Article

Teacher Agency in the Pedagogical Uses of ICT: A Holistic Perspective Emanating from Reflexive Practice

Ángela Novoa-Echaurren [1,2]

1   Programa de Bachillerato, Facultad de Educación, Universidad de los Andes, Santiago 7620086, Chile; abnovoa@uandes.cl or angela.novoa.15@ucl.ac.uk
2   Culture, Communication and Media, UCL, IOE Faculty of Education and Society, University College London, London WC1H 0AL, UK

Abstract: This article discusses a case study on teacher agency about the pedagogical uses of information and communication technologies (ICTs). The investigation explored a school ecosystem that has developed a model of reflexive practice aimed at promoting teacher agency from a holistic and relational perspective. The primary case comprised six sub-cases using ICTs with students and deliberated on these uses by applying the reflexive model promoted within the school boundaries. Data were analyzed thematically. Observations of teaching practices with ICTs, reflexive practice sessions on ICT uses, and interviews with the heads of departments of the observed teachers yielded the relevance of collaborative agency in the context of the digital age as it brings together policy, theory, and practice. In line with the claims of relevant literature, the study shows that an articulated dialogue between these dimensions is relevant for using technologies in education according to the specificities of teachers' institutional ecosystem.

Keywords: agency; reflexive practice; pedagogical uses of ICTs; school ecosystem

1. Introduction

Decision-making on the use of information and communication technologies (ICTs) in educational practices has been debated in different areas of education. For instance, comprehensive large-scale investigations indicate that teachers who deal with multiple challenges in their daily work lives have yet to receive sufficient adequate support and professional training in the pedagogical uses of ICTs [1–3]. By "pedagogical uses of ICTs", this article refers to the complete design, implementation, and evaluation process of a teaching and learning experience that integrates these technologies. Many theoretical frameworks have grown to support such uses [4–8]; however, the literature still indicates that transformative educational implementations of technologies have yet to be reported with confidence [9–11].

One of the reasons for this is the gap between the thinking and decisions adopted by policymakers, theorists, and practitioners regarding which technologies to select, for what purposes to employ them, and how to use them [12] and the notion of "agency" as it deals with decision-making at different levels within the school ecosystem (The "institutional" or "school ecosystem" refers to the dimensions and structures defining the school community [13,14]. Some concrete examples are the institutional leaders and colleagues' views about why and how teaching works best with ICTs and the learners' knowledge and desires about how ICTs can aid them best in achieving learning gains). This article will, therefore, discuss the concept of "agency" as a notion derived from "reflexive practice" and its application to teachers' pedagogical uses of ICTs.

Based on an investigation that explored the reflexive practices of six sub-cases integrated into a Chilean school ecosystem, the study examines the concept of "agency" concerning three dimensions within the organization, namely the professional, departmental, and institutional. The article reviews the concept in the digital age to continue debating

an ICT reflexive practice framework which emerged from the research. The primary focus is the relationship between the framework's features, dimensions, and teacher agency. Thus, the investigation aimed to respond to the following research question: How do the participating teachers develop the concept of agency regarding their pedagogical uses of ICTs within the reflexive dimensions of the school ecosystem?

2. Literature Review

2.1. Teacher Agency: An Outcome of Collaborative Reflexion

"Teacher agency" results from the notion of "reflexive practice", understood as a holistic process that enables the teacher to think deeply about the implications of teaching [15,16], in this particular case, with ICTs [2,9]. This perspective transcends examining narrowed practices (i.e., a particular class, a teaching unit, or a teaching practice with digital technologies) to carefully contemplate multiple features of the broader ecosystem in which teaching is embedded [15]. Thus understood, "agency" refers not only to the personal and conscious act of deciding but to a collective approach involving various dimensions of the institutional (or the school) ecosystem and even the broader macrosystem (The broader macrosystem comprises the society at large, the sociohistorical and sociocultural background of the various participants engaged in the educational process, policies and theory, among other dimensions of teaching [15,16].

"Reflexive practice" is assumed here as a collective awareness of teaching practices, specifically those pertaining to digital technologies. It constitutes an iterative and comprehensive process [16,17] in which each "agent" or actor engaged in the educational activity considers how various dimensions and features of the school ecosystem shape decision-making.

Figure 1 shows how reflexive practice results from the convergence of three dimensions within a school ecosystem, namely the professional, departmental, and institutional. In the professional dimension, the teacher considers the pedagogical and disciplinary implications of teaching with ICTs (i.e., the subject's domain specificities). In the departmental dimension, the professional collaborates with colleagues and other school members through the reception of feedback and feedforward of ideas for the continuous improvement of practices. In the institutional dimension, the teacher considers the organization's regulations and policies, the expectations of the school management team regarding teachers' use of digital technologies, and their feasibility of application in the practical context.
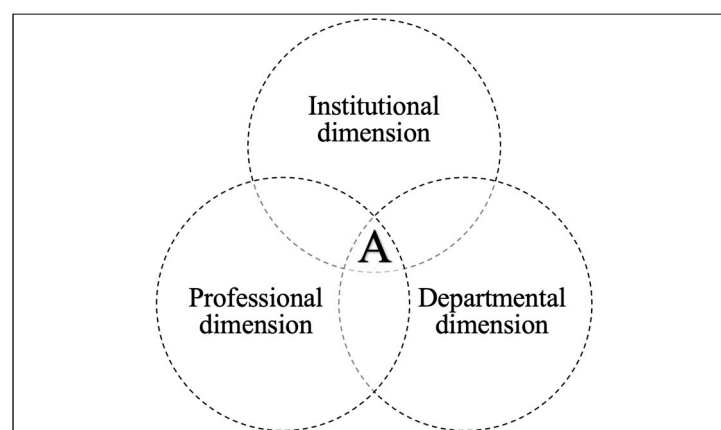

Figure 1. The ICT reflexive practice framework featured from the theory. Note: The figure disclosed in this article will be featured in other publications to examine related concepts or analyze notions discussed in the current manuscript in more depth.

As shown in Figure 1, the three dimensions converge in "agency" (see the "A" in the center of the figure). For this reason, the dimensions require interrelated scrutiny. We will discuss the figure in more depth further. Meanwhile, it is worth noting that the concept of

"agency" is understood because of a collective process embedded within the boundaries of a particular institutional ecosystem. Simultaneously, it comprises continuous professional learning opportunities.

2.2. The Relevance of Agency in the Digital Age

Throughout the last four decades, multiple studies have shown prolific ICT developments and applications in educational settings, including the vast array of synonyms employed to refer to such notions as "digital", "new", and "media technologies", among others [18]. Various stakeholders in education have thus become interested in "how" diverse ICTs can enhance student learning. However, their vast and dynamic expansion interferes with the ability of schools and teachers to make choices suited to their specific ecosystems [12].

To the gap described above, it is necessary to approach policy. The triadic dialogue between theory, policy, and practice in educational technology lies in demonstrating evidence that well-intentioned educational policies have been developed in various contexts. However, not sufficiently considering teachers in the decision-making process has yielded limited results concerning policymakers' expectations. An example of this assertion is the policy generated in Chile with the Enlaces [Links] network, born in 1992, to improve educational quality by providing professional development (PD) opportunities and increasing technological infrastructure in state-funded schools [19,20]. One of the most significant issues relates to the provision of isolated PD outside the teachers' institutional context, focused on the technical rather than the pedagogical aspect of ICT use [21,22], which resulted in most large-scale studies prior to the pandemic reporting little real transformation when ICT was employed within Enlaces-supported organizations [1,10,23]. Furthermore, deeper problems were reported during the pandemic that hindered the transition to the so-called "emergency remote teaching" [24] due to school closures. Among them, we can find inequities in access between urban and rural locations [25] and the need for ICT skills development among teachers and students, especially those related to the ability to evaluate pedagogical uses [26–29].

All these reflect the need to bring together theory, policy, and practice. To the extent that all the agents involved in the implementation of the pedagogical uses of ICTs (i.e., policymakers, teachers and students), gain the skills and knowledge required for such purposes according to the role they play in the ecosystem, it will be possible to generate a harmonious activity that aims at greater community learning.

Various scholars contend that ICTs are sociocultural technologies [12,30,31]. As such, they are generated by humans to fulfill specific purposes. At the same time, they shape our ways of thinking, communicating, acting, and representing the world. For instance, digital technologies offer multiple communication possibilities [31,32]. From written to audiovisual interactional texts, users can mix and remix them, giving different meanings according to the context in which they generate and receive the content.

Imagine a student conversing with his or her fellow classmates and the teacher through an LMS system. The student is located in a room at home. A physical space, location, and furniture distribution define the context. The device this student uses also determines the experience. If the learner connects through a smartphone, a laptop, or a tablet, it will make a difference in user interface and user experience. Moreover, the peers and the teacher share other locations, physical spaces, furniture distributions, and user interfaces that will generate other contexts and experiences. If using ICTs is complex, the level of consciousness and agency in determining what is desired to be done and drawing in which pedagogical foundations is pivotal to safeguard students' learning, which is teachers' primary concern. Therefore, a harmonious equilibrium between the school policies and the teacher's own capacity to make self-directed decisions is crucial to the success of a given ICT use [33–35]. Although teacher agency has been recognized as a relevant concept by different authors, Player-Koro et al. [35], argues that teachers often don't have much agency over what is said and thought about education policy. Therefore, it is worthwhile exploring

further how teachers and schools are involved in policy-making concerning an area such as educational technology.

In the pedagogical uses of ICT, "agency" is often linked to the teacher's capability and possibilities to choose and transform their uses [9,34–37]. The cited literature refers to "capability" or "capacity" or other related terminologies (e.g., skills, aptitudes, abilities) because "agency" is associated with the teacher's performance. The concept also deals with how the professional communicates with others their thinking about the use, the subject they teach, and the pedagogical foundations supporting their ICT uses [38]. Moreover, the concept deals with professional learning opportunities that enable teachers to increase their knowledge about ICTs, enhancing decision-making [9].

Teachers use ICT and hence develop agency within a specific school ecosystem, which shares unique structures, dynamics, and ways of operating. According to Damşa et al. [33], "agency" accounts for a holistic vision comprising iterative assessment processes, redefinition, and further refinement of practices; therefore, transformative dimensions are engaged in the process. Let us examine Figure 2. Imagine the teacher is represented by the circle moving through the continuing line, making different choices that imply foreseeing new pedagogical uses of ICT (i.e., anticipation), implementing them, assessing and refining them, and repeating all the processes in new experiences. Agency thus moves back and forth, generating and redefining ICT teaching designs, strategies, and assessment methods. Gore [39] highlights that teachers' collaborative decision-making comprises iteratively questioning, scrutinizing evidence, and carefully pondering its meaning in a particular context.
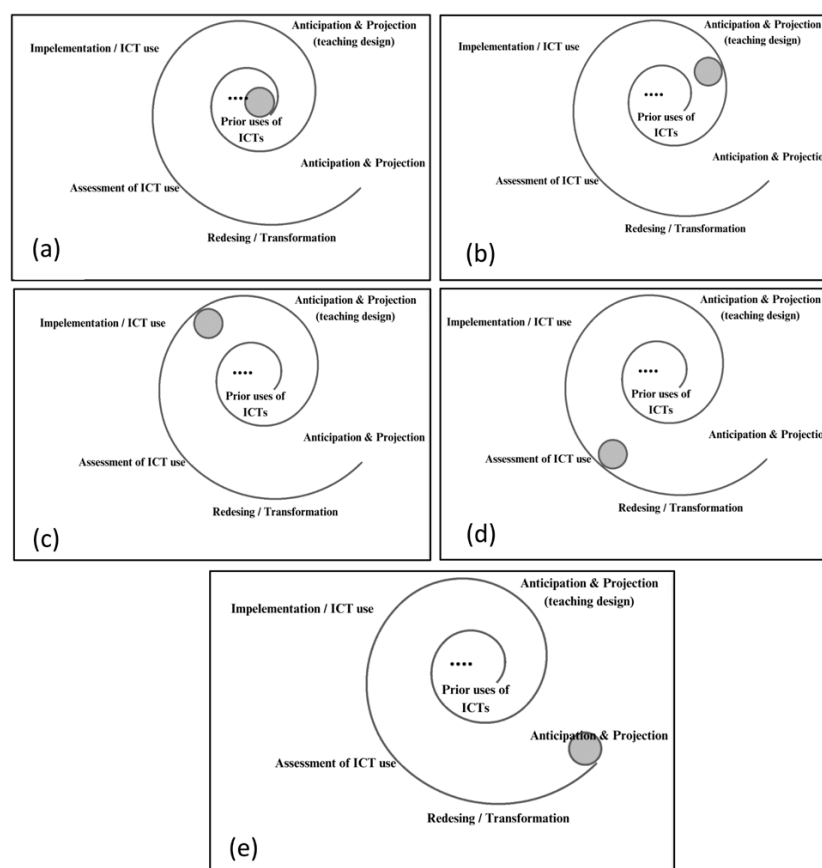

Figure 2. Iterative reflexion—authors' own creation. Note: The grey circle in each panel represents the teacher who transitions through different stages in decision-making about the pedagogical uses of ICTs. (**a**) prior ICT uses; (**b**) anticipation and projection; (**c**) implementation; (**d**) assessment of ICT use; (**e**) anticipation and projection of new/transformed/refined pedagogical uses of ICTs. The figure disclosed in this article will be featured in other publications to examine related concepts or analyze notions discussed in the current manuscript in more depth.

Agency is continuous and integrated throughout the teachers' professional life. Teacher agency as a form of continuous professional development (CPD) articulates the teacher's theoretical learning with the practical conditions and needs that make possible or constrain their intentions to use ICTs with pupils [16,40]. In this way, the teacher can iteratively bring together theory, policy, and practice and adjust the three dimensions of Figure 1 into the practical use of ICT, integrating the decisions adopted by other agents of the school ecosystem into the specific instructional context (i.e., classroom experience with a group of students). Furthermore, the teacher can enhance the theoretical knowledge gained in CPD through reflexive practice about ICT, generating or actualizing existing theories according to what has been learnt from practice [40].

Agency is dialogic and collaborative [33,40]. Teacher agency entails the balanced articulation of the three dimensions portrayed in Figure 1 (i.e., professional, departmental, and institutional). Albion and Tondeur [9] suggested that sharing experiences related to the implications of the pedagogical uses of ICTs enables practitioners to find the rationale to authenticate and, based on this validation, modify their own teaching experiences with technology [9]. Regarding this specific point, Gore [39] claimed that professional collaboration implies time to find solutions for the problems emerging from practice that suit the teacher's contextual conditions and needs. Such an agentive process entails carefully examining the teaching and learning experiences, questioning them, comparing them against evidence and theories, and reflecting on their meaning in that particular context.

A relationship exists between teacher agency and reflexive practice, understood as considering the school ecosystem's specificities. Reflexive practice that fosters teachers' agency regarding ICT uses increases the professional's self-consciousness. Hence, the educator questions the choices, gaining more flexibility and acting more freely. In this way, reflexive educators enhance decision-making regarding their pedagogical uses of ICT by iteratively and collectively thinking critically about how to improve the practice [41].

From the holistic perspective portrayed in Figures 1 and 2, reflexion constitutes a life-long learning process. The practice evolves in a continuum of thinking about the pedagogical use of ICTs, designing, implementing, dealing with uncertainties, assessing, refining, redesigning, transforming, and implementing again. According to scholars, the key to success is dialogue and collaboration among colleagues [9].

Following this relational perspective, the articulation of policy and practice is also vital. Figure 1 represents how each "agent" of the school ecosystem engages in reflexion and demonstrates agency according to their role within the organization. Understood in this way, holistic reflexivity contributes to meaningful practices for educators through CPD that increases agency within the boundaries of the school ecosystem [16,41].

3. Materials and Methods

3.1. Case Study

This study investigated a school ecosystem as an illustrative case of reflexive practices on the pedagogical uses of ICTs from a holistic perspective [42,43]. The school constituted the primary case, comprising six sub-cases of the sample.

3.2. Sampling

The sample consisted of a fixed purposive method [44]. Thus, the case study included representatives of the different dimensions of the school ecosystem:

1. Teachers observed in the classroom for the professional dimension.
2. Heads of the participating teachers' departments and teachers observed in reflexive practice meetings for the departmental dimension.
3. Heads of departments participating in the semi-structured interviews for the institutional dimension.

The six sub-cases investigated within the primary case, among other findings, made it possible to determine how the participating teachers unveiled agency through the model of reflexive practice that the organization promoted as a CPD policy.

Figure 3 shows the case's composition. Six sub-cases comprised six teachers who developed reflexive practices on ICT use. In addition, the heads of departments of those teachers took part in the research. In this school ecosystem, decision-making is distributed as follows: in educational policy formulation, the principal or headteacher collaborates with the academic vice-principal or deputy headteacher. These "agents" or actors in scholarly decision-making receive information about teachers' practical reality through collaboration and dialogue with heads of departments. In this way, each member of the school ecosystem decides differently according to their role in the organization. Communication and collaboration across roles are critical to making the model work (see the bidirectional arrows between boxes in Figure 3).
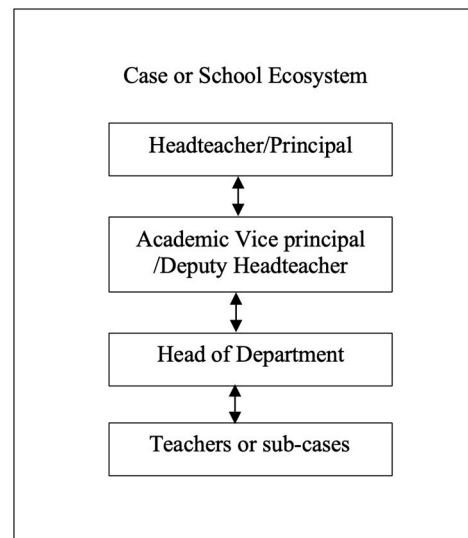

Figure 3. The Sample's Structure—authors' own creation.

3.3. Data Collection

Observations of pedagogical uses of ICTs, including classroom teaching practices with students and reflexive practice sessions, were supported by semi-structured interviews with the heads of departments of participating teachers.

Table 1 shows an overview of the cases explored. The reader is encouraged to relate the pupils' developmental stage, the intended learning objectives, the technology used and its learning potential, and the pedagogical decisions each case made. Differences in the teacher agency determined outcomes in harnessing technologies for learning to a greater or lesser extent. Thus, while some teachers maintained a dynamic based on content delivery methods, such as SC1, SC3, SC4, and SC5, others, such as SC2 and SC6, promoted more active student participation through their pedagogical uses. The results of agency and its implications will be discussed in more depth later in this article.

Table 1. Cases Overview—Source: author's own creation.

Subcase n°	Subject	Student Level	Technology	Learning Purpose	Teaching Strategy
SC1	Physics	- 8th grade	- PowerPoint	- To understand the concept of mechanical work	- Content delivery - Q and A
SC2	Programming	- 8th grade	- Robot Arduino - Open Roberta programming platform	- To identify parts and function of a robot (Arduino) - To understand how the platform Open Roberta operates	- Students' collaborative production

Table 1. *Cont.*

Subcase n°	Subject	Student Level	Technology	Learning Purpose	Teaching Strategy
SC3 SC4 SC5	History and Social Sciences	- 2nd grade	- YouTube animated videos	- To identify the characteristics of the Chilean native people	- Content delivery - Q and A
SC6	Technology	- 8th grade	- Photoshop - Google Drive	- To design a photo exhibition about the learner's journey throughout secondary school	- Students' collaborative production

3.4. Data Analysis

A thematic analysis made it possible to compare and contrast subcases to find patterns and distinctions among them [45–48]. Theory-driven scrutiny prioritized a deductive approach. A priori codes were determined from the literature on reflexive practice, pedagogical uses of ICTs, agency and CPD. Qualitative data analysis software (NVIVO) supported code generation and analysis outlined as follows:

1. Theoretical code generation from the literature review: codes associated with the notions of "reflexive practice", "teacher agency", "ICT" and "CPD" were identified from the literature and registered in NVIVO to become familiar with the research problem and categorize potential gaps the data could address.

2. Theoretical code comparison against data to check compatibility: Data were revised and reduced iteratively through theme development. Keywords, ideas, and patterns identified within datasets enabled code reduction into themes. Datasets were compared and contrasted to identify patterns within them. Themes were subsequently reviewed to assess whether they made sense, were supported by the data, overlapped, or could be interpreted independently, and whether they sufficiently represented the data to enhance the theory of reflexive practice, particularly concerning the pedagogical uses of ICT. Data were permanently compared against theoretical codes until data saturation.

In this way, theory illuminated practice and practice enlightened theory, reaching a point in which the ICT reflexive practice framework portrayed in Figures 1 and 4 was reached. The study moved from deduction to induction, enabling the generation of a framework that brings together theory and practice and highlights the relevance of "agency" in decision-making about the pedagogical uses of ICTs (see the "A" at the centre of Figure 4).
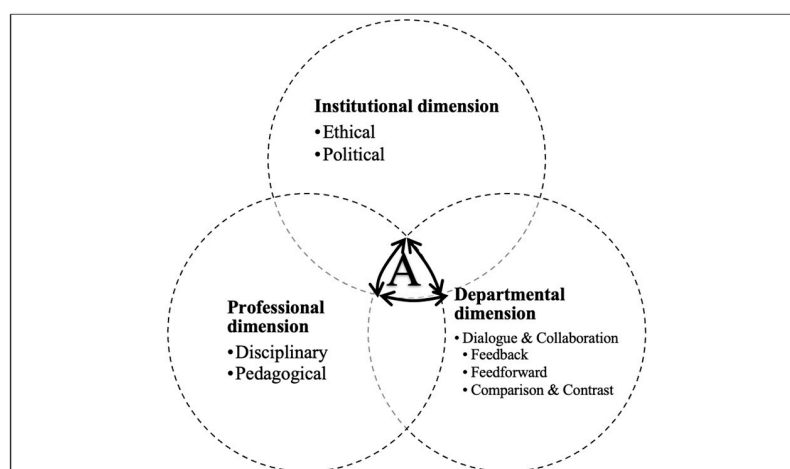

Figure 4. The ICT reflexive practice (IRP) framework enhanced from the data. Note: The figure disclosed in this article will be featured in other publications to examine related concepts or analyze notions discussed in the current manuscript in more depth.

3.5. Ethics

The research institution's Ethics Committee approved the ethical protocol to safeguard the participants' rights, data security, and anonymity, according to BERA [49] standards. The study considered the participants' acknowledgment of their responsibilities and the right to withdraw and request their data at any moment. Participants read and signed an informed consent form to guarantee their understanding and agreement to participate in the research. Confidentiality and credibility were critical in upholding the study's integrity because the pedagogical uses of ICTs are a field of particular interest for institutional policymakers. Data collection comprised field notes, video, and audio records. The participants and the deputy headteacher granted permission to use these materials: the research institution and the field of study ethical protocols guided data management.

4. Results

4.1. The School's Reflexive Practice Model

For over a decade, the school under investigation has developed a reflexive practice model based on the Teaching for Understanding framework [50]. This framework holds that the student develops a deep understanding of content through the demonstration of performances of understanding. It was born to integrate ICT in teaching with a pedagogical sense to increase student learning [50]. The school's reflexive practice model consists of 1 h of weekly staff meetings to elaborate the pedagogical designs together and another weekly hour to reflect on the implementation of the designs. Each head of department observes the staff's ICT uses with pupils weekly and then participates in the reflexive practice meetings. Teachers, colleagues, and the head of department discuss the implications of a given ICT use and agree upon future improvements. The observations revealed how the head of department provided feedback, teachers feedforwarded ideas that could improve controversial issues, and educators also compared their practices with those of their colleagues through the feedback provided by the head of department. A constructive climate of dialogue and collaboration, design and redesign aimed at improving teaching.

From the reflexive practice model, in 2018, SC2 and SC6, with their head of department and the school authorities, decided to incorporate a project-based learning framework [51] [52] to strengthen their pedagogical uses of ICTs. To this end, they dedicated all 2018 to training in the framework and in 2019, they began its implementation.

4.2. Different Forms of Agency across the School Ecosystem

The three concentric circles in Figure 4 show that each member of the school ecosystem demonstrates "agency" differently. While school leaders formulate policies regarding the pedagogical use of ICTs, teachers make daily decisions according to the specificities, conditions, and routine needs. The data compared against the literature showed that these dimensions were necessary and should operate together to increase decision-making, hence, "agency", according to each agent's role within the school ecosystem. One head of department noted that

> "I like to empower them. You know? They own their classes, their courses. They know the dynamics of their courses better than anyone. They know how the students relate with each other. They know the rhythms. I don't know. The implicit part. They know, they handle it very well. So, they must feel with the freedom of, of using that knowledge for the final common good, which is that the students learn" (SC3, SC4, and SC5's head of department).

In this quotation, multiple features of reflexive practice are intertwined. Firstly, in the respondent's view, the teachers must have sufficient autonomy and liberty to decide. Through their work with pupils, they have gained the authority to let their voices be heard. This perspective echoes that of Freire [14,41,53], who extensively developed the notion of "freedom". Secondly, the head of department recognizes teachers' knowledge about the classroom reality. Therefore, the concept of "power" emerges. A collaborative approach

that integrates bottom-up and top-down decision-making seems to give teachers a sense of power that enables them to decide with colleagues and the head of the department which technology to use, how to use it, and refine the use if necessary, having students' learning in mind. The quotation is also crucial because it reveals that integrating the institutional dimension into the other dimensions of the framework has ethical implications. The concern of educators for increasing students learning is essentially ethical [53].

Other heads of departments also revealed this collaborative approach to agency in the pedagogical use of ICT. Rather than assuming their role from a hierarchical perspective, they consider their position supportive. Therefore, they bridge the direct teaching with pupils and school leaders who make broader decisions regarding the integration of ICT in teaching, such as technology purchasing, programs implementation or training on a specific pedagogical approach:

> "I do not assume the role of the chief; I don't know because I try to support them throughout their practice" (SC3, SC4, and SC5's head of department).

> "At large, we are building together. We are learning together" (SC2 and SC6's head of department).

The head of department represents the organizational managers in the reflexive practice meeting. This role also represents teachers in the encounters with school leaders. Being at the heart of the organization, they mediate both outlooks within the ecosystem. Their perspective on decision-making about the pedagogical uses of ICTs resides in a robust collaborative component.

The ICT reflexive practice features were recognized across the three dimensions in the reflexive practice meetings. However, collaborative features were more evident in the departmental dimension. Teachers engaged in constructive dialogues during the reflexive practice meetings. The heads of department provided feedback, and teachers proposed new ideas concerning thought-provoking issues. Agreements were reached to cultivate the practice for further opportunities. In SC2's reflexive practice meeting, the teacher mentioned to the head of department:

> "One student considered making a bracelet with a distance sensor that notifies blind people when approaching an obstacle, such as a wall or something else. So, I encouraged them that, for instance, the traffic light has the shape and appearance of an actual traffic light. But we will not have enough time for that. So, we will not do it" (SC2 reflexive practice meeting observation).

Agency is seen in this quotation from different angles. The teacher shared with the head of department a concern about the implementation process. The extract shows that students made choices during the pedagogical use of ICT. Thus, learners demonstrated a degree of agency in the learning process. However, the final decision resulted from the collaborative effort between the teacher and the head of department. They discussed the year schedule and concluded that the students' plan was too ambitious to complete before the year ended. Moreover, when supporting this passage with the interview, it was possible to conclude that the head of department recognized the teacher's expertise in programming, conceiving his knowledge as a learning opportunity. Therefore, reflexion and agency as a collaborative enterprise also unveils the possibility that leaders learn from practitioners:

> "So, learning about programming. And it's not that you must know everything, but you need to understand something. Also, to empathize with the teacher, and to observe. I mean, just observing a class is a whole world, a completely new thing for me" (SC2 and SC6's head of department).

Agency extended beyond the formal reflexive practice meetings. Teachers also discussed the implications of their pedagogical uses of ICTs in informal conversations, such as passing through the hallway, chatting through instant messaging systems or sharing coffee time. Decisions were reached through reflexion and became deeply embedded in the teachers' daily work life. For instance, teachers shared coffee during the students'

recess before observing SC3, SC4, and SC5′s reflexive practice meeting. Their conversations were precisely about the outcomes of the pedagogical uses of the ICT used in the sessions observed for this research. This result is consistent with C1′s head of department:

> "We have the 'level hours'. In those opportunities, we design the lessons together. We also resolve those details in the hallway during recess or by chat (e.g., via WhatsApp) because we cannot resolve them during the level hours" (SC1′s head of department).

This extract shows that each dimension transcends its boundaries. That is the reason for representing the concentric circles in Figures 1 and 4 with penetrable lines. The decisions made by teachers regarding their pedagogical uses of ICT imply the intricate relationship among dimensions of the framework. However, the key to decision-making in all these layers of the school ecosystem is collaboration, either following a formal reflexion model or in informal reflexive opportunities such as those generated in the hallway or through instant messaging. Agency, then, implies teacher autonomy but staff collaboration as well.

5. Discussion

This study explored how six schoolteachers who integrated ICTs into their daily teaching developed agency within their school ecosystem's reflexive practice model. The data reveal, among other aspects, that teacher agency viewed from a relational and collaborative perspective is fundamental for conscious decision-making by the conditions and needs of the school ecosystem. In this sense, it reflects implications for teaching with ICTs in three dimensions that operate in an articulated manner, namely, professional, departmental, and institutional. In each of these, features influence agency (i.e., the pedagogical and disciplinary aspect, the provision of feedback and feedforward, and the ethical and political domains), shaping how teachers decide about using ICTs.

In the professional dimension, teachers often choose personally according to their instructional contexts' specific conditions. In this dimension, they consider the particularities of the subject area they teach, their students' learning needs and capabilities in their choices about the pedagogical use of digital technologies. As suggested by one head of the participating departments, teachers are provided with autonomy and freedom to adjust the ample facets that may influence their uses of ICTs to the practical reality they face in daily instruction. In line with Albion and Tondeur [9], agency refers to controlling and pedagogically managing ICTs, assuming a consumer and producer position. These aspects were evident in the different decisions adopted by the cases studied, which ranged from more and less active student roles while using technologies to learn (see, for instance, Table 1).

As shown in the framework, colleague-to-colleague collaboration is the heart of reflexion and agency. The position adopted by the heads of the participating departments is crucial, fostering horizontal relationships across the different agents involved in decision-making. The role played by each head of department had significant implications for bringing policy and practice together. In the reflexive practice meetings, the institutional dimension is considered in decision-making. Then, in other reflexive opportunities, the heads of department could inform school managers, such as the headteacher or principal, about the practical reality teachers faced in their daily work life. The model allowed school leaders to decide from the practical reality, as was the addition of the project-based learning framework to support the use of ICTs in subcases 2 and 6. This idea is consistent with Damşa et al.'s [33] understanding of "agency". In their view, the organization shapes teachers' choices; simultaneously, collaborative judgments shape the organization's future, giving it more meaning to its members. In line with Biesta et al. [36], agency results from a complex interrelationship between the members involved in the school ecosystem, as well as the institutional needing circumstances.

6. Conclusions

This article presented the results of a study that explored the concept of agency concerning three dimensions within a specific school ecosystem, namely the professional, departmental and institutional. Based on the school's reflexive practice model on the uses of ICTs, the article considered the following research question: How do the participating teachers develop the concept of agency regarding their pedagogical uses of ICTs within the reflexive dimensions of the school ecosystem?

As a primary outcome, it is concluded that considering teacher agency is crucial when discussing pedagogical uses of ICTs. Secondly, a collaborative and relational perspective toward agency leads to more realistic decision-making.

At a time of accelerated and diversified technological developments, decisions on which technology to integrate and how to use it in teaching have become increasingly unsettling among practitioners, policymakers, and researchers. In this context, the analysis of agency is critical: the teacher directly understands the students' reality and makes the final decision. Therefore, integrating agency across the school ecosystem is a path of particular relevance, through which its members can dialogue and collaborate in pursuit of a common goal: increasing and improving student learning.

The relatively small sample size of the study is acknowledged as a limitation that may affect the generalizability of findings. However, this constraint is recognized as an inherent aspect of case study research rather than a point of criticism. The depth of analysis was prioritized over the generalizability of findings to understand how teachers and school leaders practice agency and collaborate in pursuing pedagogical uses of ICTs adjusted to the ecosystem. Observing how agency about teachers' pedagogical uses of ICTs unveils in other school ecosystems is envisioned as a line of future research.

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