A visual study of learning spaces in primary schools and classrooms in Switzerland and Malta. The relevance of schoolscape studies for teacher education

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Abstract: This paper introduces learning spaces in two multilingual countries, Switzerland and Malta, with the aim to interpret space in terms of social practices related to teaching and learning. The visual study draws on schoolscape studies and the conceptualization of space in education. The comparative analysis of 913 photographs collected from two schools aims to bring to light the similarities and differences in the respective learning spaces. A comparative approach is taken in order to explore the strange in the familiar context and to prompt reflections about learning spaces. Further, based on the result of the visual study, this article discusses how schoolscape studies may prove to be a potentially useful pedagogical tool in teacher education.
Keywords: schoolscape, teacher education, learning spaces, visual study curriculum

Introduction

Upon entering a school building the observer is confronted with a space and a place for learning. Schools represent a specific form of 'spatialization' (Jaworski & Thurlow, 2010), by which space comes to be represented,

organised and experienced. Seminal work on this idea was done by Harvey (1996), who writes about the process of urbanisation, noting how space, time, place and nature are constituted and represented in relation to each other through social practices. The complex social process of place-making involves simultaneous elements of language and discourse; beliefs, values and desires; institutions and rituals, material practices, social relations and power. Whereas schoolscape studies have concentrated on the visible language by investigating language ideologies (Brown, 2012, Laihonen & Szabó, 2017), minority languages (Bíró, 2016) or translanguaging (Straszer, 2017), we focus on the use of space inside the school building, and our aim is to interpret space in terms of social practices related to teaching and learning.

The authors of this paper are all involved in teacher education, albeit with different areas of specialisation. While Krompák is based in Switzerland, Camilleri Grima and Farrugia are based in Malta. Our common interest in learning spaces, prompted us to explore educational spaces in the two countries and compare the learning spaces in the schoolscape. The comparative analysis is based on a bank of digital photographs collected in two different primary schools, one in Switzerland and another one in Malta. We follow Jaworski and Thurlow (2010) in considering written language as it interacts with other discursive modalities such as visual images and architectural features. Hence, we undertake a discussion of a particular aspect of the curriculum which is "situated text-space relationships in terms of their contexts of emplacement (or use)" (Jaworski & Thurlow, 2010, p. 14). In its narrow definition, a curriculum encapsulates a list of content to be taught, that is, "the subjects studied in a school" (McIntosh, 2013, p. 369). The broader view of curriculum encompasses all the experiences encountered by the learners. Rogers (1996) claims that "curriculum is not only what you say but how you say it! Curriculum is all the planned experiences to which the learner may be exposed in order to achieve learning goals" (p. 176). Jess, Carse and Keary (2016) consider the curriculum as "a complex and ecological learning process" (p. 510) that is made up of three elements: the teacher who is at the heart of the process of knowledge and understanding, the environment in which learners and teachers work, and the learning tasks. In this article we are concerned with the environment as part of the curricular process. In particular, we place our attention on architectural forms or physical spaces and wall displays, which are very common features in schools and classrooms. The aim of the comparison of the two learning contexts is to address the following research questions: (i) *What are the visible learning spaces in the two schools? (ii) What elements of the curriculum are visible in the*

schoolscape? (iii) *How can one use schoolscape as a pedagogical tool in teacher education?* Hence, our ultimate aim is not the specific similarities and differences in the respective schoolscapes *per se*, but to show how focusing on various learning spaces and visuals through a comparative lens can prompt reflections on curriculum and pedagogy.

The first part of the paper describes the theoretical framing of the study, namely, schoolscape and learning space. The second part comprises an overview of the methodology of the study and this is followed by the presentation of data, by way of photos and short descriptions. In the final part of the paper, we discuss the results and present pedagogical implications of the study. Thus we highlight the potential use of schoolscape studies in the training of teachers.

Schoolscape

The sociolinguistic research field of linguistic landscape focuses on signs and explores language and semiotics (sounds, scents and body language) in public spaces. Within the emerging field of linguistic landscape, schoolscape represents a relatively new area of research. According to Brown (2012) the physical setting where learning takes place is explored to understand language ideologies in the schools. Therefore, the term schoolscape is used to "refer to the school-based environment where place and text, both written (graphic) and oral, constitute, reproduce, and transform language ideologies" (Brown, 2012, p. 282). By including the notion of 'space' in the material environment, Szabó (2015) extended the definition of schoolscape to a "reference to the visual and spatial organisation of educational spaces, with special emphasis on inscriptions, images and the arrangement of the furniture" (Szabó 2015, p. 24). Straszer (2017) explored how translanguaging spaces are created with the visual materials inside and outside of the pre-school building. In the investigated context, teachers created a translanguaging space, using images in both in minority (Finnish) and majority (Swedish) languages. The Finnish language dominated in the Finnish section "as an identity marker, which strengthens the sense of connectedness for both children and parents" (ibid, p. 144).

The main trend in the schoolscape research includes the investigation of *language policy* (Brown, 2012; Szabó, 2015; Laihonen & Tódor, 2017) or of the *hidden curriculum* (Tódor, 2014, Laihonen & Szabó, 2017) in bi- and multilingual contexts. These studies focus especially on the *visibility of*

minority languages, like the Võro language in Estonia (Brown, 2005, 2012), Hungarian in Romania (Tódor, 2014), or on *mixed languages use* such as Philipino, Bikol and English in the schoolscape in the Philippines (Fresnido Astillero, 2017), on *translanguaging* in Finnish pre-school (Straszer, 2017), and on schools with *bilingual programmes* (Dressler, 2015) or with *immersion programmes* (Pakarinen & Björklund, 2017).

In the present study we concentrate less on languages and more on learning spaces as a crucial part of semiotic practices in schools, following the new paradigm in linguistic landscape research, and spatialization (Jaworski & Thurlow, 2010).

Learning spaces

We understand the concept of 'Space' as "a resource in the meaning-making process" (Leijon, 2016, p. 93). Furthermore, the notion of 'spatialization' according to Jaworski and Thurlow (2010), refers to the "processes by which space comes to be represented, organised and experienced" (p. 7).

'Learning Space' in particular, refers to "A community of practice [that] exemplifies how a *space* – physical or metaphorical – is socially constructed as a *place* that is meaningful and relevant to the members of the community and to the social practices and identities in which they are invested" (Kocatepe, 2018, p. 145). Mulcahy et al. (2015) specify that the term learning space should be understood as a verb, which includes the "multiplicity and mutability of spatial and pedagogic practices" (p. 590-591). Drawing on these definitions, we consider 'learning space' as a socially constructed space, which includes the physical, and the interactional aspects of space in order to support learning processes. In this discussion, we analyse the physical aspects of the learning space, by comparing the semiotic landscape of the two schools. The physical aspects include architectural features, furniture, artefacts, visuals, and texts, while the interactional aspects involve teachers' and students' contributions in the learning set-up and/or the actual use of the space. The interaction between the physical space and the user constitutes the learning process. Essentially, our interest is in what Selander and Kress (2010) refer to as design *for* learning. As explained in Leijon (2016), this implies an interest in the institutional framing, settings and conditions for learning, such as (visual) institutional norms, curricula and learning resources.

Research methodology

Our study may be termed 'a visual study'. Margolis (2007a) states that researchers can focus on the 'visible curriculum' by noting various aspects of the educational context such as the organisation of student and teacher bodies, spaces within the school building, art work, graffiti and visible traces of gender, race and social class. In a collection of studies (Margolis, 2007b), one finds reflections on political and social meanings based on the study of teachers' and students' drawings in the U.S. and Iran respectively (Ganesh, 2007; Gharahbeiglu, 2007); Mah (2007) uses photographic archives and architectural drawings to analyse the colonial educational landscape in Canada; Marquez-Zenkov (2007) uses photography as a research tool in her study in which she collected verbal and written accounts of students' beliefs about schooling.

Prosser (2007) highlights the significance of the elements of the expression 'visual culture of schools'. He points out that the 'visual' element gives primacy to what is visually perceived (rather that what is said, written or statistically measured), while 'culture' draws attention to "taken-for-grantedness and the unquestioned and unwritten codes of habitual practice" (p.14). The space called 'schools' provides the context in which the visual culture is situated and enacted. Indeed, a key aim of our study was precisely to show how one might bring to the fore taken-for-granted elements of the school context and culture *by interpreting it in the light of another context* and hence to render 'the familiar strange' (Amann and Hirschauer, 1997). Adamson (2012, p.646) states that the value of comparative research is that "we may not appreciate the contextual influences on our own beliefs and practices unless we are given insights into another context".

Our investigated sites shared common features, and hence the general school layout, and classroom and display 'set-ups' were, in some ways, familiar scenes to the researchers from both countries. However, the comparative approach taken was intended not only to establish a *tertium comparationis*, that is, a "shared point of reference" (Huf, 2017, p.19), or something/s that the two contexts have in common, but also to draw out differences. After all, the meaning of a learning space, that is, how the learning space is designed and used, depends on the cultural and curricular background of a specific country and is likely to reflect relevant aspects of students' and teachers' identity and diversity.

According to Prosser (2007), "A good starting point to understanding the visual culture of classrooms is to view them devoid of teachers and pupils [….]. One approach is to construct a systematic and comprehensive photo-inventory" (p.22). Hence, this was the approach we adopted for our study, and our data constituted a bank of digital photos taken in the two schools either after school hours, or by avoiding the inclusion of human participants in the photos.

Research Design

The schools
The primary schools were chosen through the method of convenience sampling, hence, in both countries, the choice was opportunistic (Wellington, 2000). The researchers were acquainted with the respective Heads of school, who kindly allowed the researchers into their schools. The Swiss school was visited by one of the authors (Krompák), while the Malta school was visited by two researchers (Krompák and Camilleri Grima).

The Swiss primary state school consisted of Grades 1 to 6 (children aged 6 to 12). It was located in a city in the German speaking part of Switzerland, in a neighbourhood with a high percentage of migrant population. Of the school's population, 85% of the students had an immigrant background and were multilingual with a total of 36 different official and non-official languages. Whereas the language of instruction was Standard German, the local variety of Swiss German was the language of oral communication especially during the lunch-break or in colloquial communication with and between the teachers. Data collection in Switzerland took place in August 2017, mainly outside school hours. A total of 360 photos were taken in 18 classes and 18 group-work rooms.

The Maltese school was a boys' Catholic primary school (Grades 1 to 6, children aged 5 to 11). It formed part of a bigger complex that included a secondary school. Approximately 90% of boys were from Maltese-speaking families, while the rest had one or more non-Maltese parents. Learners and teachers in this school were bilingual in Maltese and English; Maltese being the national and an official language, and English being the second official language (Malta was a British colony from 1800 to 1964). From Camilleri Grima's knowledge of the school, and Camilleri Grima and Farrugia's familiarity with common language practices in Maltese schools, we can say that both languages were used in classrooms, often with code-switching. Data

collection in Malta took place in October 2017, outside school hours. A total of 553 photos were taken from two corridors and six classes (Grades 4, 5 and 6).

The approach

With regard to our approach, we adopted an analysis of visual content and followed a Grounded Theory approach. Charmaz (2014) describes Grounded Theory methods as "systematic yet flexible guidelines for collecting and analysing qualitative data to construct theory from the data themselves" (p.1). We decided to focus on the interior of the schools. Thus, outdoor spaces, such as the school yard, are not included. Then, having taken a large number of photos inside the school buildings, we analysed the images by using codes and categories, refining these as we viewed the photos in an iterative manner, and engaged in discussion amongst ourselves. By categories we mean architectural features, boards, wall displays and language, while by codes we mean specific points of interest within a category, such as, class, corridor and dedicated corner within the category 'architectural features'; use of colour and aspects of content within 'boards and wall displays'; and the languages used such as Maltese, English, Standard German and Swiss German within the category 'language'.

It is important to stress that our aim is not to list the similarities and differences observed *per se*. One certainly cannot generalise these to national contexts on the basis of two schools that were visited at a particular time of the academic year. We also acknowledge that, at this stage in the development of the research idea, the interpretation of the sites is that of the authors. However, at this stage we wished to experience for ourselves the process that one might go through as a trainee (or possibly, even as in-service teachers) presented with a series of photos on which to reflect. This paper offers a comparative analysis of learning spaces in two different educational contexts (Switzerland and Malta), in which the researchers are at the same time insider and outsider.

Analysis of the Visual Data

In the first step, the research team discussed the data set and categorized the 913 photographs along thematic categories and authorship. As part of our analysis, we identified four main categories of learning spaces: *architectural features*, *dedicated corners*, *boards*, and *wall displays*. These categories fitted with our definition of learning spaces that support learning processes, and as explained earlier, the focus of this first study was to consider *physical and*

visual aspects. We also categorized the images based on the authorship of the sign. Following linguistic landscape research (e.g., Backhaus, 2007; Blommaert, 2013), we distinguish between *top-down* signs, e.g. standardised posters made by commercial firms, and *bottom-up* signs made by the teachers and students. In the group of bottom-up signs we differentiate further between signs made by the teacher - *teacher authorship* and signs made by students – *student authorship*. In the second step, key images were selected from each category (Pink, 2006) and coded applying the Grounded Theory by Charmaz (2006). In this section, we present the key images of both schoolscapes and their interpretation. A photo taken in the Swiss school is presented first (top), followed by a photo taken in the Maltese school (bottom).

Overview of architectural features, dedicated corners, boards and wall displays

a) Architectural features

The Swiss school was housed in a building that was over 100 years old; the basement and attic were also used as learning spaces. The toilets were located in the corridor and an area for bags and coats was also in the corridor, in front of the classrooms. When not in use, classrooms were left unlocked. The Maltese school had been recently built; each classroom had its own toilet and an area for bags and coats. The classrooms were locked when not in use (e.g. during break time and after school hours). Whereas in Switzerland the school building is always open and anyone is free to enter, in Malta, all schools are locked and one can only enter with permission.

We coded this significant difference as *open and closed learning spaces.* The Swiss attic did not seem to be used as significant work display area. In Malta, the students' work was amply displayed in the corridors. This gave the impression that whether the classroom is either occupied or locked, the work carried out inside the classroom can be enjoyed by all the other students in the school. The content on display in the school corridor in Malta was varied and ranged from students' writing about themselves, to writing about social and environmental issues, to advertisements for the students' council elections.

Fig. 1a & 1b. Attic in the Swiss school
and corridor in the Maltese school

b) Dedicated corners in classrooms

The Swiss classrooms were large and spacious, and *'dedicated' corners* for reading and relaxation as a *multifunctional learning space* were available. There were other specific dedicated corners such as a *pet corner* with mice in one classroom. The Maltese classrooms were smaller and more crowded by comparison; the tables and chairs filled the room, leaving only small corners for book-shelves and cupboards. In one classroom, there was a *prayer corner*, emanating a peaceful, reflective aura. The prayer corner is a symbol of a *Catholic school identity*.

Fig. 2a & 2b. Classroom corners

According to Morrow (1984) when there is a library corner in the classroom the children read 50% more books. He also stresses that library corners should be quiet, partitioned off for privacy, have easy access and provide comfortable seating, including pillows, rugs and story props. While the available space in the Swiss classrooms makes this possible, in Malta this was not possible. This prompts us to wonder to what extent educational and pedagogical issues are kept in mind by architects who design school

buildings, or what other physical constraints impinge on design, especially considering that the school building in Malta was new.

c) Boards

Fig. 3a & 3b. Boards

In the Swiss school, multi-sited chalkboards were used, and one of them was centrally located at the front of the room. The boards were used extensively for both writing and displays. The information was often retained after lessons, rendering it '*semi-permanent*'. Other single blackboards were placed on the side wall and aimed to inform the students e.g. about the homework. In Malta, interactive boards were the norm; these too were centrally located, while a smaller whiteboard could be found to the side. The whiteboard is always kept clean and what is shown on it is treated as a *non-permanent* display. Milo-Shussman (2017) draws attention to the positioning of boards and displays, and emphasises that teachers need to determine the appropriate

amount of elements to be on display. For instance, if there is too much information on, or around, the whiteboard or blackboard, this might be distracting for learners. Visual overload, or 'visual noise', impairs the learners' ability to see and understand what they see (Milo-Shussman, 2017). Furthermore, Fisher, Godwin and Seltman (2014) found that overuse of colour and overloaded displays lowered students' scholastic achievement and more time was required for the completion of tasks. We believe that all student-teachers and teachers need to be more aware of such an important visual impact.

d) Wall displays

From the analysis of wall displays as signs, four different categories emerged, based on the content and the aim of the sign: *subject* (e.g. maths, languages, or social science), *learning strategies* (e.g. how to solve a problem), *socialisation* (e.g. rules) and *identity and diversity* (e.g. bilingual and multilingual signage). In both schools, there were charts that had been commercially produced (top-down), and others produced by the teacher/students themselves (bottom-up). In the Swiss school, the wall displays were prepared by both the teacher (*teacher authorship*) and the students (*student authorship*), while in the Maltese school, the displays were mainly '*teacher authorship*', that is, they were produced and organised by the teacher, and not by the students. In Malta, as can be attested by Camilleri Grima and Farrugia, it is customary for what the teacher considers to be 'key ideas' to be displayed in class, together with samples of the children's work. Indeed, one might say that it is 'expected' that the walls of a primary classroom are covered with displays. In some classrooms there was, indeed, a display of learners' work, but since the photos were taken at the beginning of the scholastic year not much work had as yet been carried out by learners.

Fig. 4a & 4b. Bottom-up and top-down displays

A very important point is made by Milo-Shussman (2017) with regard to the display of children's work and other class displays. With reference to children's work, Milo-Shussman (ibid.) argues that these should be at students' eye-level as this creates a sense of ownership. Furthermore, the space allocated to displays such as location in the classroom and height,

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depends on the content of the display and its objectives. For example, material used during lessons or that has to be memorised should be easy to see by everyone while sitting down, but students' work and social displays like birthdays, should be placed on the rear wall (Milo-Shussman, 2017). We return to this argument below.

Displays and Socialisation
   (a) <u>Rules of behaviour</u>
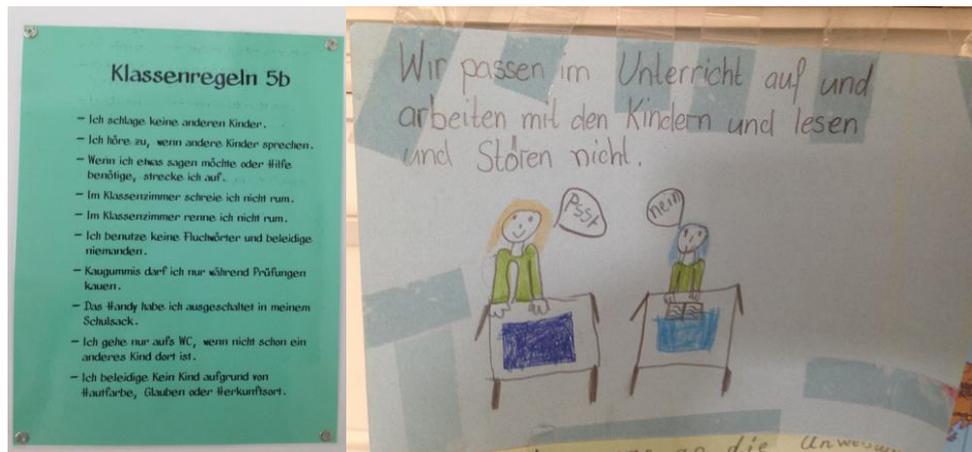
Fig. 5a, 5b & 5c. Class rules

In both contexts, there were displays that referred to behaviour, for example "Be kind to others" and so on. In the Swiss school, such displays were sometimes created by the students themselves, so that through their own drawings and notes, students took responsibility of their own behaviour. For example, one drawing was annotated as follows (translated from German): "*We are attentive in the lesson and we work with the [other] children and do not disturb*" (Fig. 5b). Class rules were written in Standard German in the Swiss school and in English in the Maltese school. The frequent presence of signs with *rules of behaviour* indicate the *significant role of school in socialisation* (Fend, 2007). Roberts (2003) argues that using a themed approach when dealing with life skills can make a set of lessons stand out from the rest and it invites interest from learners and other stakeholders like parents and student-teachers. Thus, when the focus is on social and life skills, it is recommended that space both inside and outside of the classroom be used, with several props like signs and furniture, and to change the creative design with each new theme. In the Maltese school, in fact, both the inside walls of the classrooms and the corridors were utilised for themes related to socialisation. However, students' creative writing was hung from the ceiling, above pupils' heads in a way that was impossible for pupils to read. Yet again, we note the importance of drawing teachers' attention to the choice of space and place for learning material by theme, and according to the teaching objectives.

(b) Identity and diversity

In both schools, there were a number of nationalities or language groups represented, although in the Swiss school the number of immigrant students was very high (85%) when compared to the number of non-Maltese students in the Maltese school (10%). However, in both cases, there was *limited evidence on display of multiculturalism/plurilingualism*. In the Swiss school, there was a 'Cultural calendar' in some of the classrooms, marking key celebrations/dates of different cultures, and in another class there was a streamer of pictures (e.g., Fig. 6a) with '*Welcome*' written in different languages or a vocabulary list in different languages. Apart from these examples however, the dominant language in the displayed texts was Standard German. Similarly, in the Maltese school there was a display in one corridor showing children hailing from different countries (e.g. Pakistan), but no other reference was made to the variety of cultures that might have been

represented by the children, and all displayed written texts were either in Maltese or in English.

Fig. 6a & 6b. Pluri- /Bilingualism

In the Maltese context in particular, *bilingualism appears as two monolingualisms*, e.g. Maltese as a subject, and English as another subject. We find a few examples for *translated bilingualism* as in the sign above (Fig. 6b). In both educational contexts the concept of translanguaging (García & Li Wei, 2014), which considers languages as one linguistic repertoire, was visible in a limited way. There is plenty of evidence from Maltese classrooms (Camilleri Grima, 2013; Farrugia, 2013) that in spoken interaction in the classroom, and specifally for teaching and learning purposes, teachers and students use translanguaging as a pedagogical resource. This practice, however, is not apparent in visual displays. It is very likely that it is not accepted in students' written work either, because translanguaging is penalised in examinations in

Malta. Hence, while it is used spontaneously in speech, it is not used in visual displays and in writing.

Language

    a) <u>Language as medium of instruction</u>
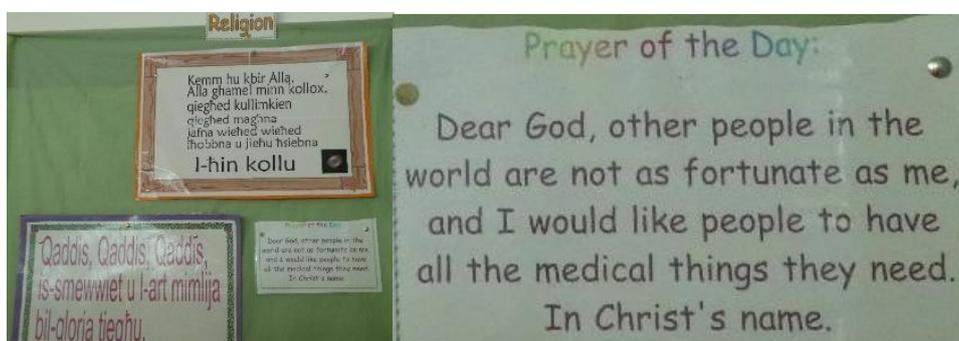
Fig. 7a & 7b, 7c. Language as medium of instruction

In the Swiss school, Standard German was the language of instruction during formal lesson times; it was also the language of written and displayed materials, except for those pertaining to the teaching of French, and the occasional use of English (e.g. a student produced artistic rendering of the word '*Freedom*'). Whereas Standard German represents the official language in schools in the German speaking part of Switzerland, Swiss German is used mainly in different informal contexts. Although multilingualism is supported in the new 'Swiss Curriculum 21', home languages of the students or Swiss German appear as cross-curricular competences and less as an integral part of translingual/multilingual competences (Swiss Curriculum 21, n.d.). In the

Maltese school, both English and Maltese were used as media of instruction, and this was evident through the displays. Indeed, for the curricular subjects Religion and Social Studies, both languages were used as part of the displays; Maltese as a subject was, of course, displayed in Maltese, while other subjects like Science and Mathematics were displayed in English. In Malta, there is an ongoing debate about to what extent should individual languages be enforced as medium of instruction in the different school subjects. The curricular recommendation in 1999 (Ministry of Education, 1999) was that there should be a separation of languages, even as a spoken medium. However, this policy was revised in the 2012 document (Ministry of Education, 2012). Thus, the practice of a bilingual medium of instruction was also visible in these classrooms so that in some subjects the visual displays were in both languages, albeit separately as reported above.

(b) <u>Language as subject: Communication versus grammar</u>
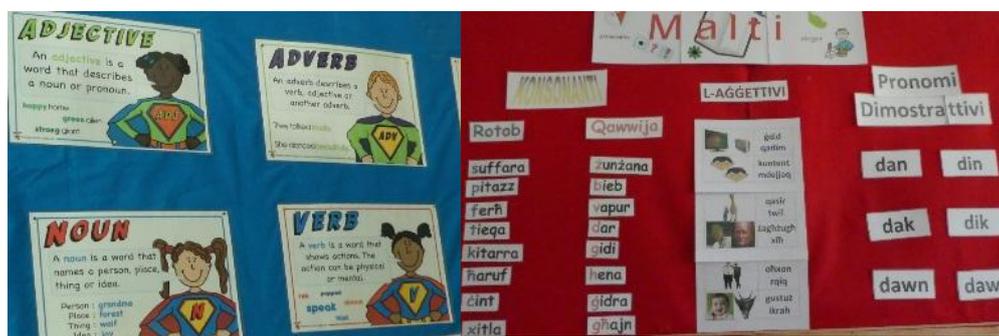
Fig. 8a & 8b, 8c. Language as Grammar

In both schools, there were displays that represented language in terms of grammar. However, this was much more evident in the Maltese school,

where both English and Maltese were displayed as 'subjects' with a strong emphasis on grammatical aspects. In the Swiss school, the grammar element was much less evident, with displayed language generally appearing to serve a more communicative role. Since the advent of the *Common European Framework of Reference* (Council of Europe, 2001), language has become increasingly perceived as a communication resource. Grammar is valued in terms of its relevance and importance for meaning-making (Liamkina & Ryshina-Pankova, 2012). However, on the visual displays in our data, grammar was represented from a structural framework rather than as a tool for manipulating meaning. This was particularly evident in the Maltese school where the charts related to Maltese as a subject presented grammatical structures with examples, but no communicative context.

(c) <u>Cross-curricular competences versus separated subjects</u>

Fig. 9a & 9b. Colourful boards for wall displays

In both schools, colour coding was used for creating a backdrop for wall displays. It seemed to us that the teachers had used colour to create a supportive environment for objects and images on display (Tarr, 2004), albeit differently. In the Swiss school, the colours were used with *illustrative aims*, as

in the example to demonstrate the different historical stages (Fig. 9a). On the other hand, in Malta, colour coding was used to *separate the curricular subjects*, for example, displays related to English might be mounted on a green background, Maths on a red background, and so on (Fig. 9b). Hence, in the Maltese context, the coloured backgrounds served to highlight subject compartmentalisation. From the visual displays only it is difficult to discuss the dynamics of subject fragmentation and to evaluate whether during lesson time there are moments dedicated to the interdisciplinary understanding of content (Kidron & Kali, 2015). Based on our experience of schools, we are confident in assuming that it is unfortunately commonplace to observe a total separation of subject content. For instance, in the teaching and learning of languages, teachers are likely to be unaware of pluralistic approaches (Candelier, Camilleri Grima, Castellotti, de Pietro J-F., Lőrincz, Meissner, Noguerol, & Shröder-Sura, 2012), and their added value and appropriateness in today's classrooms. Given the overwhelming presence of plurilingual pupils in today's classrooms, and hence their potential for greater metalinguistic awareness, it is appropriate that schools be much more sensitive to the visual representations of languages, especially to plurilingualism and multiculturalism.

(d) Displaying subjects: the case of mathematics

As an example of how one might focus on a curricular subject other than language, we focused our attention on mathematics.

In the Swiss school, we found 17 mathematics displays in a total of 36 classrooms and group-work rooms. In addition to the wall displays, there were also some large wooden resources easily visible and accessible. Most of the wall displays showed mathematics being represented through symbols (numerals, dots, operational signs, and so on) and also three-dimensionally (wooden charts for the number). The written language (Standard German) seldom appeared with the aim to support mathematics. One chart showed the number names in French, but the chart was utilised for the learning of French, rather than the learning of mathematics as such. On the other hand, in the Maltese school, mathematics displays were more frequent than in the Swiss school. We found 35 display instances in 6 classrooms. Mathematics was evident through paper/card wall displays, and language was used frequently. The language used was the '*academic' language for mathematics*, that is, English.
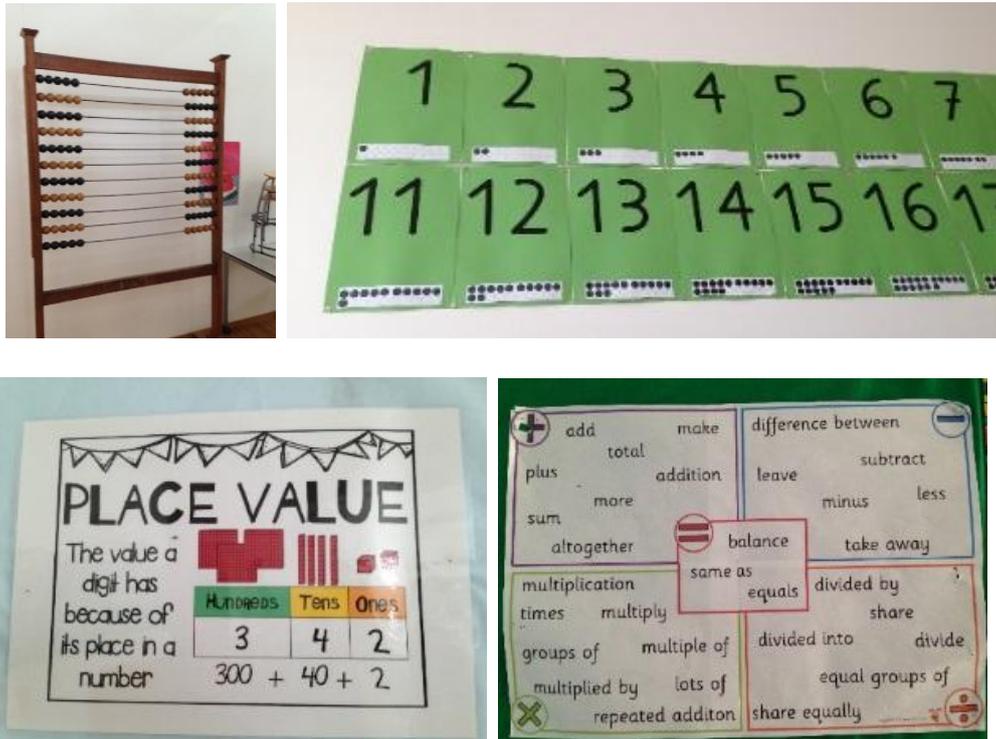
Fig. 10a, 10b & 10c, 10d. Mathematics on display

Several of the examples were related to word problems, such as 'key' terminology that one would expect to find in simple word problems or step-by-step instructions on how to tackle a problem. Bresser, Melanese and Sphar (2009) state that charts that contain key mathematics vocabulary and phrases are helpful references for students for whom the language of instruction is not their home language, although both Bresser et al. and Coggins, Kravin, Coates and Carroll (2007) go on to stress the importance of students *themselves* using the expressions. More generally, with regard to displays, Share (2001) suggests that these should be interactive, and may be designed in such a way as to be used again and again. Due to the nature of our study, the actual use of the noted displays cannot be commented upon; observations in class and interviews with teachers and learners would be necessary to explore whether the displays do indeed bring "mathematics to life through display and enthusiastic participation" (Barrs and Briten, 1995, p. 4).

Discussion

On considering the bank of photos, we could identify a number of similarities and differences in the learning spaces. In terms of similarities, we noted some evidence of *national and regional identity of the students*, similar to the findings

of Laihonen and Tódor (2017), who underlined the "importance of the school as a social space for the public display of local identity" (p. 368). The languages displayed were generally the official languages of schooling in both contexts (Standard German in Switzerland, and English and Maltese in Malta). In Malta, there was a lack of any other visible language, while in Switzerland several languages such as English and French (as subjects) and the home languages of the students appeared in the signage of some classrooms. The quality and quantity of linguistic diversity shown on display is limited in comparison to the quantity of plurilingual students, especially in Switzerland. Rules for behaviour to support learning appeared to be given prominence in both contexts. In fact, they were displayed toward the front of the classroom, thus taking precedence over subject content. *Dedicated corners* were present in both schools, although the purpose of such corners varied, and in the Swiss school they were much larger and better equipped.

In terms of differences, we noted that in the Maltese schools the corridors of the school were treated as an extension of the classroom, giving the impression that the class work was to be willingly shared through display with the rest of the school. On the other hand, the Maltese classrooms were locked when unused, thus limiting access to others when the classroom participants were not present. In the Swiss school, students appeared to have some *agency* with regard to displays *bottom up*; individual work of students was more visible; there was also evidence that students played a role in the actual creation of the learning space, e.g. chairs painted by the students. On the other hand, in Malta, the displays were *top down*, often designed commercially, and managed by the teacher. Even if some of the work displayed was done by students, it appeared to be the teacher who organised the display as the students' work was hanging from the ceiling. While boards were central features of both sets of classrooms, in the Swiss school the *board* was used as a *multifunctional semi-permanent* display of information and/or the learning process, while in Malta the *whiteboards* had a *non-permanent character* and were wiped clean. One important difference relating to curriculum was that in the Swiss school, attention was given to *cross-curricular competencies*, while in Malta clear *boundaries* were kept *between subjects*. The emphasis given to language was different in the two schools, with the grammatical aspect of language being given much more prominence in the Maltese school. Mathematics appeared dominant in the Maltese school; the *mathematics* displays in Malta *utilised mainly English*, while those in the Swiss school tended to represent *mathematics through symbols*. 3D wooden

mathematics resources were visible in the Swiss school, while in Malta mathematics was represented only through flat posters attached to the walls.

Implications for teacher education

Learning spaces in the schoolscape are not fully explored for teacher education. We believe that our investigation of schoolscapes has the potential to contribute to teacher education by offering a method for prompting discussion and reflection among trainees, (or even in-service teachers as part of a professional development session). The aim of using comparative photos is that student-teachers are encouraged to think and reflect on *what* and *why* of learning contexts, and scrutinise the implications for student learning. Four benefits of this process immediately come to mind: First, we anticipate that, as was the case for ourselves, student-teachers may become more aware of features of their own school contexts, including teaching and learning practices and role of language, as a result of comparing their context with another one. Second, through comparison, trainees may be supported to develop an awareness of the (cultural) specificity of schoolscape. Third, pertinent reflections may arise from the process itself of classifying photos. For example, while one might consider a photo in terms of its implications for language, the same photo might be considered in terms of identities. A discussion with regard to how to consider this same photo may highlight, for student-teachers, the overlap between issues of language and identity. Fourth, student-teachers may become more conscious of the purpose of displays. Tarr (2004) recommends that educators "think beyond *decorating* to consider how walls can be used effectively as part of an educational environment." (p.90, our emphasis)

We must state that we are aware of three main limitations of our study. The first is that the spaces photographed were restricted to indoors, and hence we did not explore the outdoor spaces; there may have been important messages to be taken there. The second is that, having taken the photos, we drew out certain categories, to the exclusion of other possible ones. For example, we did not focus on furniture arrangements which, according to Woolner (2010) has an impact on the learning behaviour of students, and the teaching practised by the teacher. The third limitation is that the perspective of the human subjects who operate within the spaces is missing. Further investigation carried out is to include the perspective of different stakeholders. However, despite the parameters set by our chosen research method, we believe that our results can contribute to schoolscape studies and

to education. Moreover, offer a list of reflective questions as a suggestion of our research data might be used in teacher education. The sample questions are shown in Table 1.

Table 1: Sample reflective questions for student-teachers

Examples of reflective questions based on schoolscape
How do architectural features (corridor space and use, and class size) impinge on pedagogy?
What purpose do dedicated corners serve?
What does the positioning of the board imply?
What is the significance of retaining evidence of the learning process on the board?
Why do teachers make use of top down signs? What does this imply?
What codes of behaviour are expected in the school/class? What role does schooling play in socialisation?
To what extent is learners' work displayed? In what ways? Where? And for what reason?
To what extent does the school acknowledge, and build on, multicultural identities of the students?
When and why are different languages displayed separately or together? When and for what purpose is students' home language/s utilised in the school setting?
How is language competence being represented? (e.g. grammar vs communication?)
What is the implication for teaching/learning when subjects are considered separately rather than from a cross-curricular perspective? What does the method of display imply about our view of knowledge?
How does the visible language in the classroom reflect overt and covert language policy?
What different resources can be used to access mathematics (*or any other subject*)? Which of the resources are displayed and why? Where would be the ideal space for display?
In what ways, and to what extent, might learners relate to a subject like mathematics which is taught (and displayed) in a language which is not their home language?

The examples above are somewhat varied since they are based on a variety of photos taken. The process of articulating such questions is, in itself, a useful exercise to carry out with student-teachers and in-service teachers since it promotes reflection on possibly taken-for-granted features of schools.

However, as part of a study module, one might also opt to focus on one aspect captured by a *subset* of the photos, e.g. rules of behaviour, subject compartmentalisation, and so on. In this case, teachers and student-teachers would reflect and research in more detail about one particular aspect.

Conclusion

In this article we have focussed on one aspect of the curriculum: the curricular environment, understood as a learning space or spaces, within the schoolscape. We compared a number and the use of physical and visual features in two schools, one in Switzerland and one in Malta, and in so doing we hope to have created an opportunity for reflection and discussion with teachers and student-teachers about the visual and tangible features of the curriculum. This was the initial step to be followed by more research to include, for example, a critical analysis of a verbal interpretation of the schoolscape by the Head of school, the teachers and the learners; a qualitative analysis of teachers' and student-teachers' reactions and evaluations of schoolscapes; and a larger collection of data from a wider variety of schools. In the meantime, we hope to have brought to the fore the significance of schoolscapes in education.

Acknowledgement

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