The coordinator's dilemma: between an electronic janitor and a pedagogical leader.

By

Marta Quiroga Lobos
Magister en Educación
COSTADIGITAL
PONTIFICIA UNIVERSIDAD CATOLICA DE VALPARAISO
CHILE

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Abstract
Since 1992, the Chilean Ministry of Education is developing a sustained process to incorporate ICT (Information and Communications Technology) into schools by providing equipment and training to faculty members. Schools appoint one of their teachers as a coordinator who will then receive an intense technological and pedagogical training. The purpose of this study is to investigate the ICT coordinator's roles and duties in the Fifth Region of Chile, Valparaíso. This is a qualitative study that used Focus Group studies and it was carried out in four municipalities of said region. The results of this study clearly show the difficulties experienced by the coordinator both as a technical support and a pedagogical leader, and as a peer advisor who has to perform that task choosing between an individual method and a collaborative one.

Key Words
Pedagogical leadership, Technical support, TIC resources, Collaboration.

Designing a research strategy
Choosing a research method depends on the research goal and the characteristics of the issue under study. Since the goal of our investigation is to study the coordinator's specific roles and duties, i.e. his or her daily routine, we have decided to use a qualitative method that will help us to know what the participants involved in the process think about the experiences they have gone through. That was the most important aspect for us. Our goal is to determine the coordinator's roles and duties in the school. In order to do so, it is of utmost importance that coordinators verbalize and explain what their duties are, where they stand among their peers, and what strategies have been implemented to introduce new ideas to their colleagues, assuming the consequences that this job may bring to their professional and, sometimes personal, life.

The issue under study is part of an ever-changing but very conservative reality. A reality that is liberal when it comes to changing its players, but conservative when it comes to its beliefs. Qualitative methods allow us to see this reality through the coordinators' interpretations, by means of focus group studies. The way in which participants see their local context is influenced by the environmental characteristics, their beliefs, their knowledge and, ultimately, their personal history. That is why field studies are so useful in this matter. By using this method we would be able to gather coordinators' opinions about their roles and duties that will help us identify individual and common problems. Those participating in this study come from different geographical contexts, but have previously taken part in standard educational programs. By conducting a comparative study on international experiences with ICT, we were able to indentify a series of variables that frequently stand out. The identification of those variables led us to ask the following two questions:

> What are the basic elements that would help us to typify the ICT coordinator's duties, roles, responsibilities, and perspectives according to the duties performed by Fifth Region coordinators who work in municipal schools?
> Is it possible to identify which are the main facilitator and debilitating elements that a fifth region coordinator has to deal with, by observing the ICT coordinators' experiences in schools located in the fifth region of Valparaiso?

Initially, the typification of the coordinator's roles and duties was discussed in several publications. The identified variables will be characterized and determined. These variables will be used as guidelines to formulate the questions that will be asked in the focus group studies[1]. The focus group interviews allow participants, with similar backgrounds, to share opinions and impressions about a suggested topic, based on personal experience. The information gathered from these in depth interviews will allow us to see what participants have and don't have in common.

The people under study in this research are coordinators from the Fifth Region of Chile. The selection process was initially done in different schools. The focus group members were chosen

[1] Korman defines a focus group study as "a gathering of a group of individuals selected by researchers to discuss a specific topic or social fact that is under study, based on personal experience."

according to the schools' geographical location. As a result we were able to identify the existence of two big urban areas, and small cities with rural characteristics in the region
We decided to conduct a focus group study in every urban area of great size (Valparaíso and Viña del Mar) and in two inland cities of the region (Quillota and Petorca). First we find out how many schools were located in those areas. Then, we ruled out those schools that were providing training to their faculty, and those in which coordinators did not have more that 3 years of seniority. One of the aspects we considered for this study was the period of time these schools had been participating in the Enlaces project and the level of experience of their coordinators. With that in mind, we chose schools that graduated from the project between 2000 and 2005, and whose coordinators had participated in the two-year training process consecutively, and had a minimum of three years of seniority.

The focus group script was developed from the identification of several variables and the elaboration of related questions, as shown in the following table.

Variables	**Questions**
Coordinator designation	How did you obtain the coordinator position in your school? How many years have you been the coordinator?
Hours assigned for the position by contract	How many hours are assigned to coordinator's duties by contract?
Coordinator's duties	What type of training have you received to fill that position? What kind of activities have you, as a coordinator, done in your school?
Coordinator's skills	In your opinion, what are the competencies a coordinator should have to perform duties related to the position?
Relationship between coordinator and teaching authorities	How is your relationship with colleagues, students, and teaching authorities?
Coordinator's pedagogical practice	Has your pedagogical practice been affected by your work as a coordinator?

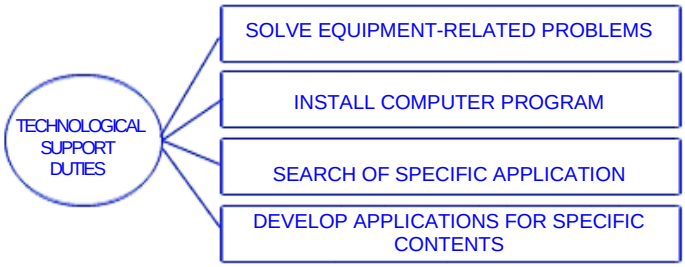
The focus group analysis was carried out using the Miles and Huberman model (1984) consisting of three elements. The first one is data reduction. There you develop a theoretical framework, identify categories according to the participants' statements, and later transform those categories into codes that would help organize the information. The second element is data display. There you draw an illustration showing the connections between categories arising from the theoretical framework and new categories. Using diagrams as a form of data display will bring better results (Eisner, 1985 and 1987). The third element is conclusion drawing and verification. Data reduction and code and subcode design can be done using the software package Aquad (5.0).

Focus Group Analysis

As mentioned before, the focus group questions were initially developed using the theoretical framework as a guideline. In other words, they were developed from the identification of common variables -that were present in previous case studies and international publications. When the focus group interviews were finished, a natural coding process started –category identification from the statements made by the coordinators. As work progressed, we were able to gather new information –nuances, and descriptions that enriched the category identification process– from the situations described by the participants. In the next pages, we will show you the analysis of each focus group study.

Focus Group 1: Municipality of Valparaíso

After the analysis and encoding of the transcriptions, it was clear that that this group of coordinators had a lot to say about the support they provide to teachers. The purpose of having a support system is to eliminate every possible technological problem -operational problems- that teachers may face when using the Enlaces classroom with the students. The following illustration shows the ways in which a coordinator can help teachers:



We can say that the performing technological support duties requires a high level of technical knowledge and a low level of pedagogical knowledge. In some cases, disciplinary knowledge is needed to find specific applications, but there is no evidence to suggest that teachers or coordinators are the ones asking for the implementation of these applications or the teaching strategies needed for the task. Moreover, coordinators clearly state that the teacher is the owner of the class and therefore of the teaching situation. The teacher's responsibilities range from mastering of knowledge to disciplinary control, as seen in the following quote:

> *3: I'm in the classroom…*
>
> *M: But you could not participate in…*
>
> *3: I mean, I can't participate when the class is restless, I mean, I wouldn't tell a kid to seat down.*
>
> *M: How do you help the teacher?*
>
> *3: How do I help the teacher? I help him when…when he says that a computer is not working…I'll go and fix it…but when students misbehave…. the teacher is the one in charge of the class… he is responsible for it, he controls the classroom, because…if that wasn't the case I'll be going over his head…*

One of the coordinators' most demanding activities is solving technical problems. In some cases, they have to stop teaching their class and go to the laboratory and solve problems. This situation is one of the most frequently reported, and in order to solve frequent problems some coordinators try to find alternative solutions. However, these solutions have nothing to do with teachers acquiring new competencies to perform the tasks, but with students internalizing competencies and becoming "tutors"[2]. This strategy consists of selecting students from each class and training them to solve frequent problems. This takes the pressure off of the coordinators who do not have to perform all the technical support duties. It is obvious that this strategy does not require substantial changes in the teachers' ICT competences. Now, this becomes the students' responsibility, and teachers do not have to make changes or acquire new knowledge. Also, this strategy is based on how familiarized the students are with the technology, and their willingness to help other students and teachers in the Enlaces Laboratory.

From a pedagogical viewpoint, coordinators think that teachers do not possess the necessary skills to plan lessons with ICT resources, and that is a big obstacle. They feel that planning a lesson with ICT resources requires more preparation than planning a traditional lesson. They also feel that teachers frequently use training software (CLIC software activities) and Internet search as part of their lessons because these do no demand new ICT skills or extra time to plan a lesson, and because students are already familiar with the technology, and the software instructions for the activities are easy to follow. This is part of the specific curriculum and allows teachers to spend less time explaining the procedures.

In order to perform technical support duties, coordinators have to acquire the technological skills needed for the position. This can be achieved through different methods. Skill acquisition is a dynamic process where formal training is not necessarily needed to learn how to use new software or solve new problems. Coordinators frequently help each other to solve technical problems through consultation forums on the Internet, as expressed in the following quote:

[2] This strategy is part of the training given by Zonal Center which uses some of the resources available on the Zonal Center website (http://enlaces.ucv.cl) under coordinators.

"…what Enlaces taught us….but in the land of the blind, the one-eyed man is king, and if I compared myself with them, maybe I know nothing, but I know a lot more than the rest of the people in the school. And if I'm not sure about something, I ask, If I have a question in the computer science class I ask…when I first started as a coordinator I called Rosita (points to number 2) first, because I didn't know anything about that job, remember? You and Juan Carlos explained it to me. When I go to Liceo 1 (school), I call Hector if I have questions…I call Eduardo when I go to Liceo Comercial, I always ask if I don't understand something, and if I can't ask them I look for the information on the Internet in several forums, but I use fake nicknames. I have obtained a lot of useful information from those sites, because we only have, uh, we only have one room with Internet access, we have to use a router and we have two high schools using the same…, more than thirty, using the same line, so I had to learn about routers, because they installed one, they set up a Linux Internet server, so I have to ask about Linux and read about it…"

According to their statements, coordinators know that in order to do a good job they need to keep abreast of new technology, as shown in the following quote:

"4. When dealing with computers, you have to be constantly reading new information, I mean, you can't stay behind, you have to learn new stuff every day"

To this group of coordinators the administrative duties can be very time-consuming. Among those duties they have to prepare official documentation, manage the resources (paper) assigned to the classroom, enter students' grades in the systems and update them when internal and external reports are needed.

In conclusion, this group of coordinators expressed that technical support duties and administration activities are their main responsibilities. The relationship they share with their peers is strictly related to functional or technological aspects. In other words they are there for technical support and not for pedagogical support. Coordinators and their peers have an implicit agreement; for example, the coordinator does not intervene directly in the teaching process, he is there to help with technology issues only. Design, execution and evaluation of the teaching processes are teachers' prerogative.

Another issue that was thoroughly discussed in this focus group interview was the fact it is impossible to certify that individuals have the knowledge and skills necessary for the job. This happens because coordinators are not required to have basic technical knowledge or meet a profile for the position. Coordinators stated that undertaking and performing this task has to do with personal commitment and a genuine interest for the job. Unfortunately, their position as ICT coordinators is not recognized by school authorities who do not allocate enough pedagogical hours to the coordinators to perform the role.

Focus Group 2: Municipality of Viña del Mar

According to the coordinators, their peers' technological skills are a serious issue. They think that having a low degree of technological skills works against them when they have to work with students in the laboratory, as seen in the following quote:

"do you want to know what the problem is? Kids know more than you, they know exactly how computers work…they were born with computers; we, in turn, had to learn how to use them, right? And the other thing I see is that the teacher is afraid of taking the kid to a computer, because he or she doesn't know if the kid is going to ask him or her something he or she doesn't know"

As seen in previous experiences with teachers and ICT, teachers, especially those with a low user profile, fear that students know more about the subject than they do. However, it is worth mentioning that using ICT for professional activities that have nothing to do with students, such as lesson planning, is an interesting experience, as expressed by a female coordinator in the following quote:

"the headmaster bought several computers for the school ..() he put one in my office, in his office, in the teachers lounge, in the small library; so the idea was for everybody to

> *use these computers, even if it was for lesson planning, and then send that information to me… Unfortunately, I discovered that they only used the Internet to download information; they copied and pasted it, so they didn't even read what they were sending to me. So, I told them that from now on their research papers had to be handwritten, just like students' papers. I also decided that the assignments were going to be handwritten, at least that way you know some of the information is going to stick with them…"*

In this case, the coordinator is also the Head of the UTP[3]. With the introduction of technology to professional work teachers started copying lesson plans from the Internet and did not adapt them to their learning situation. The solution for this was similar to the one applied to students: to have teachers to submit handwritten research studies and lesson plans.

From this quote, we were able to make several assumptions. One of them is that verbatim copying allows individuals to learn something and requires some effort, and much to our surprise, we discovered that leadership methods used by the school are the same for students as for teachers. Learning and cognitive processes used to select and analyze information do not pose technological problems.
Preparing and teaching a lesson with ICT resources is a big obstacle, coordinators say, due to the fact that students have access to a great deal of information through Internet search, and the fact that teachers have to be ready to answer student's questions coming from different sources of information, and give them answers that fit with a particular context, as explained in the following quote:

> *"this is a difficult subject, the teacher cannot come to the class with an unprepared lesson…or search the information on the Internet, because he has to interpret what shows up in each computer, so, he tells the students to visit a website he is familiar with or he brings worksheets, because otherwise, as you say, (points to 4) he or she makes a fool of himself or herself"*

Coordinators feel that by incorporating technology into their classrooms, teachers need to invest more time to prepare their lessons, not only because they need specific ICT skills to do so, but more importantly, because they have to have profound knowledge of the subject matter that will help them to convey the message in different ways and to prepare additional material for the class, like worksheets, if necessary.

Another important issue is the duality of the role. In this group, participants work as coordinators and teachers at the same time, and perform all the duties associated to those roles. A significant part of the group feel that classroom teaching is their first priority, as stated in the following quote:

> *"my priority is classroom teaching, that is how we see the quality of the process, that is why I wanted to become a teacher, the other stuff, we have to do it the best we can. The next thing on my list of priorities is the Enlaces coordination, so, I lighten my work as a teacher and make it easy for others by using computers, by using them in a different way"*

The participants say that coordination activities come second. But there is not enough time to perform them. This is stated in the following quote:

> *"Not even… I mean, they either appoint you or made you, or is part of the hours you have to complete, but you have to do it…that's how it all begins, like many other things, you need hours to do that, they don't give them to you, or there is not time. I mean that is a big problem."*

The main issue of discussion in this focus group is the competition produced between the roles of teacher and coordinator, or the roles of UTP and coordinator. Fulfilling duties and performing coordination activities in the few hours allocated to do that may sometimes cause an overlap of duties and speeches. We have to add, that this group feels that most of their time is used to do computer maintenance, as told by this coordinator:

[3] Head of UTP: Head of the Technical Pedagogical Department. This job is related to the technological and pedagogical aspects in schools. This is a contestable position within the existing legal framework.

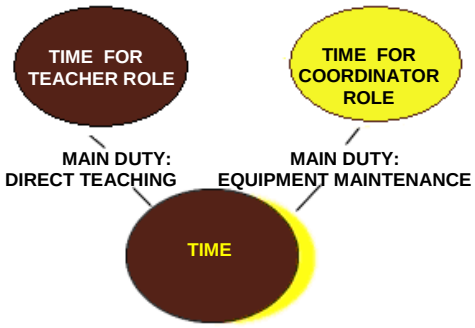
"…very old, I sometimes spend my time removing computer viruses, reloading the operational system… that takes a lot of time…cleaning, that takes a lot of time…sometimes you seat there for hours. Most Fridays I have to be there all day, and prepare everything for Monday. I check the computers to see if they are working properly, but from Monday on, I just check the schedules, see that everything is working ok, but…maintenance…basically I spend all my time doing computer maintenance".

Despite those problems, coordinators know exactly what their main duty is:

"Exactly, so, the Enlaces coordinator must be an individual with leadership skills, I mean, he must have (), I'm not talking about me, but I know some colleagues that…, the coordinator must have specific abilities to perform the task, he must know (also) how to solve problems, someone in charge who (if you ask him) will be able to find and immediate solution."

It is to be able to solve problems immediately, to be a person who solves problems, an efficient technical support.

The obstacles coordinators face when performing their duties are shown in the following diagram:



The diagram shows that one of the problems frequently mentioned by these focus group members is the time allocated to perform coordinator duties. The brown circle represents the time coordinators have to teach in their classes, and the yellow circle represents the time assigned to perform coordination duties. This duties overlap during school time. In other words, coordinators have to share their time between fixing computer problems and classroom teaching. On the other hand, coordinators say that most of the time allocated by contract to coordination duties is used to perform computer maintenance. In conclusion, coordinators spend most of their time and energy servicing equipment, and spend none of their time assisting in pedagogical issues.

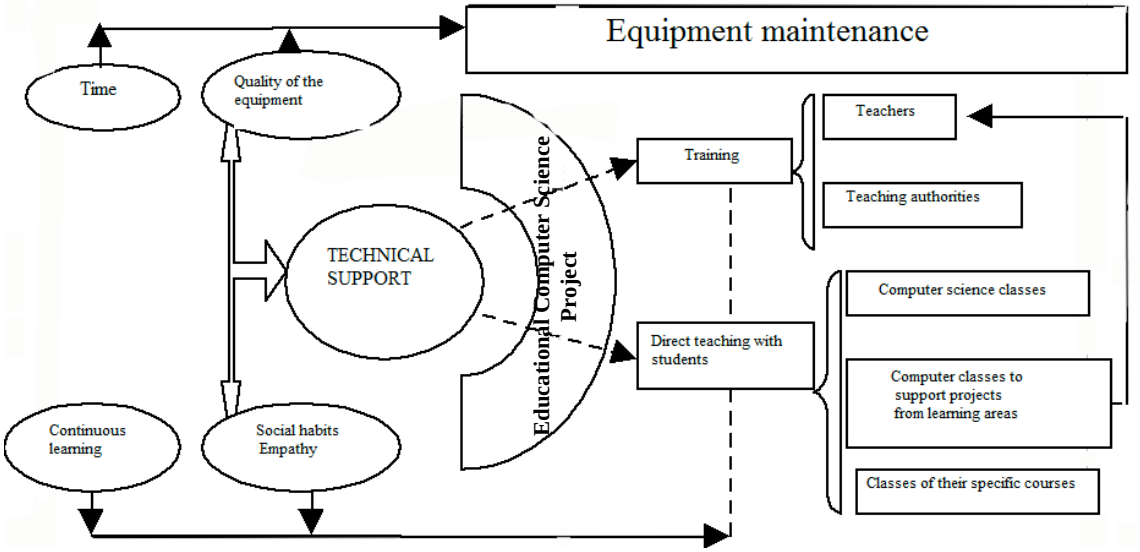
Focus Group 3: Municipality of Petorca

It is important to specify that one of the schools in this municipality took part in a Ministry of Education project called Liceos Montegrande, from 2000 to 2003[4], and it received advisory assistance from a development plan submitted by the adminstration team. In that framework, the High School suggested the possibility of becoming a cutural and tecnological development center in their commune. By taking part in this project, the school was equipped with the infrastructure it needed and with an important amount of technological resources (computers, digital cameras, scanners, television sets). Six out of the twelve coordinators invited to

[4] Project funded by the Ministry of Education; its goal was to supply additional funding to schools that developed specific improvement projects.

participate took part in this focus group study. The 50% attendance can be explained by the geographical distance that separated the focus group study location from the educational institutions.

Analysis:
This focus group study shows interesting results because it stirred up interesting debates regarding the coordinator's duties and the way these duties can be incorporated in an institutional project. The following diagram shows how the main elements relate to each other.



It is clear, from what this group of coordinators expressed, that their main duty is to provide technical support, especially in the case of teachers and teaching authorities, as stated in the following quote:

> *"I give advice and supervise teachers, I give them tools for their work; I can take over a class; I have open and hidden monitoring systems for classes, I can film the class; I can take over a class with twenty people online; I can supervise what the teacher is doing, what a student is doing; I can use their keyboard, their mouse; I can correct their mistakes, send them messages; I can make them take tests, for one thing… I Also give lectures, I attend seminars, then download those conferences; I give them advice, suggestions. I talk about computer-related risks, new tools, new software; I download new software, train teachers, show them those programs; uh, and I help those teachers who need additional training, I give them educational resources, information brochures, and I also do computer maintenance and give them advice, that is, the technical maintenance of the equipment. Besides, apart from my work as a coordinator, I am also the internal technical support, I assemble the equipment, dismantle it, repair it…"*

As described before, every task is related to technological aspects and do not consider the pedagogical or curricular aspects. The coordinator's duties are restricted to software installation and tutorials, and also to encourage students and teachers to use specific commands in order to obtain better results, but there is no evidence of any type of pedagogical input. The technological and pedagogical aspects are separated from each other. The coordinator is also in charge of hardware maintenance, which makes him or her the *internal technical support,* as one of the coordinators calls himself.

Those who perform internal technical support duties also have opportunities to participate in training programs. These programs are aimed to brush up their technological skills or provide them with new tools. This group also performs direct teaching of specific courses and/or computer science courses; and if the projects in which they are working on require computer assistance, they can incorporate additional contents that would help students to boost their technological skills, as mentioned in the following quote:

> *"In addition to that, there are some projects I have to support as computer science teacher, and all teachers who give this course sometimes neglect training activities in order to assist subsectors; for example, if a teacher is working with PowerPoint and needs to incorporate an audio file on it, then I teach him or her how to do it. I give him or*

her classes during my school hours and teach him or her how to add an audio file to a PowerPoint file without producing pauses".

From the previous quote we can infer that there is fluent communication between the teachers and the coordinator and that both respect each other's field of influence, i.e., their own area of knowledge.

The "internal technical support" duties are best described by an Educational Computer Project that dictates the technological contents students should be learning in each educational level. Thus, computer classes have their own specific curriculum and contents, which allow teachers to develop their activities without invading other areas of knowledge. The knowledge acquired in computer classes can be potentially used in different subjects. Teachers of those subjects must submit an annual report describing the students' technological advances.

Even though it is not part of this study, we feel that it is important to dedicate some lines to the idea of putting learning and technology together as seen in the previous situation. We can use Crook's (1998) computer as a toolbox metaphor. This metaphor describes two reasons why it is important to use technologies in schools: the first one is to provide students with ICT knowledge that later on will facilitate their insertion in the labor market. This will justify the creation of a course whose only objective is to teach technological aspects. The second one, of greatest interest to us, is the notion that "… the experiences with computer tools have global effects in the minds of those who use them" (Crook, 1998); these effects are described by Salomon and Cols as "cognitive residue", i.e., students add new tools (or improved ones) to their cognitive background after the experience with ICT" (Crook, 2004). This would mean that, by being part of an educational context with technological integration, these students would expand their cognitive skills or, according to Salomon, show *cognitive residue.* If we further analyze this concept, we could find a connection to the results of previous distributed cognition studies where the conceptual changes that individuals experience when using technology can come from three sources of analysis: the first one is "the increasingly important role that technology is playing to handle intellectual tasks that ease an individual's cognitive load." We can observe that human-computer interactions are usually characterized by a higher intellectual performance. This can not be solely attributed to individuals' cognitions. The second one is the "growing interest on Vigotsky's cultural-historical theory that states that individuals' cognitions are situated within, rather than just interacting with, social and cultural contexts of activity and interaction." And the third source is "a seemingly growing dissatisfaction with the notion of cognitions as only in one's mind, coupled with a shifting attention on cognitions that are situated, context dependent, and potentially distributed in nature" (Salomon, 2001).

To analyze the implications of using and teaching ICT we can see that coordinators must have pedagogical knowledge and have develop some type of relationships with the teachers, i.e., relationships that go beyond good work relations, classification of various disciplines, and solutions to technical problems. This forces them to work collaboratively when designing teaching situations where curriculum contents and ICT resources are mixed together.

For coordinators, one of the sources of stress is the lack of time available to perform their tasks, as shown in the following quote:

"It is outrageous, outrageous that teachers only get one hour. I think four hours are not enough, time so, go figure… then, um, I think that the coordinator role is not recognized; people think the job is a waste of time, that you are in the computer in chat boards or something, um"

The lack-of-time problem is even worse for coordinators who have to use old equipment, which means that they would obviously have to spend more time doing software and hardware maintenance. They feel that local authorities do not know what the coordinator job entails, so they feel that these authorities do not allocate enough time to perform their role. This leaves coordinators thinking that their job is not recognized.

Another aspect coordinators feel is important is keeping abreast of new technology. They need to be constantly learning about new software or functions, and especially about the Internet.

There are several opportunities to receive training on those matters. There is formal training, consisting in courses given by the Enlaces Zonal Center or courses that coordinators have to pay themselves, and informal training, consisting in support systems created directly with other municipality coordinators or with students. One of the problems is that there is no way of certifying the knowledge required for the position, especially the knowledge acquired when working in Zonal Centers. Some of the coordinators have worked in those centers for almost seven years.

Despite the tension perceived on the coordinators' speeches, they say that their job is recognized by their peers and the teaching authorities of the school, as stated by a coordinator:

> *"Here I'm seen as a facilitator, I am considered an essential player in the classroom; I deal with everything related to institution management, I work with the UTP, the Headmaster and the inspectors. I'm in charge of all the rooms with computers, so in that respect, I am available for the entire educational staff".*

In conclusion, coordinators think that having the necessary knowledge level and being able to efficiently solve technical problems is key to make technology classes work, as stated in the following quote:

> *"After nine years I discovered that you have to keep the equipment in perfect conditions and working properly. And I think that implementing projects that include technology in the learning situations even if the teacher in the classroom doesn't know computer science is feasible, because the important thing is not to lose the sight of educational goals, even if he or she knows very little about computer science. The secret is to keep the equipment in perfect working conditions".*

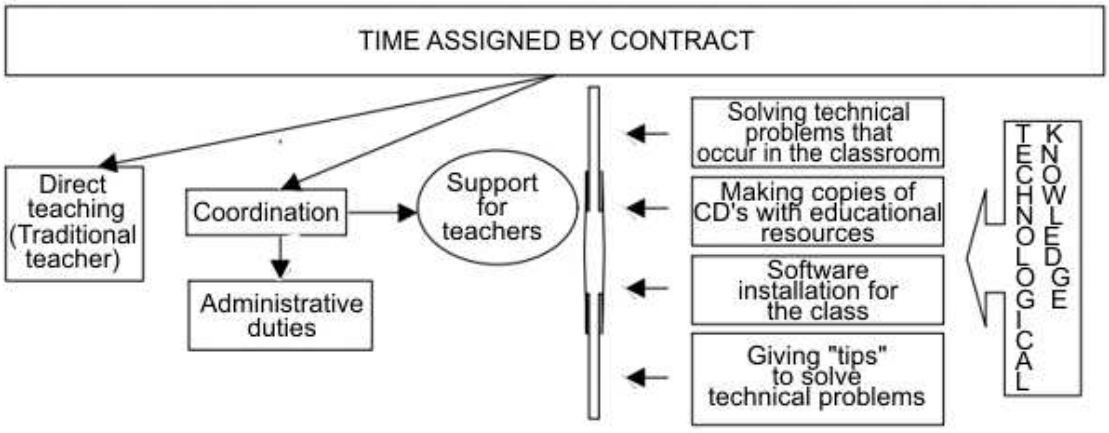
The transitional model of ICT use in learning contexts is the one that fits best with the description of the models given by the coordinators, which use… "computer programs that offer spelling and mathematics drills, and other contents used by the teacher regularly" (Coll, Palacios, Marchesi. 2004). In this model, coordinators perform an "internal technical support" role, and keeping some of the old practices using modern technologies is completely feasible.

Focus 4: Municipality of Quillota

Analysis:

As seen in the previous cases, there are several reasons why these coordinators obtained their positions. Some of them had previous knowledge of computer science; some just wanted to learn about it, and some had free time from their administrative duties or performed activities related to laboratory administration. That was the case for school inspectors or Heads of the Technical-Pedagogical Department. It can be inferred, therefore, that in order to become a coordinator it is not necessary to have certain characteristics or meet specific requirements.

One of the main concerns expressed by this group of coordinators was the time available to perform coordination duties. The following diagram shows the duality mentioned by the teachers.



One of the most frequently mentioned aspects by this group was how difficult it was to divide their time between their teaching duties and their coordination duties. They were hired to teach in classrooms for the most part, but they have to use that time to perform coordination activities as well.

> *"I think that most schools have a teacher who is the coordinator of the Enlaces classroom. This teacher is appointed as the coordinator, and even though they have to perform this task, they also have to teach, plan their meetings and lessons, perform UTP activities, and lots of other things. So, sometimes the Enlaces classroom is closed because the teacher is teaching in another classroom."*

Along with these time allocations issues to perform (teacher – coordinator) duties, it is possible to see that the time assigned to the coordinators to perform their duties gets significantly reduced, as stated in the following conversation:

> *"I've been very lucky, because I have hours assigned for that job. I don't have to use the time assigned for my classes or get out of the classroom to do the other job. I do it in the afternoon, and I only use the time that was assigned for these activities."*
>
> *"3: In my case, I started with six hours, and now I only have three. My hours have been cut, um, I like the Enlaces project very much, but I know hat I have to work overtime."*

Ultimately, coordinators undertake their task as a personal commitment, as expressed by a female coordinator:

> *"I stay here and work overtime once the kids are gone, either to service computers or because some colleagues want me to install specific software for them. Three hours is not enough time, but you do your job mainly because you love what you do."*

Even though they have to perform two different tasks, and deal with complications that come with the territory, coordinators say they support their colleagues by solving laboratory problems even when they are teaching in their respective classrooms. Coordinators say that they gather ICT resources to share them with their peers, install software when colleagues needs them, and give them with *tips* to solve simple tasks.

The following quote shows how coordinators support their peers by setting up the laboratory to maximize the time students have to learn their lessons.

> *"Setting up the classroom, setting up the classroom…, you know that first graders are coming to work with the 'Abrapalabra' software during the third and fourth period, so you need to have everything ready before recess is over, have the computers with the Abrapalabra CDs ready for the kids to start working immediately."*

So we have to wonder why teachers are not able to perform basic and repetitive tasks during recess, or why students cannot be trained to install the CDs required for the class by themselves. Could this be another sign of the breach that separates technological knowledge from disciplinary knowledge? This hypothesis is supported by the fact that coordinators are basically using their technical knowledge and not sharing experiences related to ICT teaching.

When coordinators talk about the requirements needed to fill the position, the most important one is pedagogical knowledge. They say if the job requirements were only oriented to technological aspects, it would be very difficult for the coordinators to convey that knowledge to their peers. They think that it is important to know the current curriculum, to be able to relate those contents in learning situations, to know educational software, as stated in the following quote:

> *"To maintain the educational side as the main objective, the coordinator has to know about the situation; like he said (points to 5) he has to coordinate. They have to know what software is going to be useful for a specific activity or class according to the*

contents they plan to teach in their classes, etc. So, it has to be someone with knowledge of different fields of education."

Another issue mentioned by this group, to be familiar with the school facilities, problems, and needs is essential to perform coordinator tasks in the best possible way, as expressed in the following quote:

"you already know how things work, you have worked with the children and you know how to do the job. I don't know... but you know what the school needs, you are not a stranger in that environment. I mean, if a programmer is hired, he or she is going to do his or her job and nothing else. This programmer is going to take care of the hardware, right? but he is not going to know anything about educational software and explaining it to the students, so there will be a problem there, too."

When coordinators talk about the knowledge they have acquired in this process, one aspect that stands out is the technological knowledge they have gained, as stated in the following quote:

"We've mostly acquired technical knowledge; because that is what we've been doing mostly. Actually, we know more about hardware than software 'cause we have to repair some computer's components, we have to service them." (Page 1)
"I've learnt things that I couldn't have imagined six years ago. Now, I know how to install... um... I even installed new CD-ROM readers. I even changed those... eh... how are they called? …memories? Well, I've done this because I've learnt it by heart. I've been learning thousands of things, that's how I know a little of everything, I mean, at the end you stand out in your own way"

This recognition can be easily explained as the duties they are asked to perform are basically related to technological support.

As one of the coordinators describes it, one of her duties is to motivate teachers to use technology, and to show them that it is not that difficult to perform certain tasks. The most important thing is to motivate teachers to incorporate basic technology for personal use. For example, a coordinator thinks that having some of her colleagues play Windows Solitaire on their computers is progress.

Conclusions:

It is possible to identify some common features from each focus group study. These are similar to those mentioned in publications on the subject (Kwok-Wing, 2002; Luik, Nisan, Servant, 1999; Lynch,1999; Marcovitz,2000; Moallen, 1997; Moursund, 1985; Strudler,1988).

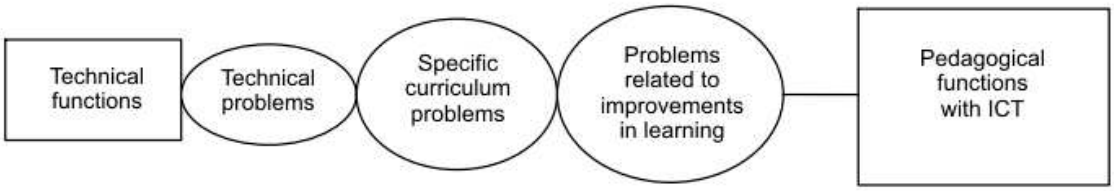
a) Coordinator and Teacher: The first conclusion, as obvious as it may seem, is that coordinators are, at the same time, teachers who work in the same school and have been part of the faculty for several years. This is a very important issue that is not mentioned very often. Sometimes it seems natural and we take it for granted. However, this situation allows the introduction of new elements into school environments. Coordinators have taken part in the creation and redesign of cultural statutes, they are familiar with those statutes, and that makes them change agents.

b) Temporal dimension and duality: In all the municipalities that took part in this study, coordinators mentioned that their duties are very time-consuming, and that they have to divide their time between: 1) having the computers ready for different classes, 2) doing maintenance, and updating and incorporating new learning topics through investigation and research, and 3) participating in formal training, with all the consequences that comes with that.

Another side of the temporal dimension is that working as a school coordinator interferes with the traditional teaching activities. The coordinator usually "leaves their classroom" and run to the lab to solve problems and provides help to a class he has not planned or is not familiar with. The overlap between the coordinator's and teacher's role is common and produces a clash of the roles.

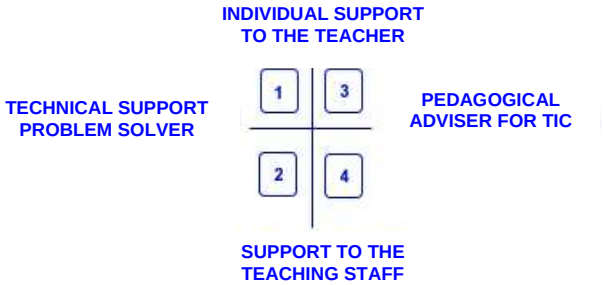
c) Predominance of technical duties over pedagogical duties: After rereading, analyzing and coding the focus groups results, we noticed that coordinators mentioned on several occasions the technological aspects of their job and the various duties they have to perform in relation to hardware and software. Every time they mentioned pedagogical aspects was in relation to technical solutions —individual who solves problems and supply resources. They rarely mentioned their participation in pedagogical assisting or facilitation.

According to the previous statements, we should conclude that coordinators only communicate with teachers when it comes to technical problems; communication regarding curriculum seldom occurs; and there is no communication at all regarding learning topics. According to that, we were able to discover that there is a fluid and constant communication between coordinators and teachers when it comes to technical problems, and that specific curriculum issues require more thoughtful strategies. The following image shows the gradient of the problem's difficulty:



Performing a role that is more inclined to pedagogical aspect that technical aspects, from specific curricular contents to learning improvement, is a difficult task for several reasons. One of them, already mentioned in publications, is that the teaching role takes place in *isolation*. Traditionally, teachers have always worked alone, the classroom is a private space they share with their students, but the decision-making process is personal. As Huberman says, "classroom pressure" affects teachers in different ways: it diverts their attention to everyday problems or short-term issues; it isolates them from other adults, especially from coworkers; it "drains their energies and limits their chances for reflection" (Fullan, 2002). Another reason is the inherited difficulty of each subject. Every curriculum is very specific in terms of conceptual contents and didactics, so they exceed the coordinator's best intentions and training. The final reason is the concept of learning and the teaching role in ICT learning method which, according to research, is substantially different from the method used in a traditional classroom.

In conclusion we present a map that allows us to define the coordinator as someone who delivers technical support —using an individual approach— and pedagogical advice —using a collaborative approach. The following diagram allows us to guide the reader and to go deeper into each quarter.



In quadrant 1, coordinators establish one-on-one communication with each teacher. They assist and relates to each teacher individually; therefore the coordinator does not work with the teacher staff as a whole. For teachers, coordinators are the ones who solve technological problems and supply them with the resources they need. They can also fix the computers, solve problems in the laboratory, and provide training to the teacher if they need to learn how to use a specific software application, among others. In the second quadrant coordinators are still seen as individuals who solve problems and supply resources, but in this case, coordinators perform this work for the teaching staff as a whole. Sometimes coordinators organize training sessions, tutorials, and workshops for their peers, as part of their work schedule and duties. However, these training sessions are mainly focused on technical aspects. The third quadrant shows the

coordinator working as pedagogical adviser for the teacher, but in an individual way. They will work as a team and develop teaching scenarios enhanced by the use of ICTs, but only as a result of personal interest. Therefore, this does not represent the way in which the institution usually works. However, it is important to stress that, in this position, coordinators can act as first order change agents who can help teachers to go from level 3 (management) to level 4 (consequence) according to Hall and Hord, 1987, stages of concern −quoted in this study from Marzano. Finally, quadrant 4 shows the coordinator as a pedagogical adviser who works with the teaching staff as a whole. In this quarter coordinators are able to make second-order changes. How ICT can help students to learn more is one of the concerns in this quadrant.

Before we finish, we would like to leave you with some thoughts about the different stages of the diagram. The first one is that it is not up to the coordinators to decide in which quadrant they are going to be, it is up to the school they are working in. Schools that use a collaborative approach as a part of their organizational system, and that use systemic learning principles, will undoubtedly put coordinators in quadrant 4; they would even develop strategies and procedures to place them there. On the other hand, schools that use a culture of ranks and a less collaborative approach will have their coordinators working individually with their teachers.

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