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International insights about a holistic model of teaching competence for a digital era: The Digital Teacher Framework reviewed.

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This paper qualitative examines a holistic framework for teaching in the digital era. The examination is based on teachers' perspectives of their career, that is, what core features can be said to characterise teacher's practice, across contexts, cultures and subjects. Semi-structured interviews of expert teachers, specifically from Australia, Europe and the Latin-America, are the main data source. The design process sought to examine teachers' approaches to their professional definition and their agency to enact this, against a theoretically validated framework. Results indicated the emergence of three defining categories based on the validation and synthesis of the relationships between six elements in the theoretical model.

Keywords: teaching competence; holistic competences; validation; digital competence

Introduction

The need for rethinking conceptualisations of teachers' professional practice in light of the global digital world is complex and pressing. In a world obsessed with the definition of partial parts of competences (the digital, the entrepreneurship, consumer...) comprehensive frameworks of competencies remain crucial, especially as representations of theoretical horizons of desirable professional performance (Biesta, et. al, 2020).

General teacher competence frameworks are used by authorities all over the world to regulate educational policies related to many issues: initial training and professional development of teachers; access to the profession; certification; leadership progression; quality indicators; effectiveness and transparency, etc. They are part of the 'policy-as-discourse' practiced by political institutions (Caena 2014). Albeit, teacher competence frameworks are not exempt from controversy. Some studies (Manoso et al. 2018) point out the lack of agreement on the definition of the very concept of 'competence' or on the purpose of education or even on the assumptions about learning, among other factors (Prestridge 2017), making it difficult to adopt worldwide common teaching frameworks which among other advantages, would contribute to a shared discourse on the teaching profession. However, the approach to the evolution and redefinition of a teacher's professional profile in a digital world has been reduced to the definition of digital skills that a 'classical good teacher' needs to perform nowadays as represented in Starkey's (2020) Digital Teacher Competence framework.

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Over the last few years, several conceptual frameworks have been developed to describe and characterise digital teacher competence (e.g. [ISTE_2017](#); [UNESCO_2011](#); [Redecker_2017](#); [INTEF_2017](#)). Nevertheless, some of those frameworks have significant problems that could be summarized as 1) a restrictive concept of the competence concept (analytical, decontextualized, role-oriented, strongly based only in operational skills, etc.); 2) an instrumental vision of technology (it is just a tool) just as a mediator of human action and, specifically, of educational action, ignoring its ubiquitous role in shaping human experiences and relationships; and 3) the reductionist (neoliberal) model of teaching action that only includes the classroom pedagogical performance which ignores every other function and task that teachers carry out (Castañeda, Esteve-Mon, and Adell 2018). This indicates significantly that all current frameworks for digital teacher competence are not holistic and representational of teachers and teachers work and importantly, do not help teachers to support empowerment and responsibility, neither promoting teachers' ownership (Caena and Redecker 2019).

This paper is a part of a wider process of developing a comprehensive, holistic framework that profiles teacher professional complexity in a global and digital world. This part of the broader study's main objective is to explore teachers' perspectives on the crucial elements that would define their teaching profession comprehensively, as well as what conditions they have to enact their agency concerning those elements. This exploration will serve as a conceptual validation of the Teaching Competency framework established theoretically (see Esteve, Castañeda, and Adell 2018). As background, this framework will be presented in the following section.

Background Literature

The two main components of the exploration run in this study are, on the one hand, the elements that shape the Teaching Competence Framework that is being validating and, on the other hand, agency as a crucial element for the enactment of digital teaching competence.

A Holistic Framework for Teaching Competence for a Digital World

This study seeks to validate the Holistic Framework of Teaching Competence for a Digital World (Esteve, Castañeda, and Adell 2018), from here referred to as DT Framework, developed after a combined process of literature review and grounded theory, in which the justification and theoretical conceptualization has already been extensively explained in previous works (Castañeda, Esteve-Mon, and Adell 2018; Esteve-Mon, Castañeda, and Adell 2018).

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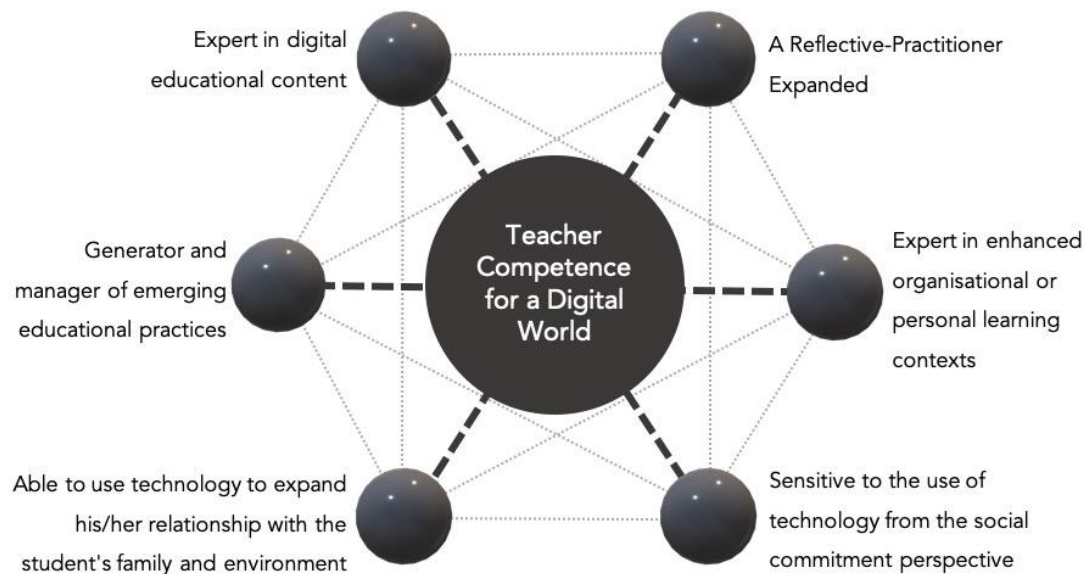


Figure 1. DT Framework.

The six elements that constitute the DT Framework (Figure 1) characterize the teacher and must be understood from a systemic perspective. The following description of the elements are provided here.

Generator and manager of emerging educational practices

Teachers in the digital world need to be experts in theoretical and practical pedagogical knowledge, which will allow them to make decisions and act effectively on issues related to student learning, managing the classroom and the most appropriate strategies for evaluating learning processes and results (Graham 2011). Thus, this competence can involve different levels, in a continuum that would go from the ability of teachers to use digital tools and resources to enrich classical pedagogical models; through the awareness of the need of using new teaching strategies that capitalise on the students' digital potential and abilities to enhance the classroom experience (Lemke 2010); to teachers who understand inextricable links among some pedagogies and the use of digital tools to work at higher learning levels (Prestridge & de Aldama, 2016; Tondeur et al. 2016) and are able to implement them seamlessly in their projects.

Expert in digital educational content

In this element, the framework includes the relationship between the teacher's disciplinary knowledge, with Pedagogical Content Knowledge (Shulman 1986), the relationship among the disciplinary knowledge and available technology –Technological Content Knowledge–, as well as the pedagogical knowledge and technology -Technological Pedagogical Knowledge- (Mishra and Koehler 2006). Additionally, and following the Mishra and Koehler perspective, this element of the competence includes the relationship between technological, pedagogical and content knowledge or TPACK (for Technological Pedagogical Content Knowledge).

A Reflective-Practitioner Expanded

Within the classic conceptions of teaching action, the teacher is conceived as a reflective professional or researcher (Cochran-Smith and Lytle 1999) capable of reflection-in-action and also reflection-on-action (Schön 1984). Action-Research (AR) (Elliott 1991) and more recently design-based research (DBR) or educational design research (EDR). Plomp and Nieveen (2013) have constituted the most important forms of educational research done

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by teachers and some level of proficiency on the use of those research methods is considered necessary for teachers. This element currently also includes the teacher's ability to know -or understand- how digital tools could be used to enrich that research (Weller 2011) on each of the phases of systematized reflective practice and professional engagement (Prestridge, 2019) in the analysis of the context and in the prototyping and evaluation of the response given (Peña-López 2013).

Expert in enhanced organizational or personal learning contexts

The main source of the teacher's professional development lies in his or her ability to learn, both from scientific sources and from the actions of colleagues (Escudero 2005). The digital has changed the way knowledge is produced, shared and disseminated. Being able to learn in this new era implies the capacity to create, manage, enrich, expand and adapt the learning ecology of teachers (Coll and Engel 2014), on its individual form -the teacher's Personal Learning Environment (PLE) (Attwell 2019; Castañeda and Adell 2013; Trust & Prestridge, 2021), as well as those collective knowledge practices. Additionally, these collective practices contribute to turning the educational context into an organization that makes an intentional use of learning processes to transform the organization (Dixon 1992; Prestridge 2019) into a school in a permanent state of learning (Bolívar 2001) with a developed Organizational Learning Environment (OLE).

Sensitive to the use of technology from the social commitment perspective

This element defines how the teacher is able to understand the importance of the social commitment as an ultimate educational goal, and the role of technology as a tool for it. This understanding operates in two different ways: on one hand, understanding digital technologies as tools of the culture-creating dimension of media competence so the teacher is able to use them in a contemporary and situated way and is able to understand those tools as the student's cultural landscape and immediate social environment, considering the consequences of this reality on its classroom. On the other hand, the teacher must be aware of the potential of digital tools for social change and as a critical digital citizenship. Consequently teachers could know how to exploit the tools, and teach the students the possibilities of citizen participation processes such as activism in a digital way (Facer 2011). The teacher serves as a model and the school should form critical, reflective and committed digital citizens.

Able to use technology to expand his/her relationship with the student's family and environment

Teachers have an important role in fostering and coordination of the interactions among the student's basic social spheres of influence (family, school and community/neighbourhood) as relevant factor in students' education conditions. Teachers and students have stopped living in the school's neighbourhood, diminishing time spent in schools interaction with the school's social group, making it difficult for teachers to be incorporated into the 'social dynamics of the territory' (Zabalza and Zabalza 2011). Additionally, families have been transformed in their components, roles and dynamics (Mottareale 2015).

Digital technologies have increased and diversified the possibilities of communication among those spheres (Lewin and Luckin, 2010). Teachers could be able to use them to open communication channels that contribute to improved communication and collaboration with families and also to reduce the digital gap that still exists by providing access to school digital resources and awareness-raising opportunities, especially in the most underprivileged areas (Pantić 2015).

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Presented here are the six main elements of the DT Framework as a system. Nevertheless, the elements of the competence do not seem enough to support the idea of a competent digital teacher in action. To complete the idea, the notion of agency must be included as an integral process as enaction of the elements is crucial to validity and appropriation.

Agency and its role in competence enactment

Agency would be defined as how the actor takes decisions about its role in the activity. In the case of a teacher, agency is considered directly connected to a teacher's capacity to enact all the aspects of teaching competence (Lipponen and Kumpulainen 2011; Priestley et al. 2015). Theoretically, one teacher could have the knowledge to be competent, but would enact this competence, or not, depending on his/her agency (Calvert 2016).

Contemporary analysis suggests that agency cannot be understood any more as an individual capacity, rather, as an ecological factor that is the result of the engagement of actors with particular action scenarios (Ecclestone 2007). As Biesta and Tedder (2007) remarked, agency is not an individual 'power' that could be used in any situation, but "agency should be understood as something that has to be achieved in and through engagement with particular temporal-relational contexts-for-action" (p. 137). Thus, understanding these contexts-for-action becomes crucial. In other words, understanding the resources and opportunities to enact agency (Jääskelä et al. 2017) can help us to understand better the possibilities of teachers to carry on the different elements of the desirable teaching competences (Eteläpelto et al. 2013).

Research method

The main goal of the research design was to engage in validating the DT Framework, and reshaping this if necessary, by exploring with a sample of teachers the six elements of the framework in relation to how well it fitted within their individual understanding (Corbin and Strauss 2015). In doing this, the study focused on exploring four main aspects (pertinence, authenticity, relevance and agency) corresponding with the main research questions, as follows:

- RQ1. Are the six elements pertinent -as a whole and one by one-? (pertinence)
- RQ2: Are the six elements perceived as part of teacher's reality? (authenticity)
- RQ3: How relevant is each element perceived by teachers? (relevance)
- RQ4: What are the resources and opportunities for enacting each aspect of the competence in a teacher's local context? (agency)

Fifteen teachers with a proven expertise in innovation using digital technologies from three different regions: Australia, Uruguay and Spain were invited to participate in this qualitative study through one semi-structured interview as the main data collection tool. The three different geopolitical regions, cultures and educational contexts were purposely included in the sample to mirror different notions and conditions of practice for teacher professionals and different approaches to the impact of the implementation of digital technologies into the educational process. A table including the demographic details of the fifteen teachers has been included in Appendix 1. Intensity sampling -not extreme experiences- was used in selecting the participants teachers (Onwuegbuzie and Collins 2007). In each context, five participants were selected based on three basic criteria (1) currently teaching in a primary or secondary schools (K16); (2) with a minimum of 5 years of experience; (3) officially rewarded or well recognized by their educational community by their digital pedagogical innovation.

The interviews included two basic sections. Section one focused on the professional background with a completely open-ended question to identify expertise and build

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rapport. Section two funneled open ended questions (Cohen, Manion, and Morrison 2017, 513) focused on the six elements of the framework. Specifically, for each element, a broad statement about the element was made -as a headline- and then narrowed down to more specific questions with regard to pertinence, relevance and agency (almost equal for each element). Finally, the interview was finished with an open section to identify any key issues not yet discussed.

There was a standardization of questioning and a schedule co-developed prior to the interviews. The full interview took on average approximately 45 minutes.

Interviews were held during May and June 2020. In the case of Spain and Uruguay, both countries were in lockdown for the Covid-19 crisis, as such the interviews were carried out by videoconference and recorded. In the case of Australia, interviews were personal or by videoconference, and were recorded by audio. Researchers closer to the teacher's context were in charge of doing local interviews and the interview was carried out in the teacher's and researcher's mother tongue to maximize teacher's comfort and ensured some flexibility associated with context.

Data Analysis

All interviews were codified directly from their recording and the digital treatment adhered to ethical requirements (Ethics Ref. 2897/2020, University of Murcia).

Interviews were codified using a simultaneous coding method (Saldaña 2015) using a deductive concept-driven approach using a code-frame (Benaquisto 2008) developed prior to viewing the data. The code frame was based on prior literature, research questions and main topics. The coding was delivered collaboratively, so the code-list was developed, then all the coders independently applied the code-list and, after the testing and debating, two more codes were included (see code-list in Appendix 2).

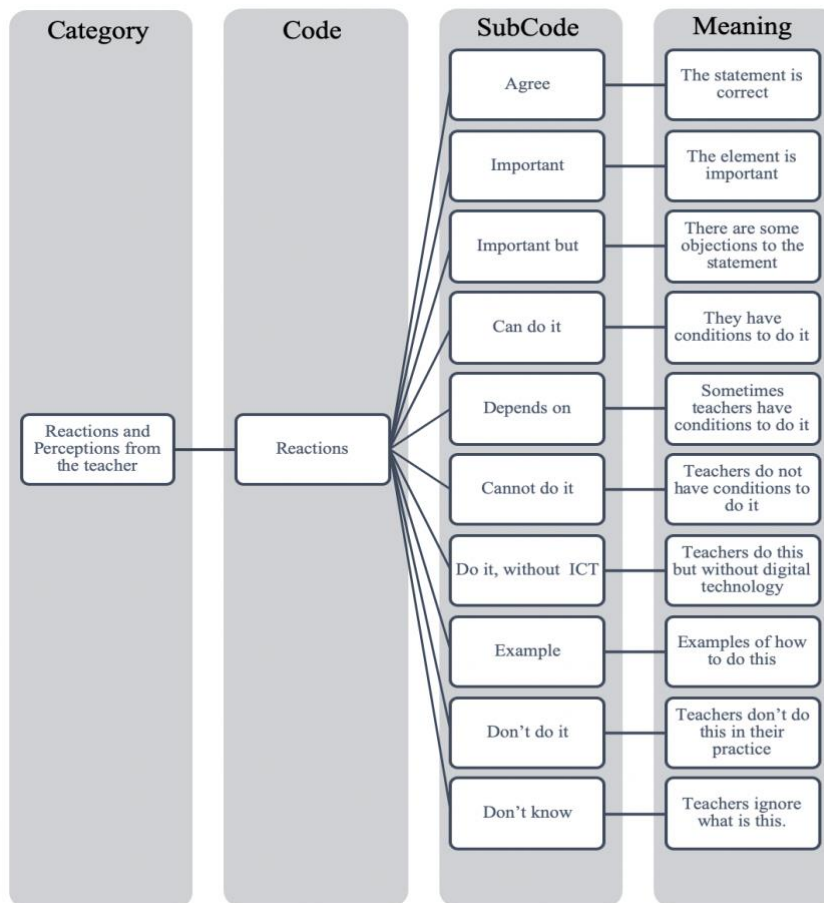


Figure 2. Code list example.

After creating the coding list and using this as a guide for identifying patterns in data, researchers reviewed the interviews separately. During the process, instead of relying on statistics of inter-rater reliability, we prefer to meet (online) multiple times to reach agreements and reconcile discrepancies (Saldaña 2015).

The criteria codes were reviewed into broader perspective themes based on validating the entire framework mixing categories during the follow-up conversations. The code 'competences' was used as a primary organizer (it differentiates the six elements of the original framework); the code 'reactions' included RQ1, RQ2 and RQ3. Finally, the code 'emergent' gave us information about RQ4. We maintained codes within each of the six elements, but we also focused on looking at the relationship between elements by altering the original model (figure 1) in sketch form. There was a process of constant comparison with data coding and modelling amongst the researchers.

Results

The main objective of this study was to explore how the six original elements of the DT Framework (figure 1) align with the practical and enacted experiences and understandings of the teacher participants. Each element is discussed.

Generator and manager of emerging educational practices

This is the element that generates the most consensus. All the teacher-participants emphasize their agreement with the statement and the importance of this in the teacher's

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profile. According to the teachers, digital tools are already integrated into pedagogical practices, and generate new learning opportunities:

Valentina: "If I, for example, as I already did, was teaching them about painters and artists, and then I proposed them to use Twitter, as an educational tool. Each student could choose an artist and tweet like he or she, and this benefited me a lot. One of them wanted to be Frida Kahlo, but to tweet like Frida you must know what she was like, what happened to her, what she believed in, who she fell in love with, where she lived (...) there you are going to have to investigate... That is, for me [technology] has been a complement".

Some of teacher-participants declared they do not see much innovative examples of digital pedagogies.

In the same way, the vast majority of teacher-participants remark that they can develop this element. In general, they stressed that they have enough technological resources, or at least, a lack of resources is not contributing to the emerging of digital pedagogical practices.

However, official curriculum was mentioned as a limitation of the teacher's performance of this element, especially in interviews in the Australian context. This means that in some contexts the curriculum is fixed at the administrative level (local government) which was perceived not only as a guide but also as constraining teachers' possibilities to integrate digital pedagogies.

Brad: "Schools will make decisions based on the needs of the students and the capacity of their communities. But everybody works within the system framework as well (...) state schools are required to have a pedagogical framework that they develop and or adopt. (...) In schools, it is expected to be a consistent pedagogical approach so that everybody, every teacher uses the same methodologies uses the same language for learning".

Then, as Brad remarks, even if teachers or schools make decisions about pedagogies, teacher's practices must be locally common (same state), therefore, the range of flexibility for implementing emerging pedagogies is low.

Also, some teacher-participants declared that digital tools sometimes do not meet pedagogical expectations, and they consider that there are some technologically feasible pedagogical applications that do not exist yet.

Marian: "There are some innovations that I would like to have, and that I do not have because I do not know if the tools exist or if I can build them. For example, in 3D geometry, I would like my students to visualize the lines and the planes and the points... but everything that I see in virtual reality, does not respond to the need that I have. I think that, for example, would make the students' 3D vision much clearer.

To sum up, teacher-participants considered that they must be generators and managers of innovative pedagogies enriched by technologies and they have the resources to do so, even if the opportunities to do it is not always available.

Expert in digital educational content

Teacher-participants showed a wider breadth relating to the importance of the teacher as a content expert, in two ways: the content creation and curation. Regarding creation, teacher-participants expressed different levels of content creation expertise in general, even if they consider themselves as able -if not experts- on creating content. For example, Valentina did not create a 3dimension pyramid but by using it as a virtual tool she associated content creation:

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Valentina: "If I'm good at telling stories, I'll keep telling stories but maybe I can add a virtual trip. I don't know, if I'm teaching Egypt, and I give them a virtual tour inside the pyramid... wow, I changed their lives".

Some teacher-participants emphasized the importance of generating their own content - or at least being able to- as the ultimate way of appropriating their content, since they believed that one is only able to understand all aspects of the concept/context when you create specific content:

Ana: "Traditionally, teachers are kind of presented. I think they're presented with the digital content that they are told that they should be using. And I think that's been part of the problem over the last 10 years (...) they have given this content, and they don't really have a deep relationship with the content, whereas I think if they create digital content, they're deepening their own understanding of the content and the pedagogy that they're having to work with".

Nevertheless, the wide majority of teacher-participants say that the Internet is already full of content and what really matters is being able to choose, to adapt, customize and use this digital content. In this sense, special mention is made of the need for being an expert at content curation.

David: "I have long thought that this was part of our work, create content.... But, every day I'm more skeptical about this. Above all because it happens the same as it happened when I was making photocopies; when I made them, they expired immediately. I think that the expiry date of educational resources are immediately and it doesn't compensate to create them for real use".

Lucas: "a TV3 journalist, makes a very good show on Fridays, and one was dedicated to the subject of mobile phones. The topic was explained in an amazing way, very appropriate to use with the kids. Well, this show is 15 days old... ...and after the material came out... ...a week later, all the teachers had already prepared exercises around this".

In short, being an expert in digital educational contents is perceived by teacher-participants as a critical element of the teacher's competence, with the role of content curator perceived as more important than the content creator.

A Reflective-Practitioner Expanded

For this third element, all the participating teachers recognized the role of the teacher as a reflective practitioner, as a generalized and very important element of the teaching profession. However, on closer inspection, some different nuances appeared.

On the one hand, in spite of some teacher-participants mention of Action-Research processes, it seemed to be more of a desirable theoretical construction that has permeated teacher training rather than a teaching reality. Teachers highlight the necessary attitude of improvement that teachers must have, they mentioned how crucial Action-Research is according to what they learnt in their pre-service training and even some of them mentioned some isolated informal initiatives for joint reflection. However, this does not seem to be a very widespread practice.

Alex: "I think that less is being done than it should be. Not much is being done. Many times, in this world, we are acting in a trial-and-error fashion, but without reflecting too much on either the pros or the cons. You use one practice with ICT, if it doesn't work you discard it and use another, but I think that without reflecting too much. We don't evaluate ourselves much about the practices we carry out".

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Also, they consider Action-Research processes as too abstract and minor in their teaching practice nor do they mention the need for any method or any intention to systematize such a process. The only reflective practices carried out by the participating teachers were particularly focused on two areas: sharing experiences and evaluation.

Joan: "For me, what helps me to reflect is to share the educational action with other people and, through technology, to receive feedback and, thus, to reflect. If I share a project that is done in the classroom with some people, the moment of reflection is when those people see the project, or see the practice, and that conversation, that feedback, takes place, and that is where I see that technology, by connecting us, produces that possibility of reflection".

Moreover, a large number of the teacher-participants who claimed to carry out these reflective processes claim to do so without technology. They do not consider that technology is a necessary part of or adds great value to this dimension.

Martina: "I always do (...) if I plan a class for 4 groups, that class is never the same, it always changes, it is taught once, I evaluate what happened, I modify it, I re-evaluate. It's like something that's already built into me. With the group of teachers in the area, too. We reflect on the activities, but it's done orally, as if we don't record much. And I think that part is missing a lot, and more than anything, as a whole. In the coordinators' offices, we talk a little, but it's not much time, we are several teachers and it is done without technology.

When teachers speak about the role of technology for Action-Research practices some of them mention the importance of learning analytics.

Julia: "We in Uruguay have SEA, which is an on-line assessment system that all teachers access from their own account. It has improved a lot, because before the tests were done, but today, it is very good because the teacher can create his own evaluations and his own rubrics, to evaluate his own practices with the data. And it's very good. But, let's see, from there to use there is an abyss".

In summary, being a reflective practitioner is considered a desirable part of a teaching competence framework but this element is not enriched by technologies, rather pedagogy with technology was reflected on. It is also not clear how technologies could enrich Action-Research and how Action-Research processes would be actually enacted.

Expert in enhanced organizational or personal learning contexts

This fourth element elicits a high degree of agreement, both in terms of importance and performance, and all teachers agree on the relevance of technology for it. That is, teacher-participants state that they have a technology enhanced learning environment through which they inform themselves or share knowledge with other colleagues and this is an essential feature of being a good teacher nowadays.

Mia: "I guess my main use of technology other than the socialization side of it, is I really like the opportunity to be able to share interesting things that come, you know, from wherever in the world with that instantaneous reflection on the time".

Joan: "We have an impressive amount of resources through technology... ..Whether it is talking, working or contacting other people, or through contact with different people, experts and professionals, who can also contribute to the classroom without the need to be physically there.

As for technology and its purposes, teachers say they use both individually and at the school level, blogs, social networks or instant messaging tools for communication and collaboration with other people and they declare certain dilemmas arise here.

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David: "More and more schools have a Twitter account, or an Instagram account, or a digital platform to showcase what they are doing. And that is very good, because those of us who have been in the networks for a long time know that transparency and visibility are always elements of improvement in a center. It should be for that, and not to compete. Because that's the dark side, I'm going to make everything I do look very nice because I need to compete with others.

Each educational context remarks the importance of some specific tools. It is noticeable in the Uruguayan context, the use of instant messaging tools, such as WhatsApp for communication and interaction among teachers, with numerous active groups through which materials and videos are shared, meetings are coordinated, and experiences are discussed.

While there is a high level of agreement on the importance of enriched professional learning environments there are also some teachers who mention the limited time available for training and learning from others. Finally, it should be noted that not everyone uses or prefers technology to enrich their learning environment and some teachers even if they mentioned on-line and face-to-face collaborative experiences, they expressed a preference for on-site professional learning:

Marian: "That's very good. But I think it's more important to get out of your school, physically, and really get together with other teachers and have them tell you what's going on. I find that more enriching than [online] networks. Networks are more for chatting, for exchanging ideas or some project...

Teachers were particularly aware of the importance of learning with each other (specially interchanging practices and reflections) and of using technologies to create this enhanced learning environment for them.

Sensitive to the use of technology from the social commitment perspective

Regarding this element, although teachers agreed on its appropriateness and importance, there are different perspectives on what social commitment means and how it translates into the classroom. Some teachers expressed the need to develop student's digital competence and digital citizenship, as part of their social commitment. Related to this, they understand it is a basic contemporary phenomenon, such as the proliferation of Fake News or Cyberbullying.

Martina: "In my planning I have a content, which is worked during the whole year: digital citizenship. The idea is to teach students about security, creative use of the networks and, is there where students are taught to use the Internet, the networks and technology in a creative way, which allows them to promote changes, and which allows them to make good use of the [online] networks".

Angelina: "That's there has made its way into our curriculum in terms of digital citizenship. Is it quite constructive in, you know, those sort of digital literacy skills in, say, the primary context (...) It's called Cyber Safety Unit for our schools... ...We wouldn't want to send our kids off to high school not being aware of how to be safe users of the Internet.

Likewise, some teachers mentioned technologies as channels or tools for social change, and how technologies can be used for ethics and commitment to change the world in which we live.

Julia: "We have to get the students to appropriate the technology, to get the technologies to be appropriate and participatory. That for me is basic. Because afterwards we would not have the problem that we have of the bad management that people do in the networks, because they do not know how to manage the networks, because we do not teach them to participate from ethics, from commitment... ...I have

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to be critical, reflect about everything. If we educate from an ethic of participation and collaboration, we are teaching how to participate in social networks”.

However, it doesn't seem to be a very common idea, or very feasible, to teach students cyber-activism. Nor is it even activism per se. In fact, in certain contexts, the education system and curriculum itself seems to limit these possibilities, even if teachers want to do so.

Brad: "And yet, when we look at the Australian curriculum, all of the political energy and the effort that's been put into and invested in the Australian Curriculum in the last sort of five or six years, has been about moving away from that. It's been about, how do we strip it back to more of core curriculum that has a more traditional approach to you. We see thankfully, as being the desirable content, all kids should be topped up, devaluing a lot of the So the, the curriculum manifestations of the social commitment ambitions that the declarations have”.

In short, teachers considered social commitment as a crucial element of being a good teacher nowadays, even if the nature of this commitment and the way it could be enacted is not clear yet to everybody.

Able to use technology to expand his/her relationship with the student's family and environment

In general, regarding this final element, teachers consider that technologies allow them to get closer to students and their families. There were numerous examples of messaging systems and applications used for this purpose.

Ana: "Actually, I think that a school who doesn't take advantage of that is missing out on an enormous scope. They're connecting and partnering with their community. So, you know, they're their social media platforms. There's new newsletter platforms, there are various ways of interacting and engaging with your community”.

Alex: "We, in our center, use technology in all aspects: administration, communication, pedagogical aspects, everything. With families too. Through e-mails or platforms, we have constant communication with them”.

However, this was not always possible, since in certain contexts parents did not have direct contact with teachers, but with the school.

Angelina: It's quite interesting in my specific context, because my principal is very protective, I guess, of the staff of his teachers. So, we weren't even allowed to give out our work e-mail address to parents. Parents, if they want to contact us, have to do it through a generic school email, go through the office and then not boarded up because he doesn't want parents having thinking that the teachers are on call 24/7 and you can e-mail them any time.

Olivia: "It's the school which have direct contact with the family. The management staff and the secretary are the only who have direct contact with the family. In my case, since I am from the town and I meet them all and most of the time I can talk to them. But no, the ideal, in all the educational centers of the country, only principals and secretary do this”.

In fact, immediate communication through digital tools with families was perceived by teachers as positive, even if also brought new challenges.

Mia: "But it's also a much more immediate connection to the teachers. Like if they don't like what's going on by demand and demand, it says straightaway, which is can be a bit challenging for people”.

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Eva: "All teachers want to take them out of daily contact. We all try not to give out our personal phone number (...), because something that could be to get closer, actually would create problems for us".

It is clear that technology helped teachers to connect to families. Nevertheless, even if the connection with families was perceived as an important element of the teacher's role, the approach to this relationship seemed very different depending on each context.

In short, we could see that there are elements that, even if they were conceived of in the original framework as independent elements, are perceived by teachers as closely related, and some of them, almost as a single element. Teachers indicated that elements were near related and the defining boundaries were unclear, appearing during the interviews as mixed and undifferentiated. This unclear differentiation happened, especially between the element 'Expert in digital pedagogical contents' and 'Generator and manager of emergent pedagogical practices', as well as between 'Expanded Reflective practitioner' and 'Expert in enhanced organizational or personal learning contexts'. The merging categorization and examination of relationships between elements will be part of the following discussion.

Discussion

In general terms our findings showed general agreement among teachers of the pertinence and the importance of every element already included in the DT Framework and with the inclusion of no other element (RQ 1 and RQ2). The six elements have been validated to define the teacher's professional competence in the digital era. Nevertheless, some particularities are interesting among the different elements and in the case of resources and conditions to enacted professional agency related to these elements, variation is quite important among different contexts and even between different elements (RQ3 and RQ4).

Some elements (Generator and manager of emergent pedagogical practices and Expert in digital content) are already well defined, accepted and integrated in the current teacher model. Both elements are considered by teachers as too close to each other, to the point that could both merged into a "Pedagogical Practices" dimension where the element related to emergent educational practices is particularly illustrated over content creation. The argument that teachers must be either or both curators or creators of content is still a long debate among contexts (Ruitenberg 2015; Drexler 2010).

Regarding the professional agency, it is interesting to highlight that, as previous research has indicated that (Ertmer and Ottenbreit-Leftwich 2013) the availability of hardware or software is not considered as an opportunity to enact teacher's technological agency, instead, the lack of actual time for training, coordination and reflecting by teachers is identified as the main problem. Those countries with more hours in class by week for teachers (e.g. a school week is 40 hrs. in Uruguay) allow more time for coordinating, reflecting and training. A lack of compromise was revealed as the main problem to foster research issues or coordination. Moreover, in some contexts an excess of top-down pedagogical regulation seems to restrict the teacher's professional agency and policies act not only as regulators but as performative forces that influence teacher's agency (Ball 2016).

Something similar occurs with elements 'A Reflective-Practitioner Expanded' and 'Expert in enhanced organizational or personal learning contexts' that appeared to merge testimonies of teachers when they talked about a dimension of their roles that could be called "Professional Learning Environments". In this case, the reflective practitioner expanded seem to enjoy an obvious 'theoretical prestige' as crucial element of the academic-teacher's role, meaning that it was considered from a theoretical point of view.

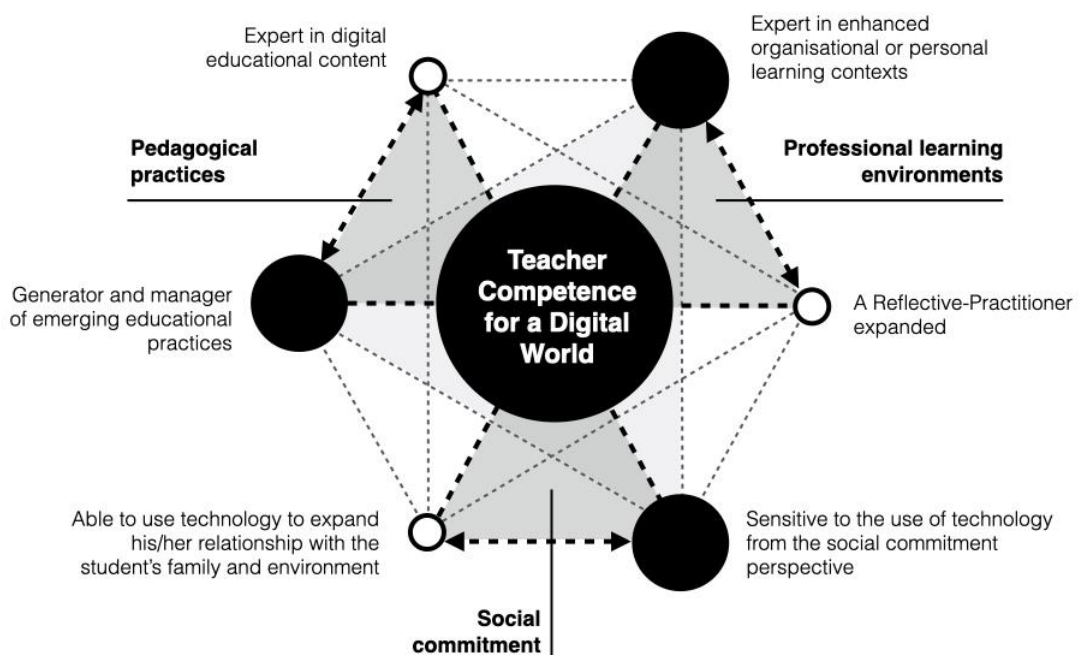
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Nevertheless, teachers seem not at all committed to reflective-practice and the main gap was related to the teachers' understanding about valid research processes and procedures. Teachers understand research and research in action as something minor within their profession and do not perform regular dynamics of research. They understand that the professional interchanges with other teachers are enough to help them to improve their practices. This perception would tempt us to remove this from the framework. However, there is a lack of relevance that could represent a problem in a world full of initiatives that want to take educational decisions based on the analysis of data (e.g. learning analytics initiatives). These research processes are almost completely new and obscure to normal teachers not only for their topic-data but for their use of data about action (Raffaghelli and Stewart 2020; Williamson 2015).

There is another merged dimension that is bought together under the title of 'social commitment' that includes the ability 'to use technology to expand his/her relationship with the student's family and environment' as well as to be 'Sensitive to the use of technology from the social commitment perspective'. This was evident in the teachers' interviews and is understood in a variety of ways depending on the context. Even when the relevance of the connection with the student environment and family was clear, the importance of the social commitment for contemporary responsible citizens was emphasized more. However, even if there were agreements and coincidences on the importance of something close to the concepts of critical digital literacy (Pötzsch 2019), or digital citizenship (Feenberg 2017), activism – and even less digital activism (Emejulu and McGregor 2019) was totally removed from the possibilities expressed by teachers.

Conclusion

Consequently, with the primary objective of this study, the fifteen cases analysed on this exploration, the results of the interviews related to the pertinence and relevance of each element of the original DT Framework, as well as the identified relationships between the components including the problematic differentiation between some of elements This process has helped to validate the elements and reshape the model of the DT Framework (Figure 3).



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Figure 3. Digital Teacher Framework (DT Framework) reviewed.

The renewed diagram (figure 3) illustrates the three main dimensions that organize and group the six original elements according to results of the validation. On each dimension, the perceived importance of one of the two elements over the other is made clear by the difference on the circle size. It must be made explicit that the six elements are still linked to each other in a system, as in the original framework, however, the identification of a closer relationships between some of the elements are emphasized by using stronger lines that join them and including arrows that stress the intimate relationship between them.

There are some limitations to this study. Overall, limitations are related to the scarcity of the sample and the limited number of countries included. However, these limitations were bounded by the richness of the data collected supported by the sample of teachers, the original framework and the systematic questions given to teachers prior to the interview that gave a dense transcription of 45 min or more.

Nevertheless, these limitations suggest there are some implications for future study. It would be an exciting path to explore how to support or foster the development of the three main domains of the DT Framework and go in-depth with the role of agency to enact the competences. Not in vain, the relationship between teacher's agency conditions (resources and opportunities) and competence enaction appear in this study as intimately interrelated in each domain and results require further examination concerning the DT Framework's practical action, even if current data are not enough to explain it in a more detailed way.

Competence itself does not complete the teacher's professional profile even less with the approaches found within the current mainstream competence frameworks (Mulder 2014; Starkey 2020). Conditions and opportunities for agency are crucial to enact teacher's competence (Albion and Tondeur 2018; Priestley et al. 2015). It seems then that beyond the conceptualization of a general model of teacher's competence, to create a comprehensive one, any framework must include agency as a conditional context, and the competence must be understood also as a crucial factor of the teacher's agency.

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