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PRAXIS: Open Educational Practices and Open Science to face the challenges of critical Educational Action Research

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Abstract

The paper presents the findings from PRAXIS, an educational action research project developed within academic professional learning communities (PLC) in the context of public higher education in Uruguay. As a strategy towards fostering teaching innovation, we explored the potential and benefits of academic PLC for the reflection and transformation of teaching practices, and the integration of digital technologies in a meaningful way into teaching. The approach was based on Open Science (OS) and Open Educational Practices (OEP) as foundational frameworks to face the challenges of critical Educational Action Research. Key findings of the project emphasise the impact of PRAXIS framework combining OEP, OS, and academic PLC, as well as collaborative and participatory technologies for the transformation of teaching and educational research practices.

Keywords: Educational action research (EAR), professional learning communities (PLC), teacher training, digital technologies (DT), open educational practices (OEP), open science (OS).

Introduction

The paper presents the findings from PRAXIS, an action research project developed within academic professional learning communities (PLC) (Owen, 2014) in the context of public higher education in Uruguay. As a strategy towards fostering teaching innovation, we explored the potential and benefits of academic PLC for the reflection and transformation of teaching practices and the integration of digital technologies (DT) in a meaningful way into teaching. The approach was based on Open Science (OS) (O'Carroll et al., 2017) and Open Educational Practices (OEP) (Cronin, 2017) as frameworks facing the challenges of critical Educational Action Research (EAR).

PRAXIS Project (September 2017 – February 2019) aimed to explore teaching practices and the integration of digital technologies (DT). Moreover, we were interested in exploring the differences (if any) between the processes developed by academics from *Universidad de la República* (Udelar) and those from practitioners of teacher training from *Centro Regional de Profesores del Centro* (CeRPC), exploring significant integration of technologies into teaching and teaching innovation.

Previous research (Ertmer & Ottenbreit-Leftwich, 2010; Alonso & Gewerc, 2015) highlights the absence of high levels of effective technology use and significant changes in the practices with DT even when they are developed in environments with high technological availability. In line with these findings, teacher training is considered to be the anchoring point of any innovation proposal that implies a genuine incorporation of DT.

EAR (Carr & Kemmis, 1986; Elliot, 1991) has a strong tradition in promoting teachers as researchers of their own teaching practices for educational change. Latin American education owns an important critical pedagogy school, in which Paulo Freire (1969; 1970) has had an important influence. Latorre-Beltrán (2010) summarises the characteristics of EAR as a participatory, collaborative, democratic and political process based on dialogue, which respects the contributions of all community actors, involving changes that affect people and their organizations.This process is aimed at producing

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improvements in own practices, conceptions and attitudes of the people involved, in particular the teacher and the students. As a reflective practice, it follows a circular and flexible process that includes several phases: planning, action, observation and reflection. In short, it is a systematic process of praxis-oriented learning, which requires monitoring and recording the reflections and evidences of progress, linking theory into practice; in other words, it induces theorizing or building knowledge through practice. For these reasons it is critical and transformative.

An approach to EAR from the perspective of academic PLC could contribute to educator's engagement in action research praxis. This approach has not yet been explored and could subscribe to a broader research agenda on PLC (Hairon, Goh, Siew Kheng Chua & Wang, 2017).

Teachers' learning instances, associated with their daily practice, can be individual (collect information, reflect, find difficulties) or together with colleagues (collaborate, share, participate in extracurricular activities, etc). This learning with others has been conceptualized in various ways and usually described within the framework of communities, particularly of teacher communities, defining different structures in which learning occurs (Vangrieken, Meredith, Packer, & Kyndt, 2017). These authors point out that these communities seem to hold promise in areas wherein traditional forms of teacher's professional development have failed.

Patton & Parker (2017) indicate that educators prefer to work and learn with colleagues and the benefits of this collaboration are well documented. In this sense, DuFour (2004) explains this collaboration that characterizes PLC as a systematic process in which teachers work together to analyse and improve their classroom practice, engaging in an ongoing cycle of questions that promote deep team learning. Hadar & Brody (2010) describe metaphorically as a "symphonic harmony" the process held by the community to achieve their goals through collegial discourse and interaction. Owen (2014) outlines that teacher PLC models are closely aligned to the community of practice literature, as they relate collegiality aspects, practical tasks with a focus on student learning, and being research-oriented for the purposes of improving practice. She emphasises that beyond student learning, teacher professional learning through collaboration is a paramount feature. Avidov-Ungar (2018) expresses that PLCs have been found as an effective strategy for improving teachers' capacities and promoting their long-term professional development, while reducing the physical and psychological barriers of isolation between colleagues.

EAR and academic PLC may be benefited and strengthened from an open perspective, integrating two areas of the open movement: OS and OEP. The combination results in an EAR approach that integrates the communal dimension of academic PLC and openness in research activity with OEP. This fusion of approaches to educational practice and research has not been explored either.

Frameworks have been established that address the analysis of OEP and the way in which academic staff integrate them into their teaching practices. Cronin & MacLaren (2018) perform a very exhaustive review of the evolution of the concept of OEP, including the integration of perspectives from Europe to the so-called Global South and based on an analysis of the state of the art on empirical studies about OEP for 10 years (2007–2017). They identify three major categories in OEP: a) OEP studies that specifically focus on practices and policies that support the creation, use and re-use of open educational resources (OER); b) studies that go beyond a focus on OER-related activities and, in some cases, recommend considering OEP separately from OER; c) highly contextualized studies, with a conceptual use of the OEP that precedes and then leads to a later use of OER.

However, a broader perspective on OEP (Cronin, 2018) allows identifying four dimensions: balancing privacy and openness, developing digital literacies, valuing social learning, and challenging traditional teaching role expectations, where the use of OEP by educators is complex, personal, contextual and continually negotiated. This new conceptualization on OEP guides towards an

approach centered on an open, collaborative and critical practice, which connects very well and also strengthens EAR, academic PLC and OS approaches.

OS proposes all stages of scientific work to be transparent, widely collaborative and accessible. As part of the broader Open Movement, OS incorporates human values such as diversity, inclusion, equity, responsibility and ethics («Open Science MOOC», n.d.) Working in an open way can make scientific practice more effective, and greatly increase the range and extension of knowledge and its access, encouraging research areas for the benefit of the public. Making OS the dominant paradigm for scientific practice becomes a new narrative (Lancaster, Thessen, & Virapongse, 2018).

OS is characterized by the openness not only of publications (Open Access), but also of research data, methodologies, processes and the involvement of citizens in a responsible research and innovation environment. It is about making available in digital format the process and results of research financed with public funds for the scientific community that produces them, as well as for the society in general that finances them, enhancing the reproducibility of science and the appropriation of its results.

This kind of values align with those driven by critical pedagogy (Giroux, 1988) and open education (Farrow, 2017), and it is a challenge to include these perspectives in the field of educational research.

Faced with this challenge, and considering teachers as researchers of their own teaching practices, it is necessary to develop competences related to OS which means, among other aspects, professional behaviour of the researcher, citizen science, learn how to interact with citizens, including the way to communicate with other interested parties that are not members of the scientific and / or academic community, to achieve better user participation and the dissemination of research results (O'Carroll et al., 2017).

In Latin America, an open approach to science could contribute to sustainable development in a variety of social, economic and political contexts, and a critical approach on OS is necessarily focused on how to address social challenges or equip citizens to access their rights (Albornoz, 2019). However, there are still few OS initiatives, with some experiences in Brazil, Colombia and Mexico (Ramírez-Montoya & García-Peñalvo, 2018).

Capacity development and building communities are priorities for the Latin American region to foster OEP, and a strategic approach for OEP in higher education is "one designed around achievable, local aspirational realities, coupled with opportunities for professional learning and support" (Stagg, 2017, p. 370). This led to a vision of the development of OS centered on action research and communities, driven by teacher professional development strategies connected to OEP.

In the next sections we describe PRAXIS research design which combines the aforementioned approaches, and some of the key factors that influenced the deepening of OEP and OS, focusing on the processes developed in the academic community #PraxisUdelar. We present and discuss the results of this academic PLC using Social Network Analysis (SNA), showing the impacts of this design on strengthening reflective practice. Finally, we report an application in progress centered on the redesign of teacher training as a new step towards educational change.

Methods

The methodological research design of PRAXIS Project corresponds to an EAR model (Carr & Kemmis, 1986; Elliot 1991) situated within the communities of practice framework (Wenger, 1998). According to a flexible design, the OEP perspective (Cronin, 2017) emerged throughout the development of the action research, which at the same time allowed the generation of OS practices (O'Carroll et al., 2017).

Developing EAR: conformation of academic PLC and burgeoning OEP and OS

#PraxisUdelar community involved 30 senior and early career university educators from very diverse disciplines, such as natural sciences, health, social sciences, engineering and art. They applied to participate on a three months teacher training course named "Analysis of teacher practices with digital technologies", whose purpose was to develop the academic PLC #PraxisUdelar (Czerwonogora & Rodés, 2019). The course proposed specific goals, aligned with those of the project: 1) develop action research processes within the framework of learning communities, favouring the reflection on teaching practices; 2) on the basis of the analysis of practices, collectively identify the institutional conditions of the teachers that effectively integrate DT and how DT are incorporated in the university classroom and in virtual environments; what is the impact they have on teaching practices; 3) devise, design and implement initiatives to improve and transform teaching practices with DT, contributing to achieve a meaningful integration.

The educators were invited to join PRAXIS research from a personal perspective, experiencing the work within a learning community, reviewing and transforming their teaching practices and analysing the experience framed by an action research process. The course syllabus was organized in three modules: identification, reflection and transformation of teaching practices with DT. A blended design was implemented, alternating face to face group meetings (Figure 1) and reflective writing-blog posts with peer comments in an academic social network.

Figure 1: One of the face to face group meetings of #PraxisUdelar community.

At the same time, the PRAXIS coordinating team developed OEP strategies, by opening to the interested public the team work sessions originally planned as internal seminars, deepening the OEP approach towards the incorporation of OS practices. These sessions were transformed to open

webinars developed using free software BigBlueButton (Figure 2); they involved the participation of the uruguayan team and also collaborators from abroad.

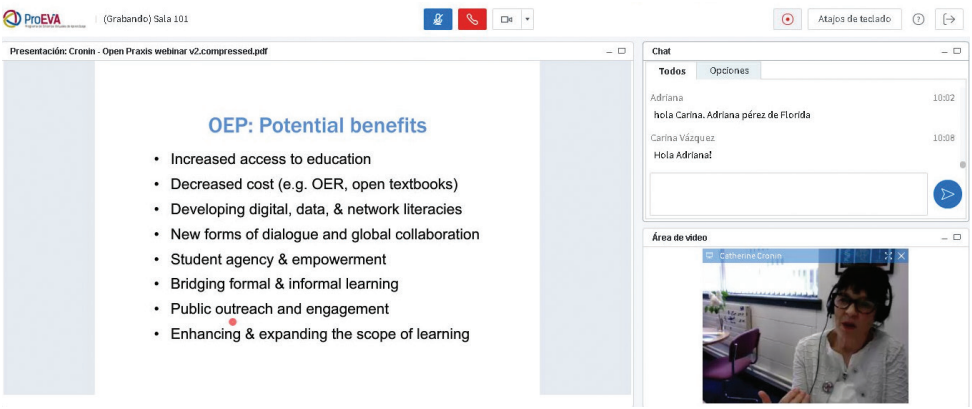

Figure 2: BigBlueButton capture of one of the open webinars of the project, with C. Cronin.

The open webinars (five in total) had an important impact on the communities of practice of the project and also on the educational sector in Uruguay, and went beyond the limits of the project, spreading the benefits of OEP and OS. They were: "Practice and reflection: an inseparable binomial" (part a, b), "Management of Learning Communities with Social Networks", "Digital Technologies: Presences and Absences in teacher training in Uruguay", "Open Educational Practices in higher education: practical and critical approaches", and "Closing the work of communities of learning and practice". This last webinar was the closure of the learning communities both at the Udelar and CeRP-C (June 20) in which the results, reflections, impressions and experiences achieved during the process were openly shared.

Gathering data methods: recording reflections and evidence of progress

In table 1 we present the details of the course syllabus and the proposed activities. A variety of instruments oriented to (self) reflect on the teaching practices were designed:

- a rubric for the observation of teaching practices with DT, based on the DIGCOMP framework (Ferrari, 2013) and the Technology Integration Matrix (TIM) (https://fcit.usf.edu/matrix/matrix/) for pair-group work, with crossed observation of online / recorded and face to face classes;
- a set of self-enquiry questions (Esteve, 2011) to help analyse in depth both the role of teachers and the students' reactions in the classroom;
- analysis of Critical Incidents (Del Mastro & Monereo, 2014);
- "Anatomy of teacher action" (based on Domingo, 2011), to promote and contribute to self reflection on teaching practices with DT.

Table 1. PRAXIS "Analysis of teacher practices with digital technologies" syllabus

Date	Meeting	Module	Activities
Week 1 - April 4	Face to face	**1. Identification of teaching practices with DT**	Introduction to PRAXIS Expectations Identification of practices with DT
Week 2	Academic social network		
Week 3 - April 18	Face to face		Crossed observation of teaching practices with DT (observation rubric) Co-evaluation of teaching practices
Week 4	Academic social network		
Week 5 - May 2	Face to face	**2. Reflection on teaching practices with DT**	Analysis of the observed practices with DT Self-enquiry questions
Week 6	Academic social network		
Week 7- May 16	Face to face		Analysis of Critical Incidents
Week 8	Academic social network		
Week 9 - May 30	Face to face	**3. Transformation of teaching practices with DT**	Teacher thinking and action (Anatomy of teacher action)
Week 10	Academic social network		
Week 11 - June 13	Face to face		Possible strategies for improvement: micro innovations
Week 12 - June 20	Webinar		Open results presentation

All the written exchanges were shared openly in an academic social network based on Elgg free software (Figure 3). This social network includes discussion forums, blogs, micro-blogging in a central space, user profile information, friend lists, an activity screen, personal walls, calendars, bookmarks, and ages. For #PraxisUdelar exchanges we used mainly blogs; in every content uploaded to the platform the participants could select the sharing options, choosing between the following: private, limited, logged users or "all of them". By selecting the last option, the content was fully open to the social network and the Internet.

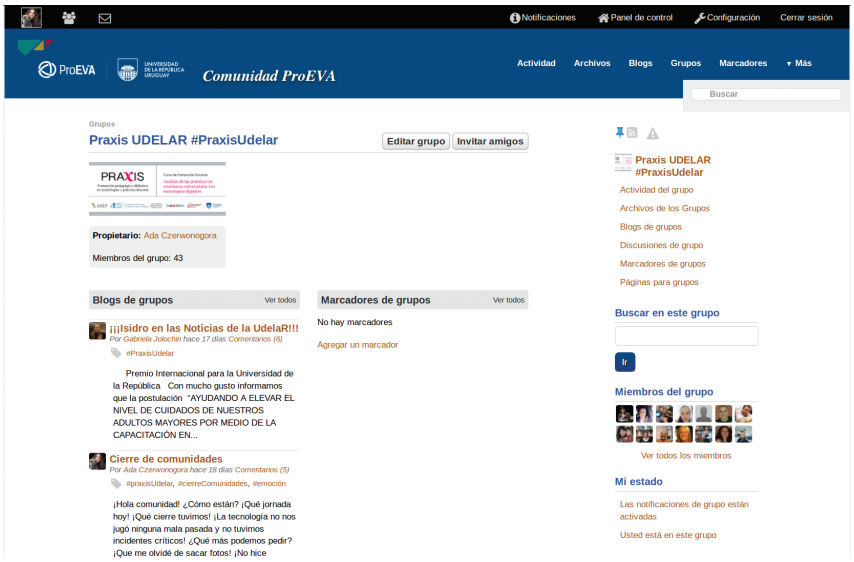

Figure 3: Capture of the #PraxisUdelar space at the academic social network.

Analysis methods: Social Network Analysis

To account the impact of the research design that merged academic PLC, action research, OEP and OS, we opted to develop Social Network Analysis approach (SNA) (Borgatti, Mehra, Brass & Labianca, 2009; Newman, 2018) to analyse the written exchanges extracted from the academic social network, as well as the educator's engagement to examine their personal teaching practices.

As Krebs (2000) points out, social network analysts look at complex human systems as an interconnected system of nodes (people and groups) and ties (relationships and flows), based on algorithms of graph theory. Data from these exchanges were gathered, processed and converted to adjacency matrix to import them to Gephi (Bastian, Heymann & Jacomy, 2009). The graphs and measurements were performed using Gephi 0.9.2. The parameters considered were node centrality and network density.

The centrality addresses the question on which are the most important or central nodes in a network (Newman, 2018). The degree centrality is the simplest centrality measure for a node in a network, defined as the number of edges connected to it. In a directed network each node has two degrees: the in-degree is the number of ingoing edges connected to a node (blog post answers received) and the out-degree is the number of outgoing edges (blog post answers sent). Eigenvector centrality is an extension of degree centrality that measures the influence of a node in the network, but instead of just awarding one point for every network neighbour a node has, it awards a number of points proportional to the centrality scores of the neighbours (Newman, 2018, p. 159). Network density measures how close is the graph to be completed: if we consider the maximum possible number of edges in a simple network, the density of a network is the fraction of those edges that are actually present (Newman, 2018).

Results and analysis

In the #PraxisUdelar community, 127 blog posts that received between 0 and 13 comments were registered along the work period. The total number of comments written on the blogs was 248.

Parameter values obtained from Gephi analysis of the academic social network exchanges are shown in Table 2. The number of nodes connected in the graph augmented from the first until the end of the face to face meetings (June 13), and the same was observed for the number of graph edges. By the time of the webinar closure of the community's work (June 20) both nodes and edges diminished.

Table 2: Parameter values for SNA from Gephi

	April 18	May 2	May 16	May 30	June 13	June 20
Nodes	20	21	23	28	30	21
Edges	49	60	68	104	109	60
Degree	2.45	2.86	2.96	3.71	3.63	2.857
Graph density	0.13	0.14	0.13	0.14	0.13	0.14

As a reflection of a living environment (Gewerc, Montero & Lama, 2014) the #PraxisUdelar network was changing constantly. The graphs allowed to visualise this evolution during the timework of the

community, offering “split second images” of the network. We selected three networks corresponding to three moments from the beginning of #PraxisUdelar on April 4, 2018, that matched with face to face meetings: April 18, May 30 and June 13 (figures 4, 5 and 6, respectively). The last one occurred a few days before the date of closure of communities’ work (webinar, June 20).

In every network, the circles represent the nodes (participants) and their dimensions represent the weight of each node in the graph. The number inside each circle corresponds to the code assigned to each participant for the purposes of visualisation. The edges represent the interactions between participants, considered as responses to posts in the blogs of the participants in the academic social network. The thickness of the edges represents the averaged volume of interactions (weighted degree centrality). The tips of the arrows indicate the average direction of the interactions (who answers / comments to whom). The nodes were coloured following the eigenvector centrality of the network, where the highest values —meaning the most influential nodes— exhibit a deeper tone of blue.

Relationships on the social network started to shape and evolve from the beginning of the course and allowed traceability, identifying movements, contraction and expansion of the nodes within every network represented. Figure 4 shows the graph of accumulated interactions in the community #PraxisUdelar until April 18. It was observed that the removal of the heavier components of the network separately did not cause its disconnection. Besides, the removal of the nodes corresponding to team members of the project (acting as facilitators in the social network, in particular, node 0) did not provoke a significant distortion either.

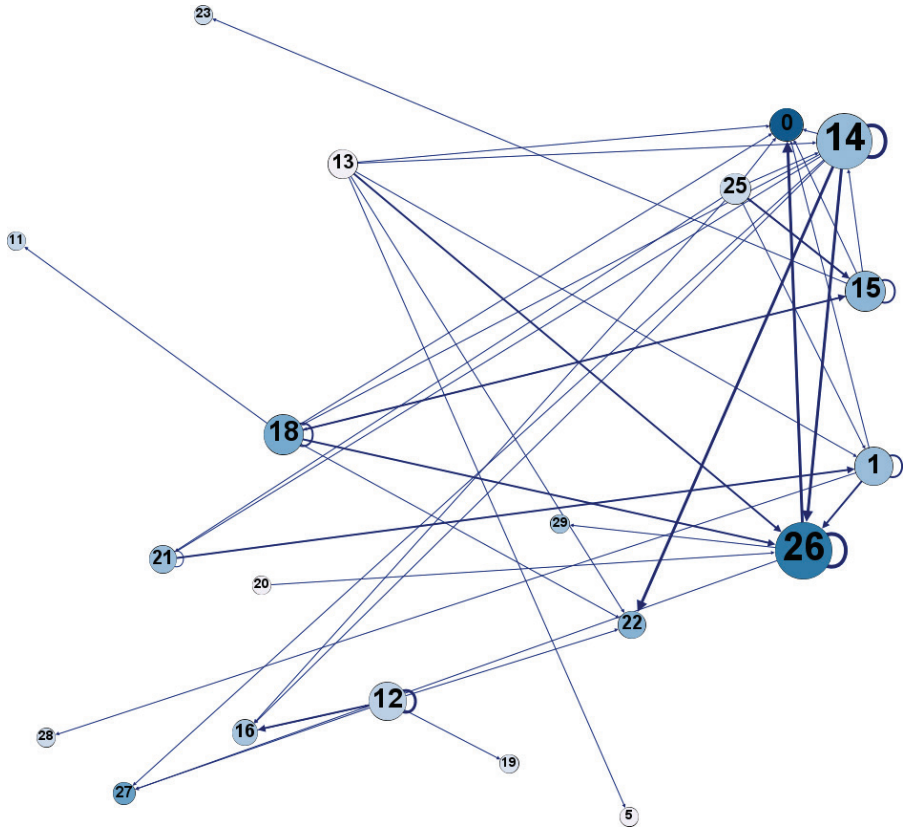

Figure 4: Graph of the community #PraxisUdelar until April 18. The numbers 0, 6 and 27 correspond to research team members of PRAXIS Project.

The interactions of the #PraxisUdelar community accumulated until May 30 are shown in Figure 5. There was a large increase in the number of interactions and the disconnected components of the network diminished. In this case, the removal of node 0, which represents the responsible of energizing the academic social network of the community and a team member of the project, involved the loss of an important part of the interactions, although not the disconnection of the remaining portion of the graph. The observed increase in the blog post comments was a consequence of the "Analysis of Critical Incidents" activity developed during May 16 meeting.

Critical Incidents are "events bounded in time and space, unexpected and challenging, that when overcoming a certain emotional threshold, put in crisis or destabilize the teacher; to regain control they may require the review of their own professional identity "(Del Mastro & Monereo, 2014, p. 6).

This encounter constituted an inflexion point for the #PraxisUdelar community: on one hand, the research team remembered the participants (and emphasised) on the significance of the cross-blog postings on the academic social network, both to #PraxisUdelar community and to the research project itself, in order to document the process, share ideas with peers and contribute towards the collaborative construction of the community. On the other hand, the openness of the academic social network and the relevance of OEP were discussed, drawing attention to their repercussion on collaboration and sharing practices, and encouraging OS as a new cultural narrative (Lancaster et al., 2018). It's worth to mention that the majority of the total blog posts of #PraxisUdelar community were shared openly in the platform (and in the Internet) selecting the option "all of them" (83%).

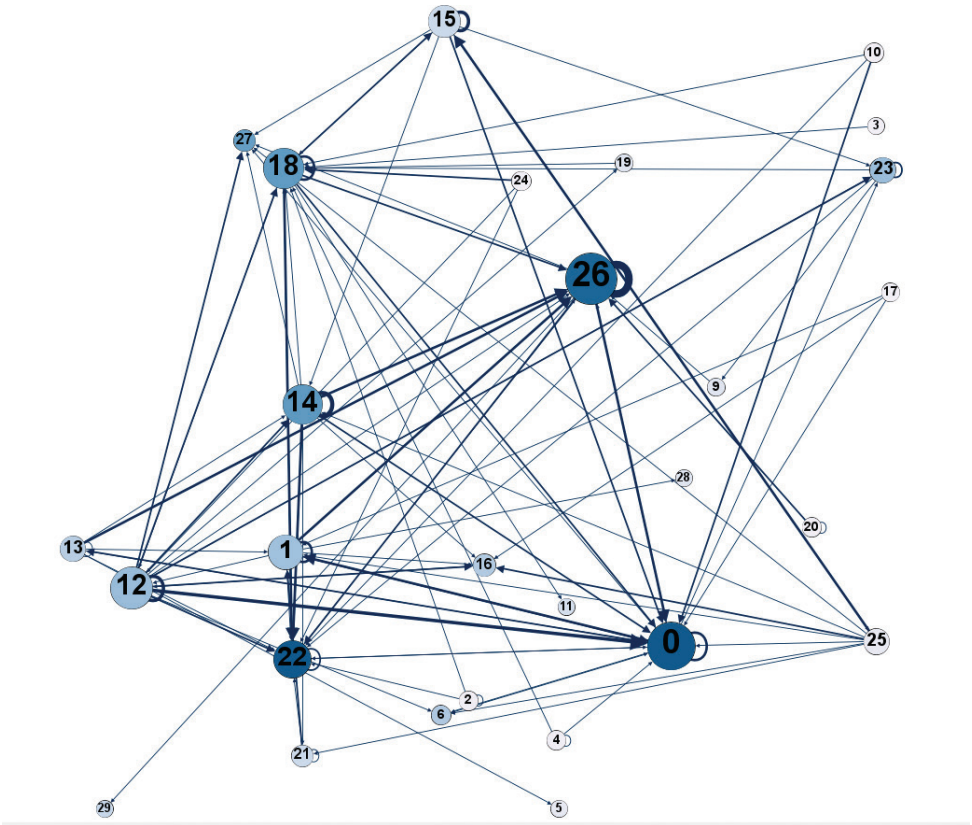

Figure 5: Graph of the #PraxisUdelar community until May 30. The numbers 0, 6 and 27 correspond to research team members of PRAXIS Project.

From May 16 onwards, the written exchanges augmented substantively. The posted narratives regarding the Critical Incidents experienced by the participants and the solutions they implemented to solve them revealed that the adoption of a particular technology (e.g. wikis) triggered diverse topics: difficulties related to new teaching contexts and possibilities to share information, the ethics of the digital world, authorship, collaboration, participation, how to exercise the role of student in new and changing digital environments. It's remarkable that the proposed solutions to overcome these Critical Incidents did not imply the abandonment of DT but the transformation of its use and the training in digital literacies to address them better.

Figure 6 presents the network of cumulative total of interactions until the last face to face community encounter (June 13). The edges represent the interactions accumulated up to that moment, that is, they reflect the exchanges made in the social network throughout the entire experience. This network captures the second climax of the community: working with the "Anatomy of teacher action" instrument on May 30 (face to face meeting) and the written reflections and exchanges on this activity, posted from May 30 until June 13.

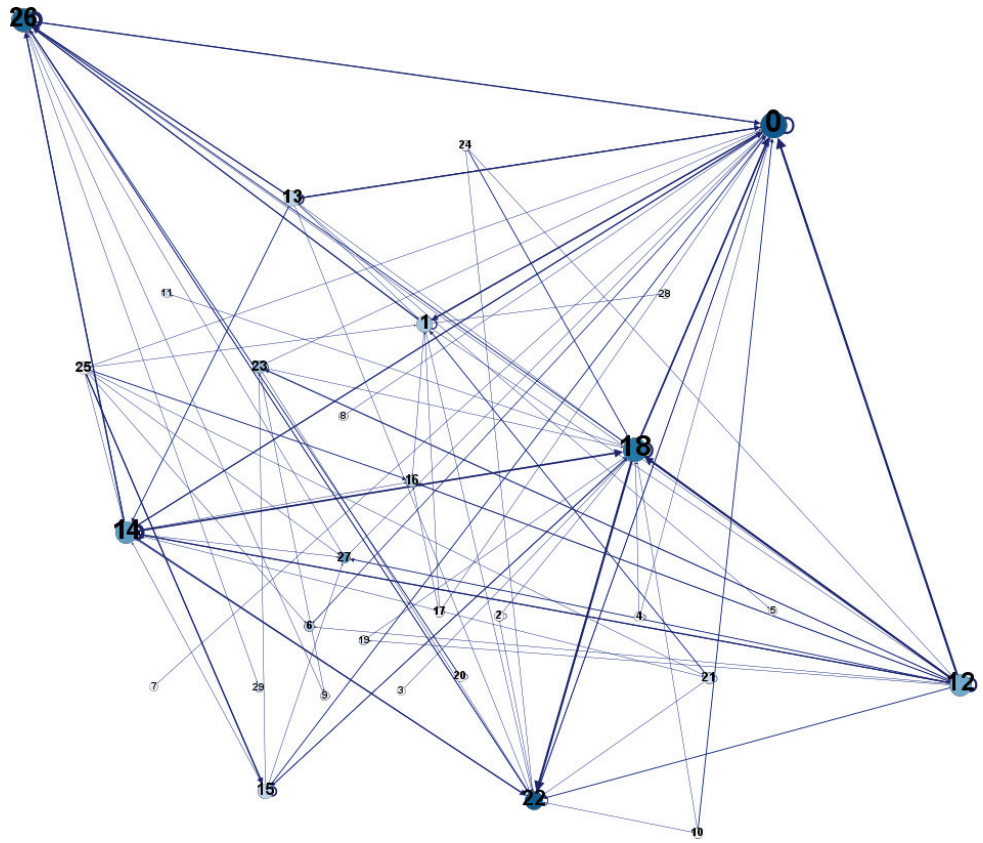

Figure 6: Graph of the community #PraxisUdelar until June 13. The numbers 0, 6 and 27 correspond to research team members of PRAXIS Project.

The "Anatomy of teacher action" considered five dimensions at play in the teacher thinking and action: 1) Implicit theories; 2) Teacher culture; 3) Emotions and feelings; 4) Professional ethics; 5) Professional development. In the face to face meeting, after a brief theoretical introduction of each dimension, we worked in groups (Figure 7), that had to locate each dimension in a teacher's silhouette, according to their interpretation. The teams proposed very interesting analogies to represent the dimensions as

elements of the teacher's body: the implicit theories were placed on the skin, alluding to the fact that this is the largest organ of the body; the academic culture was located in the stomach, "because the content of that organ actually comes from outside" and works as a place for processing; professional development was situated in the thumb, on one hand, as a symbol of the development of the humanity associated with its ability to manipulate utensils and on the other hand, in reference to Thumbelina from Serres (2013) mentioning the incorporation of technology. In addition, the participants pointed out the ethic as a foundation on which they placed the professional development. They mentioned the balance between the dimensions, their interaction and modification over time, and that the evolution of one of them generated changes in the others (Czerwonogora & Rodés, 2019).

Figure 7: Anatomy of teacher action (teamwork).

The teamwork on the "Anatomy of teacher action" was discussed and analised in plenary. These ideas were recovered individually and shared in blog posts in the social network. We proposed to center the reflection on three dimensions of the anatomy to focus the transformations, and select one of them to incorporate micro innovations involving DT. The individual work of the participants generated highly creative productions in the graphic representation of the anatomy, with a very high level of self reflection which, in turn, triggered intense exchange and discussion in the platform.

By the time of the last community's face to face meeting (June 13, figure 6), all the nodes were found connected in the graph. The greater weight (larger circles) of the nodes observed correspond to those teachers who led the exchanges (nodes 12, 14, 18, 22, 26). The removal of any of these nodes individually did not provoke disconnection in the graph, as was indicated for previous moments of visualisation. Among the significant nodes was also included the teacher responsible of dynamising the community (node 0).

Table 3 presents the evolution of the eigenvector centrality values for these nodes, that exhibit the deeper tones of blue in the graph (figure 6). Their distribution seems to "frame" the network, suggesting a "distributed power" in the community relations. Furthermore, it should be taken into consideration that not all the node's neighbours are necessarily equivalent and a node's importance in the network might be increased by having connections to other nodes that are themselves important.

For example, the connection from node 14 to node 18 exerts more influence on the eigenvector centrality of the latter than its connection with node 24.

The last column of table 3 presents the accumulated weighted degree centrality for the period (April 4-June 13). Node 18 deserves special attention because reveals the highest participant value, only surpassed by node 0. Its place in the network suggest an emergent leader role, that operated in collaboration with a small group of peers, incorporating the whole group into the discussion. This specific group of teachers were very proactive to participation and generated thoughtful exchanges with all their colleagues, who gave feedback on the ideas presented. They provoked and inspired the peers to engage them in the conversation.

Table 3: Eigenvector centrality (between 0 and 1) and weighted centrality for selected participants of #PraxisUdelar

Node ID	April 18	May 2	May 16	May 30	June 13	Weighted centrality
0	1	1	1	1	1	53
12	0.211	0.10	0.07	0.35	0.48	40
14	0.36	0.18	0.22	0.59	0.58	42
18	0.48	0.22	0.16	0.58	0.82	46
22	0.42	0.28	0.29	1	0.99	29
26	0.79	0.90	0.92	0.92	0.92	43

On the closing webinar of the communities, #PraxisUdelar participants highlighted that "the most important thing was the community work, sharing, seeing what did colleagues from so diverse disciplines do with regard to DT". The learning community provoked "... thinking in my teaching practice and establish the sense of every action; answering the question: what's the purpose of

all these things that I'm doing in this course? When these actions are foundational elements of my teaching practices, they remain because they have a function and utility".

The academic PLC led to the transformation of the participants: "In me there was a transformation, from the point of view that I am capable to identify the need, to find the tools that best fit the response, and to identify if the tool that I chose, was really useful for the objectives that I set for myself".

The community allowed "to open up, to give my colleagues confidence, empathy, maybe also some catharsis, because I felt that the things that happened to me happened to everyone else, and at the end you realise of concepts like collaborative learning and all that kind of things. That's what really happened to me here. I learned a lot from the experiences of other colleagues."

In Wenger, McDermott and Snyder words (2002, p. 115), #PraxisUdelar might be defined as a "distributed community", in the sense that did not rely on face to face meetings as its primary vehicle for connecting participants. The term "distributed" also highlights the multiple dimensions of distance to bridge. Although it might had been a limitation, participants expressed that the exchanges through the social network operated as opportunities to deepen self and shared reflections and knowledge. They also mentioned the chance to "...craft intimacy—close interactions around shared problems and a sense of commonality" (Wenger et al., 2002, p. 122).

With the reflection on the teaching practices with DT as a common goal, this task-based community (Riel & Polin, 2004) benefited from the diversity within individual members (e.g. multiple disciplines) and had more access to different and alternative perspectives that emerged during the community work, collaborating to find solutions or ideas that might not be available to groups with more in common.

#PraxisUdelar community allowed to open up and develop colleagues' confidence and empathy, realising of concepts like collaborative and open learning. The virtual interactions of this community allude to the influence of social presence (Garrison, Anderson, & Archer, 2000, p. 94; Garrison & Anderson, 2005), understood as the ability of participants in a community to "... project themselves socially and emotionally as "real" people (that is, their full personality), through the means of communication in use". The participants generated bonds that reflected trust and their written interactions expressed an affectionate and open communication with their colleagues, which contributed to the group's cohesion. In this task, the aid of those participants who appear with greater weight in the graphs was relevant, as well the dynamising role of the coordination team promoting the emergence of OEP. Whitcomb, Borko and Liston (2009) mention that respect and trust are essential for a productive PLC. In a safe and supportive environment, teachers are more likely to take risks and engage in challenging discussions that push them to deepen understanding and attempt new practices: micro innovations find a more fertile substrate to emerge and be shared.

Conclusions and future work

Key findings of PRAXIS Project emphasise the impact of combining OEP, OS, academic PLC approaches, and collaborative and participatory technologies as capital strategies for the transformation of teaching and educational research practices. This fusion generated an innovative and critical EAR approach joining the communal dimension of academic PLC with an open perspective that favoured the building of OEP and OS competences through the evolution of educational research practices.

This innovative approach has not yet been explored until the present research. The success achieved by PRAXIS Project showed the strengths of this framework for developing reflective

practices, teacher's engagement in educational research and OEP and OS adoption. This framework will require the development of new experiences to be tested and validated in new contexts and communities.

As a way to start achieving this goal and based on the previous experience, a new EAR project called PRAXIS 2 (now in progress) proposes to deepen PRAXIS framework, following and expanding its design, attending teacher professional development for teacher trainers. The study is centered in the conformation of a new community integrated by teacher trainers from the CeRP, including didactic teachers and teachers of specific disciplines from different areas in Natural Sciences, Social Sciences, Maths and Language.

This research project proposes to promote teaching practices with DT pointing to their genuine integration in different training levels. PRAXIS 2 started from an initial diagnosis of teacher trainers' practices and intends to intervene through a tailored formative plan. For this reason, we expect to generate micro innovations destinated not only to teacher training students but also High School students, final subjects of these practices. Besides, due to the OEP included in the framework, PRAXIS 2 will seek to share and build collaboratively among peers, reaching other communities to inspire significant changes.

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