In Search Of An Elusive Object: Interdisciplinary Teaching In Secondary School From The Teaching Perspective

Auinger, Andreas,
Technical University of Munich, Germany

Abstract

Although interdisciplinary education (EID) constitutes a component that is omnipresent in the educational reform initiatives in Argentina, little is known about its translation for the real school environment. This article seeks to explore the implementation of EID in educational centers of medium education from the perspective of two teachers, focusing on shared meanings when using curricular and didactic constructs to place this teaching in practice. This search is based on interviews with professors responsible for interdisciplinary curricular spaces in three educational centers of medical education in the city of Buenos Aires. The article explains the ways in which teachers use their repertoire of practical knowledge available to make sense of the urgency of EID and discover that their didactic and curricular constructions lead to a set of specific material and symbolic conditions.

Keywords: interdisciplinary teaching; curricular integration; medium ensino ; teaching practices.

1. Introduction

As in several countries around the world, in Argentina there has been a certain consensus for decades that the organization of secondary school responds to a purpose and a historical context that do not correspond to the function that is

assigned to this level today. educational nor with the characteristics of the social, cultural and economic environment that surrounds it. Conceived in their founding stage to house a training proposal designed to prepare a few for entry to university, the curriculum and organizational model of secondary level educational centers configure schooling conditions that limit the expansion of access and impose difficulties for the fluid transit of all young people throughout the level (Terigi, 2016).

Heir to the encyclopedist tradition, the Argentine secondary level curriculum carries a mark of identity in the organization of knowledge, based on compartmentalized disciplines. This is reflected, in turn, in the organization of teaching work (by modules or teaching hours) and in their training (disciplinary), and together they make up a hard core that is strongly rooted in the school culture (Terigi, 2008) .

As an expression of the consensus about the need to transform secondary education centers (EID), proposals to introduce instances of interdisciplinary teaching in their curriculum abound among federal and subnational reform initiatives. Although interdisciplinarity in teaching does not designate a pedagogical novelty, it is promoted through statements about the importance of student-centered education, as part of concerns for social justice, and it has regained strength especially with discourses about need to prepare new generations to face the challenges of the 21st century (Pountney and McPhail, 2017).

Both interdisciplinarity and interdisciplinary teaching have been the subject of conceptual developments, theoretical discussions and empirical work throughout the history of knowledge, although the topic has regained special momentum since 1971 through the OECD (Klein, 1990 ; Chettiparamb , 2007). In this work we

distinguish, with <u>Lenoir (1997)</u>, between scientific and academic interdisciplinarity, to concentrate on the latter. We adopt the conceptualization proposed by Lenoir as a theoretical definition of EID: "the interrelation between two or more school disciplines exercised at the curricular, didactic and pedagogical level, which results in the establishment of links of complementarity, cooperation, interpenetration, or reciprocal actions between diverse aspects of the curriculum (subjects, concepts, learning methodologies, technical skills) in order to promote the integration of learning and knowledge by students" (1997, p. 105, the translation is ours).

In this article we present results of the exploratory stage of a research that seeks to study the implementation of interdisciplinary teaching (EID) in the school field in the City of Buenos Aires. From an interpretive tradition, framework research attempts to understand the ways in which school actors do EID, both inside and outside the classroom situation. To this end, it investigates the implementation of integrated curricular spaces in secondary public educational centers affected by an initiative ("Secondary of the Future") that, among other modifications, introduces into the time grid a set of interdisciplinary curricular spaces ("spaces EID", hereinafter), which we operationally define as those that seek to articulate content from more than one disciplinary subject and in which two or more teachers attend different disciplinary subjects in the teaching situation.

Specifically, the data collected in a series of interviews carried out with teachers of EID spaces in secondary schools are analyzed here. The questions that guided the research are: In what ways do teachers interpret the EID mandate and what shared meanings are put into play in this process? How are these meanings related to the didactic constructions that they refer to carrying out regarding EID? And in what

ways do teachers signify the curricular constructions carried out in the name of EID?

2. **Background**

The international research background on interdisciplinary teaching at the secondary level is concentrated in English- and French-speaking countries, and addresses some recurring thematic axes. A first group analyzes the teaching proposals themselves, applying or developing different versions of a continuum of levels of integration of the disciplines to describe them in their curricular structure and, in some cases, in their didactic specificity (Woodbury, 1998; Boix et al . al., 2000 ; Applebee et al., 2007 ; Clausen and Drake, 2010 ; Baillat and Niclot, 2010).

Another group of studies places the focus on students, with research questions about their levels of acquired learning or understanding (Miller, 1997 ; Budgen et al., 2001), as well as other outcomes such as interest, motivation, and motivation. participation (Levstik, 1986).

The research belonging to a third group of studies adopts a more explanatory tenor, seeking to identify those factors that condition the implementation of interdisciplinary teaching, such as time, teacher training, support from management teams, among others (Probart et al., 1997 ; Howe and Bell, 1998 ; Rodríguez and Miñana, 2010).

Finally, another important group of studies focuses on teachers, from a concern for the way in which interdisciplinary teaching mobilizes subjective and inter-subjective aspects of the work of teachers mostly trained in disciplinary knowledge. They inquire about their perceptions about the connections between disciplines and the purpose of their task in general (Yates, 1990 ; Naidoo, 2010 ; Lam et al., 2013 ; Hasni et al., 2015); as well as about their experiences in

collective planning and teaching processes (Gunn and King, 2003 ; Shibley, 2006 ; Havnes, 2009 ; Baillat et al., 2010 ; Pharo et al., 2014).

Given the scarcity of studies on the subject in the Argentine context, we adopted an exploratory approach that seeks to obtain a description of the implementation of the EID through the different thematic axes mentioned. In this particular article, we seek to enrich the corpus of studies belonging to the first and fourth groups, since we approach the understanding of the curricular and didactic constructions that make up EID, from the perspective of teachers.

3. Theoretical framework

The theoretical contributions that we combine in order to achieve the objectives of the research are based on a general sensitivity inspired by the perspective of Actor-Network Theory (ANT) (Latour , 2008 ; Law, 1992). We start from a skepticism towards grand explanations of the social (Baiocchi et al, 2013), which suggests replacing them with the task of "reassembling the social", accounting for the existence of phenomena in a performative rather than ostensive way. That is, we seek, through empirical research, to trace the elements that come together in the implementation of the EID, and in this way they do it.

This general approach to social knowledge is especially fertile for addressing an object such as EID at the secondary level. This openness turns out to be essential when studying an "elusive" object, since its specificity lies partly in its attempt to break with different naturalized limits of school functioning: the organization of knowledge, times and spaces, groupings between students, teaching work and pedagogical leadership, just to mention a few.

From this sensitivity as a starting point, we define "enactment" as an object of study following the proposal of Ball et al. (2012) , who propose an approach that

goes beyond studies on the "implementation" of policies, thus seeking to move away from normative analyzes that attempt to verify the correspondence between what happens in educational centers and what the policy prescribes.

In the "implementation" of educational policies, "contextual, historical, and psychosocial dynamics are combined in a relationship with texts and imperatives to produce actions and activities that are policies" (2012, p. 71, italics are ours).), which are embedded in already existing power relations and modify them (or not). With this focus on the investigation of phenomena of the order of doing, the contributions of Ball and his colleagues bring the performative sensitivity of ANT to the specific study of the school space.

Thus, in line with what the authors propose, we seek to account for this creative work carried out by school actors in dialogue with the imperative of EID in their situated realities. In effect, we understand that there is in teaching practices, the central core of our object of study, something of the order of creation. Our work understands, with <u>Falconi (2015)</u> , that in teaching practices there is something that is resolved, that is managed, that is processed: in other words, there is a construction. For purely analytical purposes and inspired by the research background, we identified two major dimensions of these constructions: the curricular, as an expression of the selection and sequencing of knowledge embedded in the teaching proposal; and didactics, as a set of activities proposed for teaching this knowledge.

In particular, in this article we will seek to approach the knowledge of the interpretive processes carried out, around the EID, by teachers as leading actors in its implementation.

The focus on objects of this nature invites us to incorporate the contributions of the micro-sociologies of cognition and social interaction as threads of the theoretical framework that we have been describing. In fact, it is possible to justify the specific concern of this article based on the assumption – typical of Blumer's symbolic interactionism (1982) – that the actions carried out as part of this creative work are defined according to the meanings that they assign to them. the same EID, and that these are negotiated and modified through the same processes of interpretation. Together with Blumer, Schutz's phenomenology (1974) shares with us the pragmatic sensitivity of ANT and provides a description language sensitive to the particularity of symbolic construction processes as objects of study. We understand the implementation of EID as a microorder that results from the dynamic intersection between the subjective projects of the different school actors and the understanding that they develop about the objects to which they give relevance. We will seek to account for this understanding by identifying the typing processes that teachers carry out when interpreting their task around EID, identifying the ways in which they deploy part of their "stock of knowledge available at hand" when typing. We will understand them as readers of a mandate, and therefore as sites of production of meanings around it (Ball et al., 2012); and active builders of specific curricular and pedagogical configurations in response to this.

In this way, with this article we contribute to the re-assembly of the network of meanings involved in the implementation of the EID, giving an account of the ways in which the curricular and didactic constructions carried out by teachers in response to the imperative of EID make sense in dialogue with a set of material

and symbolic conditions, some situational and others inscribed in the long duration of school cultures (Chartier, 2002).

4. **Methodology**

We present the results of an exploratory research carried out through ethnographic techniques. In particular, we analyzed a corpus of ten semi-structured interviews, carried out between July and August 2020 as part of the exploratory instance of our research. We interviewed teachers who were or had been in charge of interdisciplinary curricular spaces in state-run secondary schools under the "Secondary of the Future" program of the City of Buenos Aires. They were questioned with broad questions about a diverse set of dimensions that sought to address the different axes addressed by the previous research: the curriculum of the EID space, the pedagogical strategies deployed there, the planning instances among teachers, and the perceptions about the contributions or disadvantages that teachers attributed to these spaces. In this way, the unit of analysis was the teachers' oral statements.

In this exploratory instance, the interviewees were selected using the "snowball" technique, starting from two teachers whom we accessed through acquaintances. A group of interviewees was formed who work in three different educational centers, which together are in charge of a diversity of subjects, and who participate in spaces corresponding to also diverse curricular areas, and even spaces that combine areas.

Due to the preventive and mandatory social isolation that was in effect (due to the covid-19 pandemic) at the time of the interviews, and also taking advantage of the familiarity that the teachers had acquired with the corresponding software, the interviews were carried out by video call. . Only in one case (Raquel) was the

interview conducted by telephone. In most cases, there were good levels of connection that made it possible to achieve fluid communication, and it was possible to access elements of non-verbal communication (such as gestures and other facial expressions) so that the means by which the interviews did not result in major limitations.

With the authorization of the interviewees and having guaranteed their anonymity, the interviews were recorded and transcribed. An open coding process was carried out on the recorded data (Strauss and Corbin, 2002), assisted by the Atlas.ti software (version 7.5.4), based on the constant comparison between different portions of the transcripts, between different cases, educational centers and disciplines involved. Thus, first sets of codes very close to the data were generated, attempting to summarize, describe, and define them, recovering in the process the native categories that appeared to be significant for understanding our object of study, as in vivo codes. This was followed by successive and iterative instances of "cleaning" the codes, through grouping and classification. After these processes, taking into account the questions that guide this article, the fragments linked to the following three topics were selected:

1. The ways in which teachers define what EID spaces consist of (family of codes "EID space definition").

2. The relationships established between these definitions and the didactic constructions that they carry out or are expected to carry out within the framework of those spaces (family of codes "Didactic constructions").

3. The ways in which they account for the relationships they build between the different disciplinary subjects in the EID spaces (family of codes "Curriculum constructions").

Based on this thematic selection, a second round of open and axial coding was carried out, which sought to identify recurring meanings as a central task towards achieving the proposed objectives.

4.1 About case selection

To select the people interviewed, we sought to ensure that they worked in educational centers affected by the "Secondary of the Future" (SF) program. SF is an initiative of the Government of the City of Buenos Aires that introduces modifications in the evaluation and grading regime, in the curricular organization of teaching, and provides furniture and technological equipment. With regard to curricular organization, spaces for articulation between disciplines are introduced that involve the joint and simultaneous work of teachers of different subjects.

For the development of each areal space, SF assigns two additional hours to each teacher involved, destined for joint planning. One hour is also added for each first-year section in which each teacher works, so that they can share teaching with another teacher. In practice, this results in a modification of the curricular framework for the first years of the level, where the subjects with the most workload "give up" a lecture hour in which the same teacher develops the integrated project together with teachers from other areas. The example of time distribution provided by Austral et al. (2019) illustrates this point (Table 1).

Table 1. Example of hourly distribution of curricular spaces in a first-year section of an educational center with Secondary School of the Future

Hour	Monday	Tuesday	Wednesday	Thursday	Friday
1st	Technologi	Mathematics/Biolo	Ethical	biology	Additional

	c education	gy	and Civic Education		language
2nd	Technologic education	Biology/Mathematics	Ethical and Civic Education	Math	Additional language
3rd	Math	Language and Literature / Additional language / Technological Education	History	Geography	Language and literature
4th	Geography, History / Ethics and Citizenship Training	Arts / Additional language / Technological Education	History	Additional language	Language and literature
5th	Geography, History / Ethics and Citizenship Training	Arts	Math	Additional language	Institutional Definition Space
6th	History / Ethical and	Arts/Additional Language	Math	Language and	biology

	Citizen Training			literature	
7th	History / Ethical and Citizen Training	Institutional Definition Space	Tutorships	Language and literature	biology
Social Sciences and Humanities					
Exact and Natural Sciences					
Communication and Expression					

Source: extracted from Austral et al. (2019, p. 91).

The introduction of these spaces and times implies the collegial construction of interdisciplinary teaching proposals. This involves jointly developing teaching planning. In turn, integrated work between subjects involves working in pairs or pedagogical groups in teaching in front of students, as well as the construction of shared criteria for evaluation and grading. Thus, as concluded by Austral et al. (2019) , with the introduction of these interdisciplinary spaces, SF significantly challenges the dimension of teaching work.

5. **Results**

In this section we present the results organized into the three thematic axes that were listed in the methodological section.

5.1 The definition of the EID space: meanings around the imperative of interdisciplinary teaching

When asked about the nature of the EID space in which they participate, the interviewees repeatedly define it as a "project." The word appears in their testimonies as the central core of the answer to the question of what defines what happens in the EID space. By naming it, teachers assume that there is a common understanding between the interviewer and them about what it means. Now, what do teachers understand by "project"? What attributes do you assign to it in particular when it is an interdisciplinary project? Through the interviews it was possible to identify four main qualities, which we recover below.

Firstly, the idea is shared that these projects must recover and interrelate part of the curricular contents established for the subjects that each interdisciplinary space brings together. The project must arise from the "unification" of these contents (and the joint work of the teachers in charge of the subjects that contain them):

"The teachers that we have in this case school of the future got together in second year to see the program of both Mathematics and Biology. And then see what we can unify." (Natalie)

Beyond this general criterion, there are no specific curricular specifications for these spaces, and it is in this sense that teachers identify the possibility of exercising "academic freedom" when building the project:

"The Ministry never told us where this project had to go. They have given us academic freedom, they have told us 'you build it however you want'. Obviously always related to the curricular designs of their subjects and social sciences" (Fernando).

Thus, a space is opened for creative work, for the original production by teachers of a specific pedagogical-curricular proposal to be developed in the EID space. In fact, in their testimonies the teachers give an account of work, of an effort made collectively for the construction of these projects, which were not given or prescribed by educational policy.

In some cases, as a second quality associated with the idea of "project", it is considered a proposal especially oriented towards students. We say "especially" because it is striking that the teachers make the project's recipients explicit when explaining it ("three or four teachers get together (...) to plan something together for the kids," Cecilia explained), when it is clear that All teaching actions that take place in the educational center are aimed at the students. In the case of the project, there is a special emphasis on achieving "enrichment" for the students ("something that can enrich those first-year students", in Cecilia's words), interesting them ("we had to start thinking about how we were going to do it to carry out, and how we were going to make this interesting and work", according to Alicia), and even entertain him, amuse him or at least not bore him ("it was difficult for us to think about what project could be rich so that the student would not get boring", said Cecilia).

Thirdly, and in line with this need to offer students a meaningful experience, on a didactic level the project is associated with active pedagogies, teaching proposals focused on students, which demand an active and even leading role on their part. . It is based on activities that invite exchange, discussion and production, mostly in groups. Thus, EID is understood as something atypical, disruptive, unconventional; in short, as something "other" than the traditional class. This is how a teacher expressed it:

"It should not be the typical meeting in math class or biology class... For that, it was key to give it another imprint, another format, another proposal, another climate..." (Alicia)

"It is a space for exchange, which is much more flexible, which breaks with that teacher-student structure of the stuffy chair, which creates another link." (Alicia)

In line with its definition as opposed to the traditional class, it is a space that shifts the spotlight from the teachers to the students. In Alicia's words, it is designed as a space where "they are actually the ones who work and we moderate [sic] that work, motivate them, organize them, guide them... But in reality the protagonists have to be them, and we have to be the model of action to follow." Likewise, it is a space in which practical activities predominate (according to Camila, "it ended up being established that it was better, let's say, more practical work with the students, than theory"); group work over individual work. Due to all these characteristics, EID spaces are described as more "relaxed", less "structured", and when evaluating they adopt a "lighter" modality than in disciplinary subjects, in the words of the teachers themselves:

"It is always based on evaluating together, whether with assignments or class participation from this side, it is lighter. But it is still an important subject." (Natalie).

In this way, around the didactic dimension, dichotomous pairs of meanings are put into play in the word teacher that function by marking a distance with the didactics that predominates in traditional curricular spaces. EID spaces are identified with disruptive classes rather than with the "traditional class"; with the teaching of skills before content; with student leadership rather than teaching leadership; with practical work rather than theoretical content; with group work rather than

individual work; with a "relaxed" rather than structured classroom environment; and with evaluation practices close to the conception of formative evaluation, based on assignments, rather than one based on exams.

Likewise, in two of the three curricular spaces investigated, the active role assigned to the students is reflected in the design of a final instruction aimed at the development of a specific product around which it is intended that the students integrate the learning built along the way. . In the case of the Mathematics and Biology space at Center B, the project culminates with the implementation of a Dengue prevention campaign; and in the case of the Social Sciences space in center C, the students were invited to make a hydroponic garden.

Returning to these meanings referring to the level of didactics, the idea of the "workshop" or "workshop format" appears in some testimonies, which seems to condense these attributes:

"We actually try to make it a workshop, not a conventional class. So, it is understood that in a workshop we all play, especially the students." (Graciela, the underlining indicates an emphatic intonation)

The ideas of "project" and, to a lesser extent, "workshop" seem to be condensing a set of meanings that allow us to think of them, from phenomenological language, as those "types" or "classes" that teachers are using to give meaning to the mandate. of the EID. These signifiers are part of the stock or inventory of knowledge shared within the educational community that they use to understand and organize their practices. These are constructs frequently used in the educational field in general, and in the school field in particular; polysemic in the sense that in practice they contain pedagogical proposals of very diverse types, but

certainly associated with a proposal to break with what is understood by traditional subject and class format, as can be seen in the testimonies analyzed.

5.2 New conditions for didactic construction

As addressed in the previous section, a good part of the qualities that teachers associate with the "project" and the "workshop" allude to features of the didactic dimension – that is, that which describes the ways of teaching. In this section we will try to trace the connections that teachers establish between these "other" didactic constructions – in the sense that they are presented as different from those that take place in the disciplinary subjects – and the material and symbolic conditions that govern around the EID spaces. Thus we seek to explore the extent and ways in which these conditions are part of the network of enactment of EID as perceived by teachers.

The didactic configurations that teachers build to give life to the "projects" are presented, in some cases, as responses to mandates of educational policy. Carina indicated that "the methodology is requested to be group," and Camila mentioned having the directive that the space be more "flexible" and "dynamic." Thus, the explicit imperatives of SF are part of the assemblage we study.

Other teachers, like Fernando, explicitly reject having received this type of directive, and instead recognize that the "relaxation" of the space comes almost as an added bonus, from its multi-teacher configuration and the absence of an explicit curricular prescription:

[When asked about the extent to which the type of activities worked on in EID differs from those of the disciplinary subject] "In my case, yes. It's a little different (...) what really changes is that you get together with another teacher who has a very different way of teaching. It's not that the institution tells you 'you have to

change the way you teach class for these hours'. Obviously, it is always requested that they be practical work, that the child be given the tools to… well, what is always required. But not something different from what is required from pedagogy." (Fernando)

From this it is possible to think that, from the introduction of the EID, the correspondence between the disciplinary contents, the disciplinary specialty of the teacher and the time block of the subject - which is constitutive of the secondary level format (Terigi, 2008) – cracks and opens a place to do more of what "is demanded from pedagogy" (in Fernando's words). In fact, it seems to be difficult to specify in traditional subjects because of the curricular prescriptions that define the contents that should be addressed in each one.

With the EID, this difficulty seems to worsen in some subjects and disappear in others. The EID spaces make their way into the already dense set of time-subject boxes, and this implies a double displacement. On the one hand, some subjects lose hours and, with this, their teachers receive pressure to "compress" the curricular contents and cover them in a shorter period of time, or to distribute them between what has been worked on in the subject and in the EID space:

"It is too much for the project to take up two hours per week. The programs, the curricula that they send you from the City Government, are very ambitious" (Carina)

On the other hand, and bordering on the paradoxical, for some teachers, the introduction of a practically "blank" curricular space in terms of curricular prescription enables a contrary movement, of decompression. A liberated, less regulated space is opening up, where, finally, it is possible to do "what is required from pedagogy." It is possible to think of a more "relaxed" proposal, free from the

pressure of program coverage, that takes the necessary time to generate activities corresponding to that "other" format in which the student occupies a more leading role. In fact, Fernando points out this in another fragment of the interview:

"They are a little more relaxed [the EID spaces]. Because many times what we teachers have is that we look at the curricular design and we run a little, "uh, how do we have to finish the curricular design" and we hurry. These are spaces where one becomes calmer. He says "well, I give the contents in my time, and well, here I can relax a little more, debate." It's not that I don't do it in my subject. But this is a space that totally lends itself to that." (Fernando)

The quote exposes a tension between the need to cover the prescribed content and the pedagogical mandate of proposing student-centered activities, in this case exemplified by the idea of "debating" as a type of slogan that enables the bringing into play of opinions. of the students and that allows the topic under debate to be addressed in depth. From Fernando's perspective, the EID seems to enable a space of decompression in terms of the contents that must be addressed: although topics corresponding to the subjects involved must be interrelated, there are no references about the extension of this list of topics and therefore room opens up for "relaxation".

Thus, this kind of "prescriptive liberation" (intentionally oxymoronic expression) that takes place around EID spaces is one of the conditions that enable "other" didactic constructions by teachers, not necessarily new but more present in this type of curricular spaces. This reflects the power that the disciplinary content-specialist teacher-scheduling block compound has when it comes to organizing what happens in secondary school. From this scheme, knowledge occupies a place,

and a very specific place of which the specialist teacher is almost "owner". The EID breaks with this and opens new places for new constructions.

These, in turn, take shape in dialogue with other elements that make up the "network" of implementation of the EID, which deserve to be explored in depth in future research. The interviews allow us to notice a set of objects " prominent" – we rely on phenomenological terminology – by the teachers that allow us to understand the microworld of EID practices: among them, the presence of other teaching colleagues, the availability of time for planning among colleagues. , the set of technological resources made available by the SF, the managerial role and the techno-pedagogical support function fulfilled by the references introduced by the SF.

5.3 The contents of the EID: about the curricular constructions of the teaching teams

The absence of a prescribed curriculum makes EID spaces a site for not only didactic but also curricular construction, since participation in these spaces implies for teachers the task of selecting and interrelating contents of their disciplinary subjects in dialogue with other colleagues, condensing them into an interdisciplinary "project."

The descriptions that teachers create to account for their curricular constructions allow access to some shared meanings through which these tasks are processed daily. Both tasks are new for teachers, whose training is mono-disciplinary and who have rarely had the power to define what to teach in a curricular space.

Metaphorical language is a recurring resource in these descriptive stories. One of the most frequent metaphors attempts to account for the predominance that sometimes occurs on the part of some subject, and to do so it compares the task

shared between teachers to that of a work team where a leader "commands" everyone's task, or to that of a musical group where one member "leads the rhythm" and others "join in", "contribute":

"Look, the truth is that... sometimes one person has more rhythm than the other. Two years ago I was taking the Geography rhythm in my first year, but because of the topics that Geography covers and because of the basis of our project itself." (Cecilia)

"And we did this, and Mathematics was coupled with the proposal made by Biology in general (…). And based on that they could advance behind us, but we always felt that we were the basis for mathematics." (Natalie)

In this last quote the idea of a subject appears as a "base" or "platform" that serves as "support" so that content from another subject is incorporated. This is another recurring image:

"My subject is the support of everyone. Because we see the transformation of space and the transformation that man made in space. And well, without space there is no type of transformation. "So it became the basis of the project." (Carina)

Another frequent metaphor, which appears associated with the role played by Mathematics, is the idea of "tool". In the Mathematics and Biology space of Center A, it is conceived as a resource, a means that "helps" work with certain topics. In contrast, the "raw material" on which this tool is applied would be biology, given that the topic chosen for the development of the project is the Dengue disease:

"Biology for prevention, knowledge of the disease, of the symptoms; and Mathematics as a resource and tool in all areas, helping the interpretation of graphs, the statistical study of the disease." (Alicia)

With different metaphorical figures, these stories convey the idea that, in these areal spaces, one of the subjects tends to occupy a primary role in the project; and the other a secondary one, linked to support, support or complement. In the teachers' story, the distribution and definition of roles is defined as something that "occurs", as they "accommodate", reflecting a process of constant negotiation around those roles that are gradually changing. building as you walk.

In the case of the Mathematics and Biology space at Center B, the teacher attributes it to qualities linked to the personal dispositions, to the "subjectivity" of the teachers in charge.

"Sometimes, you had to agree and stand firm because [the Mathematics teachers] never wanted to carry on the class, because it seemed to them that they did not know about Biology (…). Here there is a lot of subjectivity and of each person, because the same class with another classmate is completely different" (Graciela)

Unlike the previous example, in Graciela's case the alternation of roles is described as a more tense process, which requires overcoming resistance from some teachers:

"We tried to alternate a little, because it was always the Biology class's turn, see? Because it seemed that the project was about Biology and the Mathematics ones were playing by ear, nothing more, that is, a little bit: 'Oh, what can I contribute?', the Mathematics ones always say. Everything, imagine that Mathematics is in everything. But the Mathematics students resisted, so the ones who took most of the classes were the Biology teachers" (Graciela).

Regarding the Communication and Expression space, also in center A, we interviewed a teacher who had not yet found a way to integrate the contents of her subject (French) into the EID space. She then spoke of her attempt to make small

contributions, resorting to the image of introducing "sandwiches" in the development of the planned classes and starring other subjects:

"I can't find, until now, what to say with language. Dresses? Out there, the only way I can get, let's say, to put a sandwich, is to put names of musicians, athletes, what do I know, and ask them to put the word in French, if it's a musician, if it's a painter, if it's a writer. ." (Silvia)

In this case, the difficulty is attributed to the nature of the subject in question (French language), which is considered difficult to integrate with the others. Silvia added: "With language it is very difficult. In other words, the other areas out there are easier to capture. But I haven't found the language yet [the way to do it]."

6. Conclusions

The journey through the data that we present here allowed us to identify some of the components that make up the network for implementing interdisciplinary teaching in secondary school. We list them below.

Firstly, the "project" appeared as a term that ties together a set of meanings available in the inventory of knowledge shared by teachers and, with this, reveals the connections they establish between different elements of the school reality to implement the EID. . Among these elements are the contents of the disciplinary subjects as a substrate for the "unification" that the project must condense; students as recipients and repositories of the meaning of the built projects; and the didactic constructions linked to active pedagogies or the "workshop format", which distance themselves from any other set of meanings associated with the "traditional class".

Secondly, it is possible to interpret these didactic constructions based on their relationship with a set of material and symbolic conditions that the introduction of

EID generates or accentuates. Among them, we explore in particular the cracking of the deep-rooted disciplinary content-specialist teacher-subject time block triangle as a disruption that to some extent enables new didactic constructions more focused on students; although it is clear that other elements make up this set of conditions highlighted by the interviewees when it comes to giving meaning to the didactic constructions of the EID.

Thirdly, we explore the meanings that circulate among teachers about the curricular constructions forged regarding EID. There we identify different ways of accounting for the relationships that can be configured between the contents of the disciplinary subjects. At this point, the use of metaphors stands out to account for the proposed relationships, which are diverse depending on the nature of the disciplines involved, the participating people, among other conditions that also make up the network for implementing the EID and that will be necessary to continue exploring.

7. **Discussion**

This approach to the field allows us to think that EID is not something new for school actors, it does not fall into a vacuum nor is it inserted into school realities in a mechanical and ascetic way. On the contrary, it arrives and is interpreted from known meanings, embedded in the heritage of school cultures and inscribed in its long duration (Chartier, 2002 ; Rockwell, 2010), which guide a creative work from which it is necessarily transformed into another stuff.

At the same time, it implies a break with deeply rooted structures typical of the school matrix. The suspension of some rules such as the exhaustive curricular prescription inevitably opens a space for a construction, a job, a doing on the part of teachers, who on a daily basis must resolve classes in the face of the continuity

of teaching, even when this occurs unimagined ways as through complete virtuality.

This work does not imply spontaneous generation or ex nihilo creation. At the didactic level, he appears informed by what "is required from pedagogy." Discourses very present in the texts and pedagogical guidelines about the importance of provoking students, of placing them in an active role, of demanding from them productions that involve higher order cognitive operations around knowledge (Barrère, 2004) ; that in various ways reach teachers and are part of the repertoire of meanings they have at their disposal to act in these "liberated" spaces that EID introduces. It is these discourses that the teachers evoke in their testimonies when referring to the project, the debate, the research, the practical work, the tangible productions, the training in skills and the idea of students as protagonists.

At the level of curricular construction, another situation seems to unfold. The analysis highlights the abundance of metaphors, rhetorical figures that operate by replacing the concepts represented with different ones that bear a certain similarity to them, to refer to the ways in which teachers articulate or hope to articulate the contents of the different subjects involved. . It is worth asking if, through this replacement operation, metaphors do not appear to make up for the absence of a specific technical language, of a curricular or epistemological nature, that allows describing the relationships between the disciplines that are sought and that actually exist. Teachers deploy a thick repertoire when it comes to naming the workshop format, debate proposals and other didactic forms; and on the contrary, analogous categories corresponding to the field of curricular integration seem to be scarce. There are no distinctions between interdisciplinarity, transdisciplinarity and

other disciplinarities that are the subject of discussion in the epistemological field; nor its curricular translations: the correlated, shared or reconstructed curriculum (Adler and Flihan, 1997). We ask, then, what meanings are available in the repertoire of teaching knowledge about the relationships between disciplines? And in the absence of obvious answers, it is legitimate to ask ourselves: what discourses are available from the epistemology of school knowledge or curriculum studies?

Interdisciplinarity seems to present itself as an amorphous and diffuse object, with elusive meaning, capable of encompassing very diverse curricular practices and translations, which leaves the elaboration of significant constructions to the teaching possibilities. Now: is every form of interdisciplinary teaching valuable? What should happen in an EID space to meet the objectives linked to education "for the 21st century"? If it were possible to answer these questions, it would be possible to state many others for the sphere of educational policy decision-making, among them, what skills and knowledge do teachers need to be guaranteed to give rise to these valuable forms of interdisciplinarity? These are unavoidable questions for a research and action agenda on the issue of teaching at the secondary level.

References

Adler, M. & Flihan, S. (1997). The Interdisciplinary Continuum: Reconciling Theory, Research and Practice . New York.

Applebee, A.N., Adler, M. & Flihan, S. (2007). Interdisciplinary Curricula in Middle and High School Classrooms: Case Studies of Approaches to Curriculum and Instruction. American Educational Research Journal , 44 (4), 1002–1039.

Austral, R., Aguilar, L., Goldenstein Jalif, Y., & Larripa, S. (2019). Secondary School of the Future (CABA). In M. Landau, P. Morello, & A. Santos Souza (Eds.), Institutional concretions of policies for innovation in secondary education in four Argentine jurisdictions (2017-2018). Buenos Aires: Ministry of Education.

Ball, S.J., Maguire, M. & Braun, A. (2012). How schools do policy: Policy enactments in secondary schools. London: Routledge.

Baillat, G. & Niclot, D. (2010). In Search of Interdisciplinarity in Schools in France: From Curriculum to Practice. Issues in Integrative Studies, 28, 170-207.

Baiocchi, G., Graizbord, D. & Rodríguez-Muñiz, M. (2013). Actor-Network Theory and the ethnographic imagination: An exercise in translation. Qualitative Sociology , 36 (4), 323-341. Ball, S., Maguire, M., & Braun, A. (2012). How schools do policy: Policy enactments in secondary schools . London: Routledge.

Barrère, A. (2004). Travailler à l'école: Que font les elèves et les enseignants du secondaire? Rennes: Presses universitaires de Rennes.

Blumer, H. (1982). Symbolic interactionism: perspective and method. Madrid: Time.

Boix, V., Miller, W.C. & Gardner, H. (2000). On Disciplinary Lenses and Interdisciplinary Work. In S. Wineburg & P. Grossman, Interdisciplinary Curriculum: Challenges to Implementation . Teachers College Press.

Budgen, F., Wallace, J., Rennie, L. & Malone, J. (2001). Teaching and learning in integrated settings. In annual conference of the Australian Association for Research in Education, Fremantle, Western Australia.

Chartier, A. M. (2002). A device without an author. Revista Brasileira de Historia da Educaçao, 3, 1–17.

Chettiparamb, A. (2007). Interdisciplinarity: A literature review. In The Interdisciplinary Teaching and Learning Group .

Clausen, K. & Drake, S. (sf). Interdisciplinary Practices in Ontario Past, Present, and Future. Issues in Integrative Studies, 28, 69-108.

Falconi, O. (2015). Devices, artifacts and tools for the work of teaching: The use of folders, booklets and posters in the Basic Cycle of Secondary School. Latin American Faculty of Social Sciences.

Gunn, J.H. & King, M.B. (2003). Trouble in paradise: Power, conflict, and community in an interdisciplinary teaching team. Urban Education , 38 (2), 173-195.

Hasni, A., Lenoir, Y., & Froelich, A. (2015). Mandated Interdisciplinarity in Secondary School: The Case of Science, Technology, and Mathematics Teachers in Quebec. Issues in Interdisciplinary Studies , 668 .

Havnes, A. (2009). Talk, planning and decision-making in interdisciplinary teacher teams: A case study. Teachers and Teaching: Theory and Practice , 15 (1), 155-176.

Howe, A.C., & Bell, J. (1998). Factors Associated with Successful Implementation of Interdisciplinary Curriculum Units. Research in Middle Level Education Quarterly , 21 (2).

Klein, J. T. (1990). Interdisciplinarity: History, Theory, and Practice . Wayne State University Press.

Lam, CC, Alviar-Martin, T., Adler, SA & Sim, JBY (2013). Curriculum integration in Singapore: Teachers' perspectives and practice. Teaching and Teacher Education , 31 (1), 23-34.

Latour, B. (2008). Reassembling the social: an introduction to Actor-Network Theory. Buenos Aires: Manantial.

Law, J. (1992). Notes on the Theory of the Actor Network: Ordering, Strategy and Heterogeneity. Center for Science Studies, Lancaster University.

Lenoir, Y. (1997). Some Interdisciplinary Instructional Models Used in the Primary Grades in Quebec. Issues in Integrative Studies , 15 , 77-112.

Levstik, L. S. (1986). The relationship between historical response and narrative in a sixth-grade classroom. Theory and Research in Social Education, 14 (1), 1-19. https://doi.org/10.1080/00933104.1986.10505508

Miller, S. M. (1997). Making the Paths: Constructing Multicultural Texts and Critical-Narrative Discourse in Literature-History Classes . National Research Center on English Learning & Achievement, University at Albany.

Naidoo, D. (2010). Losing the "purity" of subjects? Understanding teachers' perceptions of integrating subjects into learning areas. Education as Change, 14(2), 137-153.

Pharo, E., Davison, A., McGregor, H., Warr, K. & Brown, P. (2014). Using communities of practice to enhance interdisciplinary teaching: Lessons from four Australian institutions. Higher Education Research and Development, 33(2), 341-354.

Pountney, R., & McPhail, G. (2017). Researching the interdisciplinary curriculum: The need for 'translation devices'. British Educational Research Journal, 43(6), 1068–1082. https://doi.org/10.1002/berj.3299

Rockwell, E. (2010). Three plans for the study of school cultures. In NE Elichiry (Ed.), Learning and context: Contributions to a debate. Buenos Aires: Manantial.

Probart, C., McDonnell, E., Achterberg, C. & Anger, S. (1997). Evaluation of implementation of an interdisciplinary nutrition curriculum in middle schools. Journal of Nutrition Education, 29(4), 203-209

Rodríguez, JG and Miñana, C. (2010). Interdisciplinarity and research on local issues in schools. Policies and experiences from Colombia. Issues in Integrative Studies, 28, 109-137.

Schutz, A. (1974). Social reality problem. Buenos Aires: Amorrortu.

Shibley, I. A. (2006). Interdisciplinary Team Teaching: Negotiating Pedagogical Differences. College Teaching , 54 (3), 271-274.

Strauss, A.L. & Corbin, J. (2002). Bases of qualitative research: Techniques and procedures to develop grounded theory. University of Antioquia.

Terigi, F. (2008). Changes in the Argentine secondary school format: why they are necessary, why they are so difficult. Educational Proposal, 1(15), 63–71.

Terigi, F. (2016). Public policies in Education after twelve years of government of Néstor Kirchner and Cristina Fernández. Buenos Aires: Friederich Ebert Stiftung.