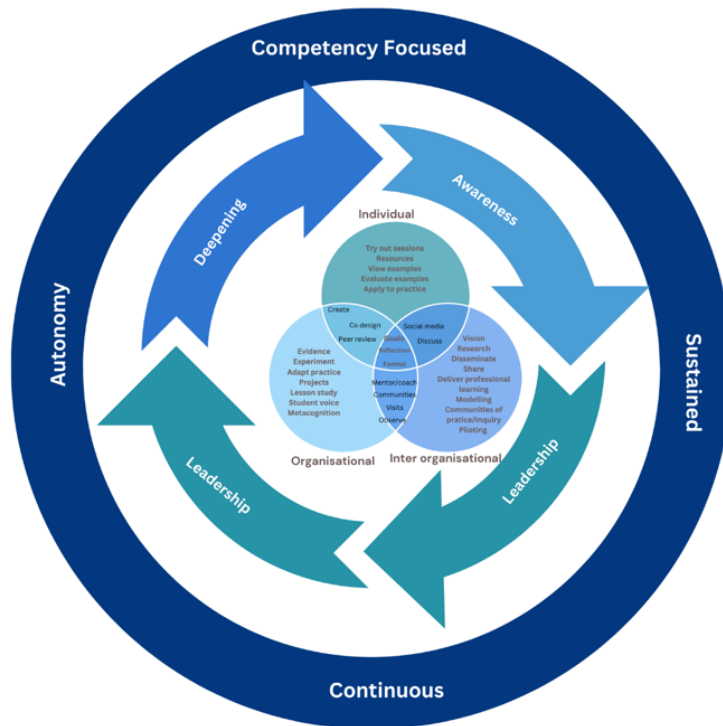
**Figure 12: Pedagogical framework for IDEAL Future**

Regarding the learning activities common to all actors is the prevalence of formal learning, however depending on the level of proficiency the number of these may vary, for example for knowledge awareness these may be more directed than at leadership level. Furthermore, the modality of such formal activities can range from face to face, synchronous or asynchronous.

Reflection is also a shared learning activity between levels, reflection can be collective or individual and aids the questioning of beliefs, attitudes and subjective norms that are often associated with resistance to change.[8] [9]Although the role of reflection activities was ubiquitous across the literature it was not described within the interviews, however beliefs and mindset were deemed as significant barriers regarding leading digital learning in work package 2. Furthermore, participants spoke of the need for professional learning to build confidence and so reflection is critical to this.

The next level considers the level of proficiency of the participants, these again are derived from the levels of proficiency outlined in many of the competency models now available. Due to the complex non-linear nature of professional learning, it was decided to consolidate the DigcompEdu framework into three proficiency levels, the individual actors can move between activities at each level. These are knowledge awareness; knowledge deepening and leadership. These were discussed within the ILR report, *Professional learning approaches that support digital transformation, enable change or impact practice: An integrated literature review* (see table 4 below).

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[8] Davis, F.D., 1989. Technology acceptance model: TAM. *Al-Suqri, MN, Al-Aufi, AS: Information Seeking Behavior and Technology Adoption*, *205*, p.219.

[9] Ajzen, I., 1991. The theory of planned behaviour. *Organizational behaviour and human decision processes*, *50*(2), pp.179-211.

|  | **Outcome** | **Focus** |
|---|---|---|
| Knowledge awareness | Awareness of the pedagogical and professional potential of digital learning technologies | Supporting them to understand their beliefs about digital learning technology, building their critical understanding of digital learning technologies and encouraging them to apply it to their practice |
| Knowledge deepening | Engage in critical discourse with stakeholders regarding the selection and application of digital learning. They will discuss with peers, students, and other stakeholders about their experiences with digital learning to date, empathize with these and adapt their practice based on this dialog, observations of their own experimentation and reflection | Reflective experimentation, collaboration, and knowledge exchange to become digital pedagogical leaders |
| Leadership | Develop critical thought leaders in digital learning leadership. They will question the adequacy of contemporary digital and pedagogical practices and challenge current systems, technologies, and processes regarding their feasibility to support contemporary education needs.  They will support a culture of innovative practice within and beyond their own context and within their organizations act as an advisor and sounding board for new ideas regarding digital learning.  They will have the ability to collaborate with organizations at national and international levels both in education and beyond to develop novel pedagogical and professional practices within education. | Supporting those to plan and actively collaborate on projects and problems regarding digital learning across the sector, conduct action-based research to address such and disseminate |

**Table 4: Levels of proficiency: Descriptors**

Knowledge awareness requires individuals to move beyond their immediate context to question their beliefs, attitudes and subjective norms and so learning actors and activities involve both the individual and inter organisational collaboration. Knowledge deepening supports learners to critically example their own context, adapt and change this, gather evidence, and share in their organisation and so the main learning activities encourage them to engage with the self (at individual level) and those in their organisation. Leadership requires systematic change, innovation and evidence informed practice and so engaging with all actors is critical.

The outer layer of the pedagogical model recognises the need to balance autonomy with structure and so the provision of a competence based professional learning model that provides choice regarding modes of engagement is critical. Furthermore, the competence model must emphasise the continuous and sustained nature of professional learning over time, rather than once off and sporadic initiatives. This mirrors the findings of the IRL on the use of more sustained approaches for higher levels of proficiency and the need for long term approaches to supporting change associated with theories of change.[10]

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[10] Darling-Hammond, L., Hyler, M.E. and Gardner, M., 2017. Effective teacher professional development. *Learning policy institute*.

[10] Prestridge, S., 2017. Examining the shaping of teachers' pedagogical orientation for the use of technology. *Technology, Pedagogy and Education*, *26*(4), pp.367-381.

[10] Nespor, J., 1987. The role of beliefs in the practice of teaching. *Journal of curriculum studies*, *19*(4), pp.317-328.

[10] Becker, H.J. and Riel, M.M., 2000. Teacher Professional Engagement

## 6.2    Learning pathways and examples

It is recommended to balance autonomy and flexibility that each pedagogical pathway provides a choice of learning activities. It is proposed that for each competency and proficiency level approx. 4-6 learning activities are provided for participants and participants choose to complete three of these to achieve recognition (as per table 5). These pathways have been developed because of an analysis of 1,971 peer reviewed articles as part of a systematic literature search and an integrated and thematic analysis of these and a survey of over 500 teachers.

| | Awareness | Deepening | Leadership |
|---|---|---|---|
| **Individual** | Goal setting | Goal setting | Goal setting[11] |
| | Formal[12] | Formal content | Formal content |
| | Reflection[13] | Reflection | Reflection |
| | Resources/examples to try in practice | Create | |
| | Video examples of digital teaching in practice | Experiment | |
| | Try out sessions | Adapt practice | |
| | Apply to practice | Scenarios | |
| | Scenarios | Video own practice | |
| **Organisational** | | | |
| | | Co design | Metacognition |
| | | Projects[14] | Student voice |
| | | Lesson study | Projects |
| | | Evidence gathering | Observation |
| | | Communities[15] | Communities |
| | | Peer review | Mentor/Coach |
| | | Discuss | Modelling |
| | | Observe | |
| | | Mentor/Coach | |
| | | Share[16] | |
| | | | |
| **Inter organisational** | Reflection | Co design | Vison |
| | Check in sessions | Projects | Research projects |
| | Evaluate examples | Lesson study | Evidence |
| | Discuss | Communities | Communities |
| | Social media | Peer review | Discuss |
| | Peer review | Discuss | Observe |
| | Observe | Observe | Modelling |
| | Visits | Mentor/Coach | Deliver professional learning |
| | Share | Share | Share |
| | | Communities | Disseminate |
| | | | Piloting |

**Table 5: Suggested learning activities by level of proficiency**

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[11] Competency based frameworks can guide this through self-reported questions or reflection
[12] Formal content can be  pre-recorded/self-directed/face to face/live sessions
[13] Reflection can be individual or collaborative
[14] Projects can be design based, problem based or inquiry based
[15] Communities can be communities of inquiry, practice or learning
[16] Share can be sharing experiences, resources/practice

## 6.3   Recognition

During the survey's respondents were asked which form of recognition they would most prefer. These were certificate of completion (34%), Career progression (33%) and Award (20%).

It is suggested that knowledge awareness is surface level and does not relate to career progression and so a certificate of completion is issued. For the other two levels it is suggested that a micro credit is developed to facilitate career progression into digital pedagogical leadership (positions within their own communities and schools) or Digital educational leadership (these are more outward facing roles), see table 6 for summary of the proposed recognition model.

|  | **Awareness- Digital education professional** | **Deepening – Digital pedagogical leader** | **Leadership – Digital education leader** |
|---|---|---|---|
| Recognition | Certificate of completion | Each competency strand 1ECTS and<br>Cert of completion for each strand. (for those who do not want the micro credit)<br><br>A micro credit when all strands in the competency framework are completed e.g. 3/4/5ECTS – **students need to be assessed and may choose not to submit assignment** | Micro Credit<br>Cert of completion for each strand. (for those who do not want the micro credit)<br><br>A micro credit when all strands in the competency framework are completed e.g. 3/4/5ECTS - **students need to be assessed and may choose not to submit assignment** |
| Level of Effort | Can be flexible depending on the competencies being developed | 20-25 hours per competency strand – this can be content, learning activities etc. Learning content needs to be divided into granular objects, | 20-25 hours per competency strand - – this can be content, learning activities etc |
| Role of tutor | Drop-in sessions – encourage practice sharing…prepare<br><br>Set up and moderate social media groups/digital communities- Tutor scaffolds group to be more self-directed | Regular synch sessions- semi structured. People vote on what to cover or gleaned from spaces<br><br>Providing spaces to collaborate or share resources or practices<br><br>Moderate any collaborative activities - COPs (Community of Practice)<br><br>Questioning<br><br>Mentoring | • Regular synch sessions – less directed<br>• Moderate any COI<br>• Coaching<br>• Questioning<br>• Research consultant<br>• Correct and provide feedback |
| Assessment | None | Pass/Fail | Graded or Pass/Fail |

**Table 6: Proposed recognition model for pedagogical framework**

# 7   Recommendations for implementation

To aid the implementation of the pedagogical model it is recommended that the following actions are undertaken for implementation for the work package 4: Learning content and activities and work package 5: Digital Hub. Critical to the success of the pedagogical model is adapting the DigcompEdu framework to incorporate the skills needs identified in WP2 (Work Package 2) and the levels of proficiency and learning activities identified in this report. Furthermore, the digital hub should be designed so that learning activities are not compulsory, learners have choice.

To ensure a continuous and sustained model of professional learning at European level it is important that a certification framework is developed to recognise the different proficient levels, and the associated recognition is provided at each level of proficiency. It is recommended that work package 4 considers this broader context while developing micro credentials. Furthermore, consistency in developing learning activities and materials' is critical. See table 7 for an overview of the recommendations.

| Recommendation | Work package |
|---|---|
| Adapt the Digcompedu framework to integrate the skills needs identified in work package 2. Integrate this into the digital hub to ensure professional learning is goal orientated | Work package 5 |
| Consolidate the levels of proficiency in the competency models to three levels as identified in the ILR. Align the various learning activities to each competency level to provide learning pathways for each participant in the digital hub | Work package 5 |
| The digital hub should balance flexibility and autonomy. Within the learning pathways for each participant there should be suggested activities and a choice of learning activities for participants to engage with. In addition, the emphasis should be placed on continuous learning | Work package 5 |
| Develop learning outcomes for each competency area and proficiency level to facilitate recognition and accreditation where needed. | Work package 4 |
| Provide recommended lists of learning activities and content | Work package 4 |
| Develop templates for learning activities and content to ensure consistency | Work package 4 |
| Develop a certification framework for each level of proficiency that will be recognised throughout Europe, this should acknowledge the continuous and evolving nature of professional learning in the domain of digital education | Work package 4 |
| Develop the accreditation documentation to accredit the appropriate recognition for each level of proficiency | Work package 4 |

**Table 7: Recommendations for WP 4 and 5: implementation of the Pedagogical Model**