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Defining Primary Geography from Teachers' Expertise: What Chilean Teachers Mean by Geography

Victor SALINAS-SILVA[1]
Pontificia Universidad Católica de Valparaíso, Valparaíso, CHILE

Patricio PEREZ-GALLARDO[2]
Pontificia Universidad Católica de Valparaíso, Valparaíso, CHILE

Andoni ARENAS-MARTIJA[3]
Pontificia Universidad Católica de Valparaíso, Valparaíso, CHILE

Abstract

This article examines teachers' subject expertise in a context where geography could be considered a neglected school subject. Using an empirical approach to the problem, the article aims to provide a view on the dynamics of teaching primary geography in Chile, through considering teachers' narratives on curriculum making and their associated conceptualisations of the discipline. 21 rural educators were interviewed about geography education to gain a general view of primary geography in the country. Findings reveal the need to understand how teachers conceive of and accommodate geographical knowledge. Even though there is a recognised chain of pressures regarding curriculum changes and deficient initial teacher training, geography as a school subject is still in place because of teachers' practices. Recognising their dynamics will shed light on how to make geography sustainable as a school subject in the future.

Keywords: Subject expertise, primary geography, geography education, geographical knowledge, Chile.

Introduction

Primary teachers' subject expertise is explored as a methodological perspective to characterise geography's pockets of knowledge and the way it is structured in Chilean schools. Hopefully, this paper will shed light in the way school geography is address in Chile with its particular background and understandings of what is and should be the

[1]Corresponding author. MSc Victor Salinas Silva: Teaching fellow at Instituto de Geografía, Pontificia Universidad Católica de Valparaíso. Avenida Brasil 2241, Valparaíso, Chile. victor.salinas[at]ucv.cl
[2]Patricio Perez Gallardo: Researcher at Instituto de Geografía, Pontificia Universidad Católica de Valparaíso. Avenida Brasil 2241, Valparaíso, Chile. p.perez.gallardo[at]gmail.com
[3]Dr. Andoni Arenas Martija: Professor at Instituto de Geografía, Pontificia Universidad Católica de Valparaíso. Avenida Brasil 2241, Valparaíso, Chile. andoni.arenas[at]ucv.cl

subject. We expect that this study will be a practical contribution to anyone involved in teachers' training, to help understand how a school subjects' ideas are transformed or reorganised in relationship to its parent discipline.

Background: Geography in Primary Schooling

School geography is not a single subject in Chile but is combined with history. Recent curricular reforms have led to other topics being included in the same subject area as geography, such as civics, economics and other social sciences. Changes in the national curriculum in 2013 left school geography in a weak position (Table 1). Not only was it reduced in presence but also relegated to explaining historical processes; in essence geography has come to be regarded as merely the physical support for history.

Table 1.
School geography's presence in the curriculum. [Adapted from Georgudis & Ortiz, 1982, and Garrido, 2013a.]

School reform	Approach	% of learning objectives in geography school curriculum for social sciences
1981	Thematic	35-40%
1998	Interdisciplinary	25-30%
2009	Interdisciplinary, with separate learning objectives from history	25-30%
2013	Integrated into history's learning objectives	10%

However, primary geography is still in service. Its current approaches to teaching geography are primarly informed by social constructivism (Berger & Luckmann, 1968). As part of the 1996 educational reform adapted from Spain (Coll, 1993), approaches to teaching school subjects in Chile are cognitively driven and knowledge based. This means that learning objectives are designed to develop students' skills, which are understood as a mental processes that students have to develop to accomplish a determine task, e.g. identify, analyse or, in the case of geography, locate elements. Most of the subjects are organised by parent disciplines such as mathematics, language, sciences and social sciences, which means that they are based in thinking using content knowledge. Much of contemporary educational literature in use in Chile (Monereo, 1997; Pozo & Postigo, 2000; Marzano & Pickering, 2005) integrates these elements using a competence model, considering school content as the sum of conceptual disciplinary content, cognitive skills and attitudes.

Geography curriculum content for 5-12 years olds is embedded within other disciplines. For the Ministery of Education the subject allows students to 'better understand the society and their role within. It is shaped by disciplines – History,

Geography, Economy, Demography, Sociology and Political Science – that study human beings as individuals and members of society' (Mineduc, 2012, 178). To teach these different perspectives the subject is organised with three disciplinary focuses: History, Geography and Citizenship.

It is considered that geographical thinking provides the means for reasoning and thinking spatially (Mineduc, 2012, 180). Progression for 5-10 years old (Table 2) is organised in three stages. In the early years student's locational skills and orientation are developed in the individual. Then students are taught to recognise the national territory, to develop the skills of observation, and finally to analise the landscape and Chilean geography. Much attention is given to the use of maps and orientation. Furthermore, as Table 2 shows, from Year 2 the geography curriculum incorporates learning objectives that are subsidiary of history and economics.

Table 2.
'Geography focus' in school primary curriculum for History and Geography. [Adapted from MINEDUC, 2012.]

Content	Year 1	Year 2	Year 3	Year 4	Year 5-6
Skills of spatial thinking	• Use of geography tools (maps and plans) • Relative location	• Relative and absolute location	• Use of geography tools (maps and plans) • Absolute location	• Geographic coordinate system	• Localisation in map (Y5) • Inquiry (Y5) and explanations (Y6)
Geography General Themes	• Labour • Cultural diversity in the world	• Landscapes (of Chile)	• Diverse landscapes • Climate zones	• American continent (landscape, resources, physical features, population and others).	• Geography of Chile • Natural zones (Y5), Political regions (Y6)
Themes to support other disciplines	-	• Localisation of historical pre-Columbian indigenous people. • Their relationship with its surroundings	• Influence of geographical factors in classical history (Greece and Rome)	• Problems of economy (resources scarcity, renewable and non-renewable resources, sustainable development)	• Economy: added value to natural resources

Conversely, teachers' education is another element of context that could influence teachers' understanding of geography. Initial teacher education has been managed by universities since the late 1960s. After taking a national standardised test to access higher education, future teachers select from among the primary teacher training programmes across the country. Like any other degree course in Chile, these programmes last five years.

Primary teachers receive pedagogical and academic discipline training. Depending on the university, most of the programmes consider language and mathematics as foundation subjects for teachers' training, which together with pedagogical and psychology courses will take most of a programme's time. Separate from this structure, future teachers can choose to specialise in science or social science to teach in Year 5 and 6. These courses generally cover a few terms during the five years, which is reduced further, since social science consists of geography, together with history and civics. The amount of time spent on geography could be only a few courses or a mixed course with the rest of social science subjects during the entire degree.

Most teachers' further education programmes for public schools are subsidised by the government and implemented by a private organisation. Generally, these in-service programmes are short update courses (20 hours in total) or diplomas (200 hours). In any case, there is little access to geography programmes, as courses tend to focus their approach on history. In Chile, it is not customary to have a postgraduate degree in any area, although in recent years, government programmes have encouraged teachers and especially head teachers to take a master's degree.

Rationale

Primary geography in Chile is reduced in terms of the curriculum and in teachers' training. It is at a curriculum level that tends to be seen as limited, with a good reason. If this background issue continues, school geography in the country is likely to be absorbed by another subject. However, if we consider that teachers are the ones who shape the curriculum and put together content knowledge, we can find out to what extent and how geography is rooted in teachers' actual classroom practices. Their understanding about the subject might shed light on the directions that school geography effectively has taken, the ideas that have changed, and the ideas that have been resilient regardless of what the curriculum states at the national level.

The aim of this paper is to explore these elements in an attempt to understand how resilient school geography is among primary teachers. It considers how they conceive the basic structure of the subject and its capacity to explain their context and absorb changes (Solem, Lambert & Tani, 2013).

The research presented here is an effort to begin understanding the practical knowledge (Wynne, 1996) of in-service teachers. The concept of expertise (Collins & Evans, 2002; Ericsson, 2006), as distinct from formal certification, implies that we can explore teachers' structure of knowledge and specialisation.

Subject expertise is related to pedagogical content knowledge (PCK) (Araya, 2007; Gonzalez, 2012). However, the former takes into account the process of specialistion by

which knowledge emerges as a product, rather than the prefixed modeling that PCK normally addresses. This involves how teachers' conceptions of geography and their consideration of spatial phenomenon could differ from what it is stated in the curriculum (Arenas & Salinas, 2013; Garrido, 2013b) or during their initial training.

We examined teachers' knowledge of geography and the environment as core elements of their subject expertise (Brooks, 2010; Collins & Evans, 2002; Young, 2014). This was an effort to ascertain how teachers do what they do. Our goal was not only to find out what they know, but to understand how particular concepts or themes anchor themselves in teachers' explanatory models of their school subject (Lambert & Jones, 2013; Jasanoff, 2003). We can infer the content and organisation of their knowledge and the strategies they use to operate from the information that they gave us regarding their conceptualisations of the discipline and the purpose of teaching particular topics (Walshe, 2007; Ericsson et al., 2006).

In order to answer these questions, this paper begins by identifying teachers' definitions of the environment and geography and later complements this understanding with their strategies for structuring and appropriating geographical knowledge. Those elements that arose from teachers' narratives are discussed in relation to geographical and spatial thinking and professional identity as three cross-cutting issues in teachers' subject expertise.

Methods

We have selected teachers' narratives (Flick, 2007) regarding general problems and views about geography education at the primary level. This is based on research into Chilean teachers' concepts of geography, in which 21 rural educators were interviewed on a one-to-one basis.

The interviews were structured using the following topics: teachers's thinking about lesson planning in geography; the school's local context; geographical issues highlighted by teachers; definitions on geography; description of lessons about geography. Altogether, these topics were considered to build on the meaning (Elliot & Timulak, 2006) that teachers confer on geography as a school subject and also its presence as a phenomenon in their daily lives (see Appendix 1 for the interview questions).

The data analysis involved qualitative content analysis about the practices and conceptualisations that teachers declared, using emerging categories based on their narratives (Giddens, 1997; Seale, 2004). Coding resulted from triangulation between the interviews using a descriptive approach to organise the findings. The interviews were audio recorded and transcribed verbatim. They were undertaken at teachers' schools between April and June 2014, and lasted between 75 and 100 minutes.

Participants

The participants were 21 rural educators across three different regions of Chile (Coquimbo in the north, Valparaíso in the centre, and Bío Bío in the south). The sample was non-probabilistic, and the teachers were selected on the basis of their membership

of Rural Microcentres (Microcentros), which are public organisations that gather together teachers from rural areas. They are territorially organized by municipality or province, depending on how close the schools are to one another. The participants were primary teachers with standard training, as generally there is no specialist training for rural educators in Chile, although one university in the country (UPLA) does have a speciality in rural education. They have the same access to courses and further education as teachers across their own area or municipality (borough). During the research that informs this paper, we found that the ratio of in-service teachers who had ever – during the course of their career – taken a course that was specifically related to geography was 1 in 21.

The differences of the rural teacher participants to other primary teachers may stem from their professional practice (Seale, 2004) and development (Kennedy, 2014). Their schools are normally attended by students between the ages of five and 12, where several year groups are taught together in one single classroom. Furthermore, primary rural educators are one of the few groups of teachers in Chile who regularly have an opportunity each month to gather together with colleagues from other schools to share experiences and solve administrative issues.

Findings

Teachers' Definitions of Environment and Geography

The teachers tended to recognise environment and geography as two complementary dimensions related to the general term 'surroundings'. 15 of them considered that this term expresses the idea of experience situated in space, and they used it indistinctly to refer to the habitat, places, the locality or just the terrain that supports human action. In turn, it provides teachers with the motivation actually to teach the subject to their students.

In their definitions of environment and geography, five of the teachers made an interesting distinction. Environment was considered to be a field of action, while geography played the role of a body of knowledge that allows us to understand the environment.

The teachers' definition of environment was expressed in terms of their attitudes towards the surroundings. Even though the terminology that they used tended to vary, there is a certain consistency regarding the purpose of the field. Two of them referred to it as environmental stewardship, another three to caring for the environment and three of them to conservation initiatives. As Tamara, a primary teacher, states:

> '*For me, it's kind of the surroundings, it's all that's around us and you can make use of it and you can contribute to it as well. Because it's not only what is around us, it's not only related to the little trees in general, but also to the people. It's what we do with it, what our surroundings imply, how we take care of them, how we maintain them.*' Tamara [3, 171:171][4].

[4]Interviewees' quotes are referenced as: name [ID number, quote initial paragraph number: quote final paragraph number] e.g. Tamara [3,171:171].

Although none of them have ever said so directly, the teachers have often given the impression that there is tension between those who think of the environment from the point of view of conservation and those who attribute to it what they call a 'mixed view'. The former tends to treat conservation as the effort to maintain the environment intact. It is considered as an issue of aesthetics that conflicts with the pollution of the surroundings, which is even related to the 'hygiene' of the place, as one of them said. However those who subscribe to the mixed view understand the environment as the interaction between social and natural settings and what humans do to impact on and transform the surroundings. Tamara's view apparently assumes this position. She even advocates that this is translated into her daily practice as a teacher:

> *'... Students find it hard to realise that they can take concrete actions, for example they have trouble assuming that if you see the tap running, you can go and turn it off. I mean, they do not visualise that these types of small actions could be a contribution. Most of the time they propose actions such as 'go and ask the president to tell everybody in the country that they have to stop using plastic bags'. I mean, I think that they start from actions that are too radical and they don't consider small initiatives.'* Tamara [3, 165:165].

One implication of Tamara's translation – from her definition of environment to actually including it in her teaching practice – implies the dialogue between her own conceptualisations with those belonging to her students. She deals with it by expecting disagreement but it does not generate uncertainty (Stirling, 2007) in her practice. This act of translation involves her turning ideas into concrete steps visible to her students and making visible to us the elements that inform her teaching of environmental issues.

Although teachers' views on environment are quite diverse, it seems that for five of them, the phrase that is closest to teaching environmental issues is 'taking action'. María, another teacher, even states that the environment is deeply embedded in the definition of 'citizenship education' [16, 37:37], promoting the participation of students in their community on a local level.

Conversely, teachers' definition of geography clearly state that it is a science, referring to its role in describing space. While environment's definition was focused on the attitudes towards the surroundings, geography's is closer to knowledge and concepts involved in the description and explanation of what you can see and feel in your surroundings. As Edison and Veronica say:

> '*Geography is more like a science, is to know the latitude, meridians, the specific location of a place'* Edison [6, 27:27].

> '*I think that the concept of geography that I have goes beyond the mountain, the river or the physical map, because it implies the peoples that have settled in certain places, the customs that are associated with the geographic place. It's the complementary relationship between man and his surroundings, rather than only the physical part of a place.*' Verónica [12, 28:28].

Geography's definition involves far more conflicting views than environment's definition. As the two teachers above show, we can actually see a fluent dialogue with

conceptualisations that they consider in direct relation with scientific disciplines such as cartography, geology or natural hazards, which operate as organisers of what they already know. However, their views are interchangeable between social and experimental sciences, which might imply an interdisciplinary approach to their considerations of what are spatial phenomena. A case in point is Veronica's, whose conceptualisations tend to use a cultural lens on physical phenomenon such as mountains or rivers. When she translates this into her daily practices the examples that she gives to the students seems to corroborate this.

> '*There is a relationship between environment and culture, because it is the two things, not only the physical, as I told you it is the social and natural together but is complicated…with my students, I can't compare northerner and southerner dwellings [of Chile] who knows?!*' Verónica [12, 30:30].

While teachers rarely admit they are using different lens, they often take for granted that the social and natural are bonded. However, as Verónica states, she feels conflicted because she should explain to her students why the types of buildings in a desert region (North of Chile) should not be judged by the parameters of the rainforest area (South of Chile). It seems that the multiple perspectives that she considers should be taken into account make it harder for her to provide a satisfactory explanation to her students.

In order to achieve a level of certainty (Brooks, 2006) in their approaches as educators, teachers turn to a series of strategies to make this information understandable and furthermore, operational in their practices as professionals.

Teachers' Validation Strategies on Geographical Knowledge

Teachers' own recognition of their lack of geographical knowledge made us curious about the issue of how they handle uncertainty when they have to explain spatial facts or phenomena. Definitely, this is one of the most common practices for teachers. They constantly stated that they were poorly prepared to face issues within the school subject. Thus, the question that we have to ask involves how they are accommodating their understandings, rather than making an inventory of contents that students should or should not know. It is a matter of organisation.

Teachers' conceptualisations are organised using a series of mechanisms of categorisation. When teachers' definitions of concepts are not in conflict with their own views, it seems that these mechanisms could be seen as strategies that allow the teacher to handle the uncertainty involved in the process of explaining a fact or a phenomenon. We were able to identify three strategies: labelling, appropriation and discarding.

Strategy 1. Assigning a Purpose to Geographical Topics

Teachers' conceptualisations tend to overlap each other. However, in the case of geography's and environment's definitions, most of the teachers produced a subtle distinction, attributing the status of science to the former, and assigning an applied understanding to the latter.

'Researcher: *What would be the difference between Environment and Geography?*

Jorge: *I emphasise the human action as we say, in the environment, how the human being transforms its environment and gives another shade to the landscape.*

Jorge: *Geography is a science that sets, locates, describes the landscape*.' Jorge [2, 132:135].

'*the environment is headed towards caring for the surroundings, I mean, measures to preserve it, and geography maybe, is what explains you or is the one to look up for explanations on why something is there.*' Tamara [3,209:209].

Labelling turns out to be the basic process by which teachers understand subject content. What Jorge and Tamara's narrative above is indicating is that the process of structuring knowledge is not a matter of hierarchy attributed to scientific disciplines' development. Such a process seems to be linked to the role that teachers assign to each pocket of knowledge (Collins & Evans, 2002). For five of the teachers, when the topic of environment was elicited they immediately associated it with their students' campaigning, sending letters or even them generating projects. On the other hand, teachers' approximation to geography tend to show them appropriating the language of geography, where each word was enacted (Butler, 1993), and seemed to have a role to play in the narration of their own practices. Therefore, that would be a possible reason why words such as 'description' or 'location' were so noticeable in teachers' definition of geography.

Strategy 2. Geographical Knowledge Categorisations

Teachers assumed different approaches to explaining different facts or phenomena. For them it represented the act of taking a position about what they knew. There were three approaches clearly differentiated by the teachers:

- Physical geography approach. There is a prevalent group of nine teachers that use this approach as a platform to engage with explanations related to the terrain and physical features in the country such as, and mainly, land relief (mountains, rivers, valleys), Chile's different climates, the ocean and vegetation.

When teachers describe its methodological features they tend to emphasise the use of experiments such as terrariums, the use of compass and cardinal directions. Some teachers, such as Edison, have oriented their understanding of geographical phenomenon as something measurable and absolute.

- Landscape approach. A second group of five teachers tend to see the same previous physical geography phenomenon using a social scientist lens. They are inclined to explain changes in the environment and the locality as socially determined. Issues such as water scarcity are explained as an effect of climate change but strongly related to the exploitation of natural resources, especially from mining and the forestry industry in the region.

Observation techniques and experiences in the field tend to be teachers' preferred to approach to information associated with the landscape.

- Historical approach. A third group of teachers are disposed towards providing explanations of geographical issues from a humanities lens. Teachers like Tamara tend to focus on the concepts of identity and local history in order to explain the place where the student has come from.

  '*In general it is always assumed as something historical, but eminently geographical as well, because [it] is how you appropriate, distribute and organise the space.*' Tamara [3, 158:158].

Their methodological approximation is embedded within anthropological and historical methods focusing on documents such as old photographs, parents' narratives or interviews with people from the sector.

These approaches are not exclusive and sometimes teachers use them interchangeably. It does not represent a progression either. Nevertheless, what these approaches have in common is the use of the same information to state different arguments about the students' environment or surroundings.

Strategy 3. Adaptation to Curriculum Change

Teachers are also dealing with a processes of functional obsolescence (Bartels et. al., 2012) regarding their own subject knowledge. This process involves the disuse of a particular set of knowledge that at some point they considered necessary to know and cover as part of students' learning but now consider should be put aside to privilege other topics. An interesting example of such obsolesce has been the incorporation of the concept of environment into the curriculum and its effect on teachers' previous conceptualisations.

We have identified that such obsolescence issues in teachers' practices are primarily driven by two factors: A sense of solace, and the changes in the national curriculum.

By sense of solace we understand teachers' attempts to find comfort when they are marginalizing topics that they like or recognise as necessary to students to learn but are unbearable to teach for reasons that range from time management to moving to other schools. As Jorge states:

'*There is so many things that we were taught, that the university gave us, and then it settles down as individual knowledge, if there is no further studies it stays as our own knowledge. To work it with the children is more complicated. The cartographic formula [topographic profile] for example, if you don't teach it, it simple falls into disuse and even you forget it, you forget it because you don't practice it.*' Jorge [2, 143:143].

This factor challenges the practices of teachers such as Jorge, who are mostly veteran teachers with years of experience but not necessarily close to retirement. It contests their expertise because they realise that a tool of explanation that they have held during all their years of practice has been taken away, reduced to only a personal interest without connection to the problems of the field or the interest of their students. Moreover, the topics that have lost their value are often related to what they have learnt at university and have constituted what they have recognised as their primary function as teachers.

The second factor is external and is related to the changes in the national curriculum. Three of the primary teachers agreed that some geographical knowledge is neglected by the Ministry of Education. Thus, when they have to discard content, it is more a practice of forced obsolesce arising from a discussion in which they have not participated as stakeholders, creating for them a sense of misunderstanding of what is subject knowledge. As Carol states:

> '*The ministry [of education] created this 'amoeba' [a Chilean saying referring to something inconsistent] that is Earth Sciences, so now we have all together geography, natural sciences and social sciences… Natural sciences tends to be general topics and small portions of geography*.' Carol [11, 30:31].

The problem with this factor is that most of the teachers still consider they have a good working knowledge in some of the topics that are not currently required by the central government. Indeed, what both factors have in common for the teachers is that sense of having taken away something they regard as useful for their practice. It is not surprising that three of the teachers, regardless age or experience, acknowledged this issue during their interviews.

Discussion

Cross-Cutting Issues in Teachers Subject Expertise

Having just argued that the conceptualisations and strategies held by the primary teachers help us to constitute their knowledge structure, there are some cross-cutting issues that arise from teachers' subject expertise in environment and geography related to geographical and spatial thinking, and professional identity.

Geographical Knowledge

Much of primary teachers' polysemy on geography can also be found in the development of geography as a scientific discipline in Chile.

With regard to the purpose of geographical topics, we feel it is necessary to point out that some of the attributes that teachers assign to the concept of environment discarded the relationships between society and nature. According to Enrique Leff (2001), this is because theoretical discussion of the concept of environment over the last few decades has focused on the idea of the trade-environment relationship. As a result, the environment is envisaged or catalogued in a way that prioritises aspects such as the study of natural resources, or that considers – and economically values – nature as a collection of eco-systemic services, thus forming part of a new geopolitics of nature that expands across various domains. This ties in with the fact that many of the teachers interviewed associated the concept of the environment with ideas such as *looking after nature or our surroundings* or *campaigns against contamination*, as opposed to the idea of understanding the complexity of relationships between human groups and their natural surroundings.

Teachers' physical geography approach seems to be consistent with a modern geography view in close relationship with Humbold's ideas, which in Chile were mainly disseminated by the German geographer Hans Steffen (Sanhueza, 2014) who

contributed to establish the discipline in this country. As Alarcon (2010) argues, this is parallel to the historical process of appropriation of German educational notions in Chile at the end of the 19th and beginning of the 20th centuries. The narratives stated by the teachers would to some extent contribute to explaining to what extent this perspective evolved and is currently rooted in Chile's school geography.

Conversely, narratives informing the landscape and historical approaches are not clearly consistent with a particular human geography tradition. Academic geography in Chile received an important influx from regional geography during the second half of the 20th century as a consequence of processes of industrialisation and descentralisation. French regional geography, with contributors like Vidal de la Blanche, and economic geography, from the Spanish Joan Vila Valenti, were key to shaping human geography's understanding in the country. These specific sets of ideas were enabled by the presence of humanities in Chilean education and the use of historical explanations to understand physical space.

With regard to teachers' geographical knowledge categorisations, by studying geographic space, only in recent years has Chilean geography managed to move towards an understanding of the socio-spatial reality in which the physical and human perspectives are in constant dialogue. Garrido (2009) proposes that the spatial condition of life is configured by the interrelationship of human existence and the natural base. Therefore, within the task of understanding human reality, geographic space reaches a point of "resistance to any fragmentary attempt to understand or explain the world of life" (Garrido, 2009, 13). In geography, the study of geographic space is being approached from various different perspectives, in which this space can be understood as a territory, but also as a landscape, place, environment or region (Gallastegui, 2009).

Even though the three approaches to geographical knowledge seem to be indistinctly used by the teachers, we are not certain if intentionally they establish connections between them or, evenmore, if the relationship between them is considered as part of the content knowledge of geography. This is paradoxical because, at an academic level, this is not a strange idea in Latin America, though it suggests a knowledge transfer problem. The work of the Brazilian geographer Milton Santos (1996) has been informative since the 1970s about the more complex socio-spatial perspectives and his ideas have spread widely across the region. He established that geography is primarily the study of space, but more importantly of the relationships of objects and the actions of people. This idea has recently been address by Moreira (2012) who takes into account the bond between the natural and social worlds. In fact, he makes a conventional argument in contemporary Latin American human geography: the relationship between mankind and nature is spatial, and therefore, geographical. Harvey's (2012) ideas have been interpreted in a similar way with its critique on the role of geography, arguing that it should enhance and not restrict the understanding of the world. There is an understanding that we cannot spatially understand the world without localisation, that is without the relationship that people establish with their own environment (Harvey, 2007).

This raises further questions in terms of acknowledging the similarities or disparities in the way that geographical thinking is dealt with by geographic sciences and primary teachers in Chilean schools.

Spatial Thinking

When we took into account the concept of environment in its relationship with school geography, the former tended to constitute a type of spatial thinking that should not be analysed only from the epistemic point of view of geography. For Gardner (2006) spatial thinking is a type of understanding which is not necessarily connected to the traditional organisation of knowledge in scientific disciplines. Furthermore, it involves the ways in which ordinary people deal with tasks (Bednarz, 2011) that require different levels of spatial intelligence, such as navigation in the case of drivers or layering for architects. However, Capel (1981) discussed during the 1970s that geography, as a discipline, claimed in favour of a comprehensive approach to social phenomena, arguing that experience-based knowledge involved meanings, values, objectives and purposes that are key to understanding space.

Framed as a matter of spatial thinking, teachers' understanding of environment could guarantee a level of transferability not restricted to the local knowledge of the teacher. The Association of American Geographers has an interesting working hypothesis linking spatial skills to mastering geographical knowledge, 'enhancing both factual and conceptual geographic knowledge' (Bednarz, Heffron & Tu Huynh, 2013, 36). We have seen that teachers understand the category of environment by its practicality. However, if we understand the notion of practicality through the lens of spatial thinking, we can understand there are a series of elements which are crossing teachers' conceptualisations that traditional geography cannot provide. For them, environment implies community involvement or taking action. This requires a series of abilities related to problem solving that differ from those traditionally used to understand geographical phenomena academically, which are addressed across the three approaches identified above. As Massey (1984) notes, geography's importance as a science lies in its contribution to society's understanding of the relationship between the diverse elements that make up its reality (the economy, social structure, politics, etc.); these types of relationships are accessible through the daily lives of students and teachers (Catling & Martin, 2011).

Nevertheless, we do believe that geography as a structured set of knowledge offers a wealth of perspectives that would enable a deeper understanding of these relationships in people's daily lives, i.e. a deeper spatial thinking.

Professional Identity

Subject knowledge (Alexandre, 2009) not only arises as a matter of understanding but also as a defining factor in teachers' professional identity (Kennedy, 2014). This is an element that informs teachers' daily practices (Lambert & Jones, 2013) and is close to what we have called above the *teachers' approaches to knowledge*: physical geography, landscape and humanities.

We can identify the different types of teachers by the approach which they assume to perform their lessons. In this case, the approach is not only a technical tool, it is also considered as a representation of teachers' preferences (Brooks, 2010). By identifying the approach, we are also considering the self-image that teachers have of themselves and which tells us about the priorities primary teachers would have in issues of curriculum making. For instance, a physical geography teacher would spend more time explaining to the students the features of their surroundings using climatology and cartography as primary sources than a humanities one.

Teachers' approaches are also used to establish practice boundaries. Generally, Chilean teachers in this area have expertise in history and geography, so most of those who define themselves from a physical geography setting will most likely be separating both bodies of knowledge. One is the geography: measurable and observable; and the other is history: identity related and symbolically constructed. In this case, teachers' professional identity is polarise and most of the time the teacher would define themselves as 'history teacher'. In the other two approaches, teachers tend to assume a mixed view, using concepts of geography and history interchangeably. However, when teachers assume a landscape related approach, there is an interesting pattern of usage for the concept of environment, incorporating conceptualisations with a natural sciences angle, such as 'water cycle', 'climate change' or 'erosion', that are going to complement the explanations produced from a cultural angle.

The different approaches allow us to define groups of teachers with shared beliefs, in terms of Kuhn's (1996) paradigms. Thus, their strategies of practice and boundary definitions are also the means by which teachers accommodate their practices and endure the changes in the system during their professional trajectory. For Young & Muller (2014), professions that are linked to a scientific discipline commonly have a core concept or idea that defines the area. When Carol [11, 30:31] is talking about this new 'amoeba that is earth sciences', she is expressing frustration at the fact that the core facts and arguments that belong to geography are now becoming part of natural sciences. This is an important controversy that entails recent curriculum changes indicated by Carol as conflicting with her capacity as a professional and creating a crisis in her conceptualisation of her subject expertise and, therefore, re-signifying her practices to the new national requirements.

Conclusion

Generally, primary school teachers approach to the study of geography, i.e. of space, is mostly based on their academic-professional training. We have noted, while acknowledging some exceptions, that teachers who have training in the exact sciences – like biology or mathematics – envisage geographic space more in terms of the world's relief features, hydrology and climate; whereas teachers with a humanities background – for example, language or history – tend to envisage geography from a more holistic perspective. Even though it is based in its academic discipline, the school subject of geography is transforming its paradigms to be environmentally driven, incorporating the concept of environment and encompassing in this view cultural backgrounds at local and national levels.

As for the limitations of the study, the sample bias is relevant, as teachers' rural context might envisaged a more favourable assessment of geography than their urban colleagues. However, we constructed the interview questions to take into account this element, and in the analysis we established generalisations on the basis of arguments that were related to cross-cutting issues for most of the teachers or that were in connection with a national level.

Future research should take into account traditions in the school system and how they were implemented to make them so resilient, considering that there are conceptualisations in Chilean school geography which still retain its basic structure with more or less viability to explain the world for students. In fact, to investigate particular traditions regarding human geography, it would be useful to ask teachers about their history initial teachers' training and how they use this to explain geographical issues.

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References

Alarcon, C. (2010) *El discurso pedagogico fundacional de docentes secundarios. Sobre la transferencia educativa alemana en Chile (1889-1910)*, Buenos Aires: Flacso.

Alexandre, F. (2009) 'Epistemological awareness and geographical education in Portugal: the practice of newly qualified teachers', *International research in Geographical and Environmental Education*, 18(4), 253-259.

Araya, F. (2007) 'Educación geográfica para la formación ciudadana', *Didáctica geográfica, 3ª época*, 9, 153-168.

Bartels, B., Ermel, U., Sandborn, P. & Pecht, M. (2012) *Strategies to the Prediction, Mitigation and Management of Product Obsolescence.* New Jersey: Wiley.

Bednarz, S.W. (2011) *Spatial literacy in the geographical sciences. Curriculum Making in Geography,* London: Institute of Education, University of London and International Geographical Union Commission on Geographic Education.

Bednardz, S., Heffron, S. & Tu Huynh, N.. (2013) *Geography Education Research. Recommendations and guidelines for research in geography education.* Washington D.C.: Association of American Geograhers.

Berger, P., & Luckmann, T. (1968) *La construcción social de la realidad*, Buenos Aires: Amorrortu.

Brooks, C. (2006) 'Exploring Issues of Validity in a Study of Geography Teachers' Subject Knowledge'. *Research in Geographic Education*, 8, 59-72.

Brooks, C. (2010) 'Why geography teachers' subject expertise matters', *Geography*, 95(3), Autumn, 143-148.

Butler, J. (1993) *Bodies that matter. On the discursive limits of sex*, London: Routledge.

Capel, H. (1981) *Filosofía y ciencia en la Geografía Contemporánea. Una introducción a la geografía*, Barcelona: Barcanova.

Catling, S., & Martin, F. (2011). Contesting powerful knowledge: the primary geographical curriculum as an articulation between academic and children's (ethno-) geographies. *The curriculum journal*, 22(3), 317-335.

Coll, C. (1993) *El constructivismo en el aula*, Barcelona: Graó.

Collins, H M & Evans, R J (2002) 'The Third Wave of Science Studies: Studies of Expertise and Experience', *Social Studies of Sciences*, 32(2), 235-96.

Ericsson, A., Charness, N., Feltovich, P. & Hoffman, R. (2006) *The Cambridge Handbook of Expertise and Expert Performance*, Cambridge: Cambridge University Press.

Elliott, R. & Timulak, L. (2005) Descriptive and interpretive approaches to qualitative research. In J. Miles & P. Gilbert (eds.), *A Handbook of Research Methods in Clinical and Health Psychology* . Oxford: Oxford University Press, 147-159.

Flick, U. (2007) *Designing qualitative research*, London: SAGE.

Gallastegui, J. (2009) *Espacios para una geografía social, humanista y crítica*, Valparaíso: Punta Ángeles.

Gardner, H. (2006) *Multiple Intelligences: New horizons*, New York: Basic Books.

Garrido, M. (2009) 'Introducción' in Garrido, M. (Ed.). *La espesura del lugar. Reflexiones sobre el espacio en el mundo educativo*, Santiago: Ediciones de la Universidad Academia de Humanismo Cristiano.

Garrido, M. (2013a nov) *El currículo como espacio político: La batalla de la geografía escolar por recomponer un sentido*. Paper presented at the XXXV Congreso Nacional y XX Internacional de Geografía – SOCHIGEO, Valdivia, Chile.

Garrido, M. (2013b) 'The place where waters murmur: Taught and learned Andean space', *Review of International Geographical Education Online RIGEO*, Volume 3(1), Spring, 26-55.

Georgudis, B.; Ortiz, J. (1982) 'Diagnóstico-evaluación del cumplimiento del programa de Geografía en la Educación Media', *Revista de Geografia Norte Grande*, 16, 39-42,.

Giddens, A. (1997). *Las nuevas reglas del método sociológico: Crítica positiva de las sociologías comprensivas*, Buenos Aires: Amorrortu.

González, I. (2002) 'El conocimiento geográfico e histórico educativo: la construcción de un saber científico', In Ministerio de Educación, *La geografía y la historia, elementos del medio*, Madrid: Ministerio de Educación.

Harvey, D. (2007) *Espacios del Capital. Hacia una Geografía Política*, Barcelona: Akal.

Harvey, D. (2012) *La Geografía como oportunidad política de resistencia y construcción de alternativas*, Santiago: Ediciones de la Universidad Academia de Humanismo Cristiano.

Kennedy, A. (2014) 'Models of Continuing Professional Development: a framework for analysis', *Professional Development in Education*, Volume 40(3).

Jasanoff, S. (2003) 'Breaking the waves in science studies: comment on H.M. Collins and Roberts Evans, 'The third wave of science studies', *Social Studies of Science*, 33, 389.

Kuhn, T. (1996) *The Structure of Scientific Revolutions*. Chicago: The University of Chicago Press.

Lambert, D. & Jones, M. (2013) *Debates on Geography Education*, London: Routledge.

Leff, E. (2001) 'Presentación' in Leff, E. and Bastida, M. (Eds.) *Comercio, Medio Ambiente y Desarrollo Sustentable. Perspectivas de América Latina y El Caribe,* México D.F.: Programa de las Naciones Unidas para el Medio Ambiente.

Massey, D. (1984) *La Geografía Importa*, Cambridge: Cambridge University Press.

Marzano, R. & Pickering, D. (2005) *Dimensiones del aprendizaje*, Mexico D.F.: ITESO.

MINEDUC (2012) *Bases Curriculares 2012*, Santiago de Chile: MINEDUC. Retrieved from http://www.curriculumenlineamineduc.cl/605/articles-21320_programa.pdf.

Monereo, C. (1997) *Las estrategias de aprendizaje*, Barcelona: Edebé.

Moreira, R. (2012) *Geografía e praxis*, São Paulo: Editora Contexto.

Pozo, J, & Postigo, Y. (2000) *Los procedimientos como contenidos escolares*, Barcelona: Edebé.

Santos, M. (1996) *La naturaleza del espacio*, Barcelona: Ariel.

Sanhueza, C. (2014) *Geografía en acción. Práctica disciplinaria de Hans Steffen en Chile (1889-1913)*, Santiago de Chile: Editorial Universitaria.

Seale, C., Gobo, G., Gubrium, J. & Silverman, D. (2004) *Qualitative Research Practice*, London: SAGE.

Solem, M., Lambert, D. & Tani, S. (2013) 'Geocapabilities: Toward an international framework for researching the purposes and values of geography education', *Review of International Geographical Education Online* [*RIGEO*], 3(3), winter, 214-229.

Young, Michel and Muller, J. (2014) *Knowledge, expertise and professions*, New York: Routledge.

Walshe, N. (2007) 'Understanding Teachers' Conceptualisations of Geography', *International Research in Geographical and Environmental Education*, 16(2), 97-119.

Wynne, B. (1996) 'May the sheep safely graze? A reflexive view of the expert-lay knowledge divide' in S. Lash, B. Szerszynski & B. Wynne (Eds.) *Risk, environment and modernity: towards a new ecology*, London: Sage, 44-83.

Biographical statements

MSc Victor Salinas-Silva is teaching fellow and researcher of the Geography Education Laboratory at Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile. His research interests are related with historical geography, methodology and environmental education with focus on natural hazards, Victor also works as a teacher trainer.

Dr. Andoni Arenas-Martija is professor at Instituto de Geografía and head researcher of the Geography Education Laboratory at Pontificia Universidad Católica de

Valparaíso, Valparaíso, Chile. The focus of his work is on geography teacher training and geographical thinking. He is part of the board at the Chilean Geographical Society and his interest are related to cultural geography.

Patricio Perez-Gallardo is researcher of the Geography Education Laboratory at Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile. His research interests are related to political geography of environment and cultural geography, Patricio also works as a GIS specialist in the public sector.

Appendix 1

Interview Questions.

Tell us about you,
• Where did you study? • What type of preparation in Geography did you have? • How long have you been teaching? • In what type of schools do you have experience? • What are the characteristics of your students and the area of the school?
How prepared do you feel to teach the subject? Why?
• How do you prepare yourself to perform a class in this subject?
Could you explain us the kind of issues that are in the local area?
• Do you use the students' context in your classes?
Do you consider [local environmental issues/recent natural disaster] as an opportunity to teach the subject? Or seize the attention of students to explain determined topics of your interest?
• How was the experience of 2010's earthquake [or other event that national media covered]? Did the children ask you about these catastrophic events? • How did you explain that phenomena to them?
How would you define geography? **How would you define environment?**
• What kind of relationship would you suggest there is between Geography and Environment? • Why do you think that [Environment/Geography] would be import for your students?
Could you describe your favourite lesson?
• What kind of resources do you use? • How do you use the map?