

Abstract:

This article focuses on the application of quantitative methods in schoolscape research, including a discussion of its advantages and disadvantages. This article seeks to rehabilitate the quantitative by re-theorizing the landscape in linguistic landscape (LL), moving from an area based study of visible forms to a poststructuralist and postempiricist interpretative study of landscapes. The article discusses previous quantitative LL research and introduces a quantitative approach developed by the author during a data gathering and annotation of 6016 items. Quantitative methods can provide valuable insight to the ordering of reality and the materialized discourses. Furthermore, they can mitigate personal bias. They cannot provide in-depth understanding of the analyzed items due to the inherently reductive nature of classification. However, considering that the objects of inquiry are discourses, not the artifacts themselves, the issue is not paramount. Nevertheless, large scale data gathering and annotation is time consuming, which sets practical limitations to research.

Keywords: schoolscape; linguistic landscape; landscape; education; sociolinguistics

1. Introduction

This article focuses on quantitative schoolscape research and the applied methodology. It examines the few existing studies on the linguistic landscapes (LL) of educational spaces and the applied methods. Furthermore, it re-theorizes landscape and introduces a data annotation scheme developed specifically for schoolsapes. The scheme is based on and inspired by an LL data annotation model presented by Barni and Bagna (2009).

The first part of this article discusses moving from a tradition of area based studies of visible forms (cf. Backhaus 2007, Blackwood & Tufi 2015, Huebner 2006, Soukup 2016) to a poststructuralist and postempiricist interpretative study of landscapes inspired principally by Schein (1997). The second part of the article discusses previous schoolscape research and provides an overview of previous quantitative LL research in the absence of quantitative schoolscape studies. The third part examines conducting quantitative LL research. The fourth part introduces the multidimensional data annotation scheme followed a brief discussion of quantitative data analysis. The fifth and final part addresses its advantages and disadvantages.

2. What is schoolscape?

Brown (2005, p. 79) defines schoolscape as the physical and social setting of teaching and learning, the context in which the curriculum is implemented and where certain ideas and messages are socially supported and officially sanctioned. Brown (2012) further specifies schoolscape as “the school-based environment where place and text, both written (graphic) and oral, constitute, reproduce, and transform language ideologies” (p. 282). To align it with LL research, Brown (2012, pp. 281-282) refers to it as the linguistic landscape of educational spaces.

My understanding of schoolscape as an LL differs from Brown's definitions (2005, 2012). I have no issues with its linguistic component as pertaining to languages, albeit I see great prospect in defining schoolscape as more than linguistic, i.e. semiotic, as done by Laihonon and Tódor (2017) and Szabó (2015). It is the landscape component as understood as an environment marked by artifacts that is arguably problematic, echoing the commonly cited definition of landscape as a delimited area, a

territory or a region by Landry and Bourhis (1997, p. 23). There are exceptions, such as Jaworski and Thurlow (2010) and Leeman and Modan (2009), but I agree with Nash (2016) that there is not enough attention paid to the relevance of landscape in LL research.

There is no single definition of landscape that most (geographic) landscape researchers agree on, except, perhaps, that it is more complex than mere forms or phenomena as given on a delimited piece of land. This is attributable to the rejection of early landscape research (cf. Granö 1929/1997, Sauer 1925/1929) as unscientific by Hartshorne (1939) and to a subsequent reintroduction and reconceptualization of landscape by humanistic geographers in the 1970s (cf. Meinig 1979a). More contemporarily, landscape is approached via representation (cf. Cosgrove & Daniels 1988) and non-representation (cf. Thrift 2008), with discord among landscape researchers on the word itself (cf. Lorimer 2005, Wylie 2007).

In a very abstract sense, following Deleuze (1986/1988), Deleuze and Guattari (1980/1987), Foucault (1975/1995) and Massumi (1992), landscape could be described as an abstract machine or a diagram, a discursive and a non-discursive formation, that entails interpretation. In less abstract terms, Cosgrove (1985) elaborates that landscape as we know it, primarily as a pictorial representation or a view, has its origins in landscape painting and, following Berger (1972), presents it as a way of seeing. Similarly, Ronai (1976, pp. 125, 146) states that there is no landscape in itself, only gaze. More specifically, Cosgrove (1985, p. 55) indicates that landscape is composed and structured by a detached observer. That does not, however, entail that landscape is unique to each observer, rather, following Foucault (1977/1980b, p. 98; 1983, p. 212), it is arguable that one is shaped into an individual, or, rather, as Deleuze (1990/1992, p. 5) puts it, a *dividual*. With less emphasis, Ronai (1976, p. 146) states that

perception of landscape depends on language and culture. Nevertheless, Meinig (1979b) argues that based on one's prior knowledge it is possible to perceive landscape as different versions of the same. Meinig (1979b, p. 47) acknowledges that his list of ten alternatives is not exhaustive. One could easily envision LL as another version of the same, but for reasons unknown it seems that language has rarely been addressed in landscape research (but see Drucker 1984, Weightman 1988). While de-emphasizing Meinig's (1979b) claims on the autonomy of the observer, Schein (1997, pp. 663, 677) takes this insight to entail that landscapes can capture thematic knowledge networks or discourses, which Foucault (1969/1972) defines as “practices that systematically form the object of which they speak” (p. 49). In other words, Schein (1997, pp. 662-663) envisions landscape as a node of intersecting discourses that stretch across space.

Summarizing Schein (1997, p. 663), human actions that alter the landscape by creating tangible elements result in materializing discourses and once materialized in the landscape discourses can discipline, i.e. limit human action and thinking. In other words, landscape involves what Scollon (2008) refers to as a discourse itinerary, a process of transforming discourse into discourse materialized, which reifies or modifies the underlying discourses. The zebra crossing discussed by Blommaert (2013, pp. 34-36) is a good example of discourse materialized in landscape. As Mitchell (2002a, pp. 1-2) puts it, landscape therefore not only is, but also does. Nevertheless, as noted by Lewis (1979, p. 11), for many landscape just is. In Foucault's (1969/1972, p. 25) terms landscape can be understood as an unquestioned continuity of incorporeal discourses, the never-said. Schein (2003, pp. 202-203) argues that landscapes can become seemingly unproblematic to an extent that the materialized discourses become naturalized and normative, making landscape central to the (re)production of everyday life. Cresswell (2003, p. 277) characterizes such landscapes as *doxic*, in reference to Bourdieu's (1972/1977,

p. 164) *doxa*, a system of classification that produces an arbitrary but seemingly natural order of things that can limit human action and thinking in order to reproduce the established order of things, the status quo. Similarly, Duncan (1990) characterizes landscape as “an objectifier *par excellence*” (p. 19).

The analysis of landscape in this article is grounded on Tuan's (1979, pp. 89-90) understanding of landscape as an integrated image, an ordering of reality, consisting of smaller units, which function as subsidiary clues to a larger construct. On their own the units are merely objects, but together they provide information about the discourses materialized in the landscape. Schein (1997, p. 676) argues that landscape is not a mere collection material objects in an area or a sum of history. On the contrary, Schein (1997, pp. 661-662) accentuates that landscape is dynamic, not static; it is a palimpsest, not a sedimentary accumulation of matter. As Bender (2002) and Massey (2006) argue, landscape is not an unchanging totality, despite the stable appearance. Therefore, rather than attempting to reconstruct landscapes piece by piece into particular synthetic scenes (cf. Granö 1929/1997, Sauer 1925/1929), landscapes must be constantly (re)interpreted due to their changing nature, as argued by Schein (1997, p. 676).

Ben-Rafael, Shohamy and Barni (2010) echo Tuan's (1979) definition of landscape. To Ben-Rafael, Shohamy and Barni (2010, pp. xv-xvi) LL is both disorder and order, chaos and gestalt. Ben-Rafael, Shohamy and Barni (2010, p. xvi) argue that as individual units, the signs, appear chaotic, but together, as an *ensemble*, the signs function as one whole, as *un ensemble*, which is more than a mere collection of units, a *gestalt*. Reflecting on Ben-Rafael, Shohamy and Barni (2010), Schein (1997) and Tuan (1979), it is arguable that one should not focus solely on the landscape items as such, otherwise one risks not seeing the overall pattern. In other words, one should see the trees, but not risk seeing the

forest for the trees.

3. Previous schoolscape and linguistic landscape research

Interest in research of schoolscales is relatively recent, albeit similar research has been conducted in the past prior the use of the term by Brown (2005, 2012). As a result, the existing published literature on schoolscales is not particularly extensive and best described as qualitative. Firstly, certain studies focus on either demonstrating the educational function of LL in language acquisition (Malinowski 2015, Rowland 2013) or examining the utility of LL in promoting awareness and teaching cultural and linguistic diversity (Dagenais, Moore, Sabatier, Lamarre & Armand 2009, Clemente, Andrade & Martins 2012, Hancock 2012, Sayer 2010). Secondly, Brown (2005, 2012) approaches schoolscales from an anthropological and ethnographic perspective, combining interviews and observation. Thirdly, Dressler (2015), Hanauer (2009, 2010), Laihonen and Tódor (2017), Linkola (2014) and Szabó (2015) combine digital photography, field notes, interviews, questionnaires and group discussions. Fourthly, only Garvin and Eisenhower (2016) and Gorter and Cenoz (2015a) represent the fairly established approach utilizing photography. None of the studies, however, utilize large sets of data and therefore one must discuss quantitative LL studies in lieu of quantitative schoolscale studies.

LL research predates the widely cited definition of linguistic landscape by Landry and Bourhis (1997). This *avant la lettre* research is primarily quantitative (cf. Conseil de la langue française 2000, Monnier 1989, Rosenbaum, Nadel, Cooper & Fishman 1977, Spolsky & Cooper 1991, Tulp 1978, Wenzel 1998). Similarly, as noted by Barni and Bagna (2015, p. 7), a good deal of the early LL research is quantitative (cf. Backhaus 2007, Bagna & Barni 2005, 2006; Ben-Rafael, Shohamy, Amara &

Trumper-Hecht 2004, 2006; Huebner 2006). What is common in quantitative LL research is that it focuses on the distribution of languages in landscapes. Amos (2016, p. 132) summarizes that quantitative LL studies tend to utilize only a small set of variables in data annotation. Gorter (2013, p. 199) refers to this type of research as the quantitative-distributive approach. The data may well be extensive (cf. Backhaus 2007), but the data annotation is often limited to examination of frequencies of different languages and their spatial distribution, and to a broad interpretive examination of agency as either top-down or bottom-up. Amos (2016, p. 132) notes that this shortcoming was already articulated in Spolsky and Cooper's (1991) study of Jerusalem and one could add that it still persists despite the advances made in digital technologies that permit more complex quantitative inquiries at relative ease.

Landscape can be understood as a text, as written and read (cf. Barnes & Duncan 1992, Cosgrove & Daniels 1988, Duncan 1990, Duncan & Duncan 1988, Duncan & Ley 1993, Lewis 1979, Samuels 1979). If landscape is understood as a text, then the quantitative-distributive approach discussed by Gorter (2013, p. 199) bears similarity to certain restrictive definitions of content analysis (cf. Berelson 1952). Krippendorff (2013, pp. 25-27) acknowledges that in a restrictive sense content analysis is descriptive as it involves counting items and examining frequencies contained in texts. Therefore it does bear similarity to much of the existing quantitative LL research. It has been argued that quantitative LL research is descriptive (Weber & Horner 2012, p. 179) and indicative (Blommaert & Maly 2014, p. 3) and arguably remains to be considered as such if the researchers utilize only a small number of descriptive annotation categories in quantitative studies. However, as argued by Amos (2016, p. 152), this does not have to be the case, just as it is not necessarily the case with content analysis, as maintained by Krippendorff (2013).

Krippendorff (2013, p. 28) refutes that content analysis is restricted to being descriptive and argues that it is rather interpretative than descriptive as texts do not simply contain a message that can be found, uncovered and subsequently described. Krippendorff (2013, p. 29) adds that it would likely be impossible to conduct critical research if the analyst must strictly adhere to the description of the content as universally agreed by everyone. Nevertheless, Krippendorff (2013, pp. 30-31) argues that texts do not permit infinite number of (individual) interpretations, but rather a limited number of them that depend on the context. Similarly, in the context of landscapes, Duncan and Duncan (1988) recognize that meaning is unstable, but nevertheless finite as interpretations depend on the social context; meaning is created collectively and tends to reflect hegemonic discourses. Figure 1 illustrates how prior knowledge affects the analysis:



Figure 1

In figure 1 someone, likely a student, has written 'Ronaldo' accompanied by a heart on to a corridor wall. It is likely, albeit not universal, that people connect the name to a world famous footballer either Cristiano Ronaldo dos Santos Aveiro, the Portuguese national team player, or Ronaldo Luís Nazário de

Lima, the Brazilian national team player, as both are commonly known as Ronaldo. The name itself is by no means inherently Portuguese as it also seems to appear in Spanish and Italian, but it is fair to assume that many make the connection due to the world wide popularity of the football players. Therefore, it can be argued that prior knowledge affects the interpretation of texts.

4. Conducting quantitative LL research

Backhaus (2007, p. 61) and Blackwood (2015, p. 40) summarize three key steps in conducting quantitative LL research. Firstly, the survey area must be delimited. Blackwood (2015, p. 41) notes the selection of representative survey area remains unresolved in LL research. I agree with Gorter and Cenoz (2015b) that a smaller scale, such as a neighborhood (cf. Schein 1997, 2009), a shopping center (cf. Goss 1993, 1999) or a school, is more suitable than a large scale unit, such as a city. Treating an entire city as one landscape defined by the administrative boundaries fails to capture the essence of landscape, its omnipresence (Meinig 1979a, p. 3; Relph 1987, pp. 1-3), which one can rarely escape, except perhaps in a dense forest, as noted by Kalaora and Pelosse (1977, p. 92). Consequently there should be more anxiety over defining landscape rather than the survey area. Secondly, the survey items must be defined. Thirdly, the linguistic categories must be determined.

The key steps of the quantitative-distributive approach elaborated by Backhaus (2007, p. 61) and Blackwood (2015, p. 40) are arguably similar to the research design of content analysis, which requires a set of data, either a population or a sample of it, and a set of categories utilized to annotate the data (Krippendorff 2013, p. 84). The annotation categories should be relevant to research, complement one another and bear analytic significance (Krippendorff 2013, pp. 82-83). Furthermore, the categories

should be developed by testing them on real data (Krippendorff 2013, p. 87). Ideally the annotation scheme should provide identical results on the same set of data, making it replicable (Krippendorff 2013, p. 83). It should be kept in mind, however, that landscape contains no inherent objective meaning as there is no landscape in itself, as argued by Ronai (1976, p. 146). Therefore that ideal is at best an approximation, as acknowledged by both Duncan and Duncan (1988, p. 125) and Krippendorff (2013, p. 83).

5. Units of analysis – physical and semantic definitions

LL is generally considered to be embodied on signs, which function as the survey items in much of LL research (cf. Backhaus 2007, Gorter 2006, Jaworski & Thurlow 2010, Shohamy, Ben-Rafael & Barni 2010, Shohamy & Gorter 2009). In quantitative LL research these signs are often static or fixed items put on public display, such as shop signs. Some include less static items, such as newspapers (Itagi & Singh 2002), skin (Peck & Stroud 2015), spoken data (Shohamy & Waksman 2009) and smells (Pennycook & Otsuji 2015). Jaworski (2015) addresses the signs as two- or three-dimensional language objects of various sizes, extending the range of survey items to various objects ranging from fridge magnets to sculptures. Amos (2016) opts to define units of analysis according to their pragmatic functions.

Influentially among the quantitative studies, Backhaus (2007) defines the unit of analysis in his study as textual and physical; a sign is “any piece of written text within a spatially definable frame” (p. 66). The frame is attached to another physical object, a carrier, such as a wall or a door, or the frame and the carrier may also be the one and the same thing (Backhaus 2007, p. 66). For example, a road sign is a

physical object, a carrier, which itself functions as the sign. A carrier may have more than one surface and therefore the signs on different surfaces are counted as separate from one another (Backhaus 2007, pp. 66-67). A box, for example, has a number of sides that are separate surfaces.

Huebner (2009, pp. 71-72) argues that the definition provided by Backhaus (2007) is problematic as it offers equal importance to signs of different sizes. For example, a sticker and a billboard both count as a single item. It is clear that the lack of differentiation of signs by their physical dimensions is problematic. However, it is also an oversimplification to state that physical size alone determines object salience (cf. Dupont, Ooms, Antrop & Van Eetvelde 2016, Wolfe & Horowitz 2004). Another problem is defining what counts as a definable frame and/or carrier. A carrier, such as a box, has multiple surfaces, marked by each side. However, a non-angular carriers, such as advertising columns, do not have multiple sides, yet the surface cannot be observed in its totality from any given point of view. This is even more problematic considering that it can be difficult to differentiate units even on the side of an angular carrier. For example, graffiti are typically done on to carrier frames, as in figure 2:

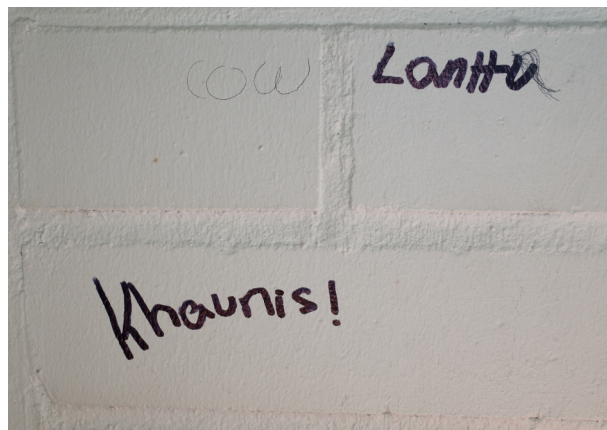


Figure 2

When the frame and the carrier is the same and it is non-angular, it becomes even harder to judge the unit of analysis by its physical properties. More problematically, certain carriers, such as billboards that incorporate rotating blades, contain multiple sides that are displayed at certain intervals. These carriers present multiple frames on its sides, but they cannot be observed simultaneously from the same spot.

An alternative to a physical definition is a semantic definition (cf. Conseil de la langue française 2000, 2012; Monnier 1989). Figure 3 illustrates this in the schoolscape context:

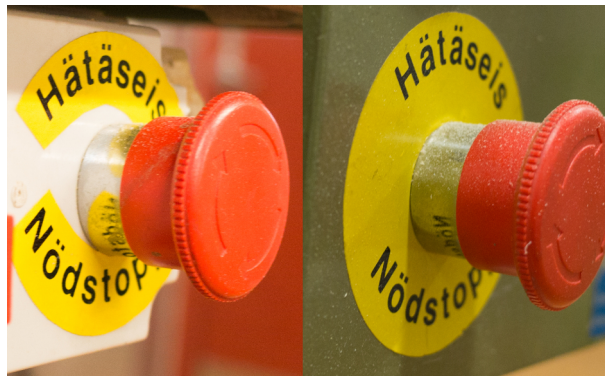


Figure 3

Figure 3 contains two nearly identical cases: red emergency stop buttons are highlighted by yellow tape (frame) on the side of a machine (carrier), containing identical writing in both Finnish and Swedish. On the right side, the yellow tape is one full circle. On the left side, there are two pieces of tape, likely retrofitted to replace the original, perhaps worn tape. If a strictly physical definition is applied this contains two separate units of analysis, one in Finnish, the other in Swedish. In this case, both are interpreted as one unit of analysis. Contrary to this, the graffiti tags in figure 2, 'cow', 'Lanttu' (rutabaga) and the likely intentionally misspelled word 'Khaunis!' (bbeautiful!) are all written on to a wall (carrier frame). There seems to be no connection between them and therefore they are interpreted

as separate items.

Both the physical and semantic definitions have their advantages and disadvantages. However, both ignore the problems posed by the digital era. Digital carriers function similarly to the carriers that can present multiple frames in succession. However, while the succession of physical frames could be solved by, for example, attributing them as less than a one unit of analysis based on the total number of frames on the carrier, the frames displayed on a digital carrier are potentially infinite, limited only by how many frames can be displayed in a specific time span. Moreover, digital carriers do not necessarily display anything except a blank frame. This did not prove to be a major concern in the research carried out by the author. However, the increasing use of digital carriers such as interactive whiteboards will likely change this in the future.

Another issue posed by the digital era is presence of mobile devices that influence the way landscape is perceived. Augmented reality further complicates the landscape as the carriers are no longer necessarily physically manifested in the landscape, but rather digitally superimposed on it and/or accessed through a device, as discussed by Gorter (2013, p. 204). In 2016 observing the digitally superimposed became mainstream as millions of Pokémon GO players started to observe reality through their smartphones. Virtual reality offers a further step into a hyperreal simulation (Baudrillard 1981/1988, p. 166), in which landscape is observable, but materially intangible, advancing the metaphor of landscape as representation even further than argued by Daniels and Cosgrove (1988, p. 1). It is clear that blurring of reality poses methodological challenges that remain unanswered, as discussed by Duncan and Duncan (2010, p. 233).

6. Multidimensional multimodal data annotation scheme

The data annotation scheme proposed in this article was created in response to the criticism mounted against quantitative LL studies. As the existing research design options were limited during the planning stage of the author's own research in late 2014 and early 2015, the model presented by Barni and Bagna (2009) served as the basis for this schoolscape specific scheme. Their model proved to contain the most comprehensive and clearly defined data annotation categories available at the time and therefore it functions as the basis for the model presented in this article. There are other more recent alternative models (cf. Amos 2016, Soukup 2016), but they were created in parallel with this model.

Unlike Barni and Bagna (2009, pp. 135-136) who classify the data also on a micro-linguistic level, a process that involves entering each textual occurrence into a plain text format, transliterating and examining lexical and grammatical features, the proposed annotation scheme presented in this article is applicable only on a macro level. Similarly to Barni and Bagna (2009, p. 130) and Amos (2016, pp. 133-134), the proposed approach is based on the use of large sets of data, or corpora, that can be filtered into sub-corpora, compared, contrasted and examined each category or cross-tabulated with other categories. The intention is to make best use of the gathered data.

The data gathering is conducted similarly to Barni and Bagna (2009, p. 131) by using a digital camera and the subsequent processing of the data into a database. It seems to be best to include all items regardless of their physical features, namely size, as done by Backhaus (2007, p. 67). The images are visually inspected on site during the data gathering and again during image post-processing. The raw image data is visually inspected for duplicates and for adequate quality. Duplicates in the data must be

removed. The data must be gathered again if the quality is deemed insufficient for analysis. The data examined in this article was gathered by using a Ricoh GR, chosen for its combination of high image quality, low optical distortion and inconspicuity on site. The images were saved in digital negative raw file format (DNG) in order to minimize image quality loss caused by the equipment. The post-processing was conducted first in Adobe Photoshop Lightroom 5 due to its library and non-destructive development capabilities. Each photo was inspected and categorized by the specific study site in order to ensure data was not missing. This needs to be done as GPS georeferencing is not applicable in indoor environments. It also retains the possibility of diachronic analysis. Duplicates were removed in the process. Images deemed insufficient in quality were replaced by regathered data. In such cases the specific site, such as a specific room, was covered again in its entirety in order to avoid possible duplication and inconsistency in the data. After the first round of post-processing, the raw data consisted of 2373 digital negatives (DNG) amounting to approximately 32 gigabytes of data gathered in ten days. It is arguably ideal to gather the data in as short time span as possible, but at least in the schoolscape context this did not prove to be feasible as the relevant spaces were often in use. After the first round of post-processing, the images were inspected again and split into multiple images, applying a physical definition as the starting point in determining the unit of analysis, but ultimately defining each case semantically due to the benefits of this approach (see figures 2 and 3). After the second round of post-processing conducted in GIMP 2.8, the data consists of 6016 units of analysis gathered from a large school unit that provides compulsory education (ages 7 to 15) and voluntary secondary education (ages 15 to 18) primarily in Finnish but in part also in English to approximately 800 to 900 students in an urban municipality in Southwest Finland. Similarly to Amos (2016, p. 133), the proposed data annotation scheme was tested and developed on real life data gathered and processed by the author. The data annotation was conducted in LibreOffice Base. In order to test the proposed annotation

scheme nearly all spaces were included in the data, including the immediate exterior spaces, namely the school yard, and the interior spaces, consisting of 40 classrooms out of the 46 classrooms, all the entrances, corridors and staircases, the sports facilities, a cafeteria, an auditorium. The six classrooms not present in the data were not included due to practical reasons. They were in heavy use during schooldays, which prevented consistent data gathering. No storage rooms, changing rooms, toilets, kitchen spaces, staff meeting rooms or offices were included as they are inaccessible to the majority of the schoolscape participants. Moreover, some of these areas, namely the changing rooms, the toilets and the offices, were excluded due to legislative and research ethical concerns. In summary, in spatial terms the examined data sample consists of nearly the whole population.

The data annotation scheme consists of 22 different data annotation categories. The selection of annotation categories is based on published research available to the author at the initial planning stage. For the sake clarity, the annotation categories are divided into six distinct thematic sets in this article. Nearly identically to Barni and Bagna (2009, p. 132), the first set contains five administrative categories. The second set is languages specific and provides basic information on the linguistic composition of a schoolscape. It is the most extensive set, containing six annotation categories which are typical in quantitative LL studies. The third set contains two categories that pertain to multimodality, including a medium durability category that is similar to the materiality category presented by Amos (2016). The fourth set addresses agency, which is in a pivotal position in landscape research. As Samuels (1979) notes, “[h]owever rational, there is something unreasonable about a human landscape lacking in inhabitants; something strangely absurd about a geography of man devoid of men” (p. 52). However, unlike in most quantitative LL studies, the presented scheme adopts a Derrida (1980/1987, 1988) inspired tripartite examination of agency. The fifth set contains three

categories dedicated to the examination of item functions, addressed in part previously by Amos (2016), Barni and Bagna (2009), Ben-Rafael, Shohamy and Barni (2010) and Scollon and Wong Scollon (2003). Not unlike Amos (2016), but bearing more similarity to Barni and Bagna (2009, pp. 132-134), the sixth set consists of three categories pertaining to the spatial distribution of items located in the schoolscape.

6.1. Administrative categories

The first set of data annotation categories are administrative:

1. identification number
2. camera type
3. name of the researcher
4. survey date
5. free text

The first category, identification number (ID), is provided automatically and functions as the unique reference number for each unit of analysis. The second, third and fourth categories are optional in single researcher projects where the personnel and equipment does not change during the project. The free text category is also optional, but it is helpful in providing space for making notes.

6.2. Linguistic categories

Influenced by Deleuze and Guattari (1980/1987), the author holds an anti-essentialist stance on language not unlike Blackwood and Tufi (2015, p. 9) and Makoni and Pennycook (2010), yet at the same time the author acknowledges that for many languages are distinct entities. In other words, following Foucault (1977/1980a, p. 131), the presented annotation scheme relies on the existing labeling as languages are considered distinct from one another in the existing regimes of truth. The second set consists of six categories:

6. first language
7. second language
8. third language
9. number of languages
10. language saliency
11. translation and code-mixing

The language categories (6., 7. and 8.) indicate the languages and the number of languages present in the schoolscape. They should be expanded accordingly to include more languages if need be. Following Meinig (1979b), prior knowledge serves as the starting point for the interpretation. Moreover, dictionaries may prove to be useful in the interpretation. However, they may prove to be of limited help in cases such as 'Khaunis!' in figure 2. In running text proper names are not interpreted as separate instances from the body of the text. Otherwise items containing foreign names, such as news articles pinned to a notice board, need to be classified as containing multiple languages, which,

arguably, makes the landscape seem more heterogeneous than many would agree with. Proper names are, however, far from unproblematic. Similarly to Blackwood and Tufi (2015) and Tufi and Blackwood (2010), place names, brand names and surnames are identified with a language if possible (see also category 18). First names pose yet another issue, as illustrated in the schoolscape context in figures 1 and 4:



Figure 4

In figure 1, 'Ronaldo' is indeed a first name. Figure 4 contains another example of transgression, writing 'Marjo', a Finnish first name. Based on these two examples alone, it may seem as if first names are unproblematic to classify. However, not all names are as easy to classify as the ones in figures 1 and 4. For example, without any contextual cues names such as 'Maria' could be interpreted as markers of a wide range of languages. Out of the three first names, only 'Ronaldo' is interpreted as language and classified as Portuguese in the data due to the likely reference to the public figures. Regardless of the interpretation, it is perhaps best not to exclude them from the data and address them separately. Thingification of words such as 'love' (Jaworski 2015) invokes yet another issue. For example, concrete poems contain only writing, such as printouts of 'love' repeated in multiple languages, yet they form an image, such as the shape of a heart. Not uncontroversially, these are interpreted as not containing language in the data. Similar to proper names in running text, interpreting them as containing a vast

variety of languages could distort the overall data, considering that it is arguably the shape that people pay attention to, not the languages.

The order of languages is defined on the basis of language salience, which in turn is based on Scollon and Wong Scollon's (2003, pp. 116-128) code preference, interpreted by text size, contrast, quantity or composition. The language saliency category corresponds with Barni and Bagna's (2009, p. 135) relevance and dominance categories. Figures 5 and 6 illustrate the interpretation by size and contrast:

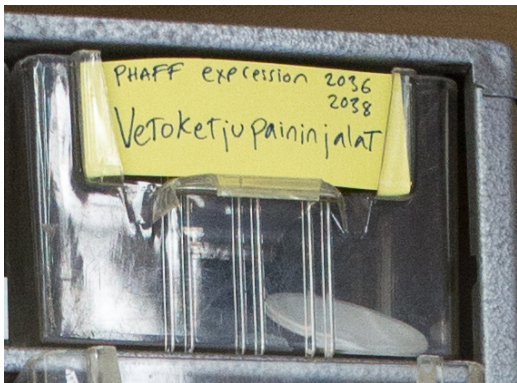


Figure 5



Figure 6

Figure 5 contains a photo of a label on a small box drawer. It contains both English and Finnish, of which Finnish is interpreted as more prominent due to its size on the label. Figure 6 contains a photo of a circuit diagram sticker on a wall mounted power socket. The Finnish 'Luett. n:o', short for 'luettelo numero' (list number), is not only smaller in size and quantity, but the writing in black stands out from the white background less than the Swedish white on black 'Ahlström Strömfors'. Figure 7 illustrates the interpretation by quantity:



Figure 7

In figure 7 there is quantifiably more Finnish than English on the label. The code preference by composition is based on Kress and van Leeuwen (2006, p. 197). In the center-margin composition the center is considered more salient than the margins (Kress & van Leeuwen 2006, pp. 194-197). In the ideal-real composition the top section is more salient than the bottom segment (Kress & van Leeuwen (2006, pp. 186-193). In the given-new structure the attention guiding new information is placed on the right side (Kress & van Leeuwen 2006, pp. 179-185). Figure 8 illustrates the interpretation of code preference by composition:

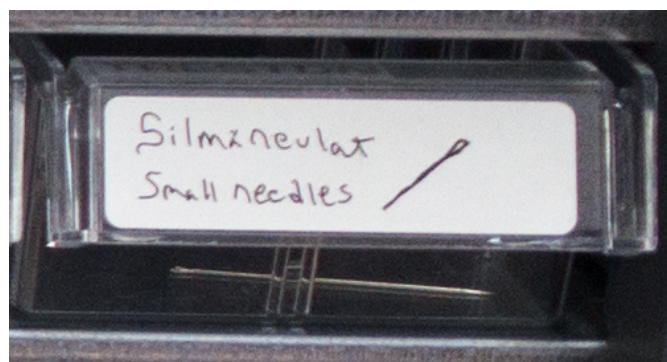


Figure 8

In figure 8, the Finnish 'Silmäneulat' (eye needles) is placed in the more prominent ideal position on top

of the English 'Small needles' which is in the real position. Moreover, the writing is on the left in the given position and the image on the new position. However, the new position drawing attention is arguably less salient as the writing is in size more prominent than the image. If the writing was on both sides of the image, the image would be in the more prominent center position.

Following Reh (2004), the translation and code-mixing category indicates whether the listed languages provide the same information (duplication), one language provides full information and others provide fragments of the same information (fragmentary), some information is provided in all languages with some information provided exclusively in a certain language or languages (overlapping) or provide complementary information with no clear overlap between languages (complementary). This addresses the function of other language similarly to Barni and Bagna (2009, p. 135). Figures 3, 9, 10 and 11 illustrate this categorization:



Figure 9

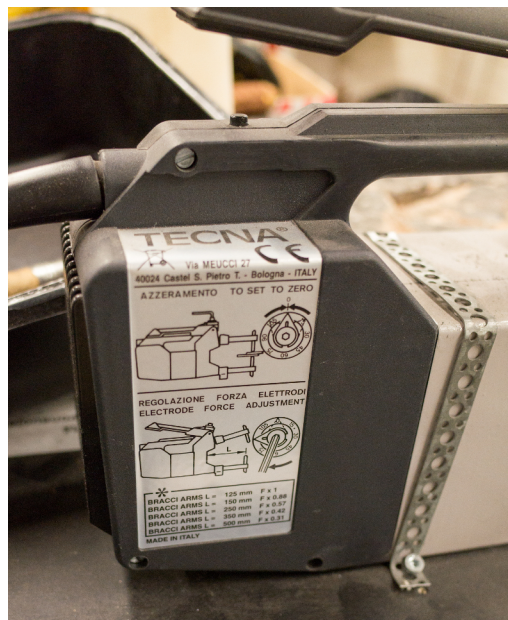


Figure 10



Figure 11

The labels in figure 3 contain the same information in Finnish and Swedish. The fire blanket holder in figure 9 contains all information in Finnish, but not in Swedish. The sticker on the side of a spot welder in figure 10 contains information mostly in both Italian and English, but also in part exclusively in either language. The sheet of metal bolted on to a pillar drill in figure 11 contains information exclusively in a complimentary manner in German and English. This categorization does, however, have its limitations as even the code-mixing category (complementary) ignores certain possible uses of language, such as blending words of different languages discussed by Gorter and Cenoz (2015b, pp. 63-65). It may be that rethinking languages as non-distinct entities as advocated by, for example, Deleuze and Guattari (1980/1987) is required in order to overcome this limitation. However, this would lead to abandoning the categorization of items by languages, which, in turn, would most likely go against the perception of languages as distinct entities in the existing regimes of truth (Foucault 1977/1980a, p. 131).

6.3. Multimodal categories

During initial data trials, it became apparent that schoolscapes tend to be markedly more than linguistic. Many items contained both text and image, sometimes in a complementary form (see figures 1, 9, 10, and 11). The author was also intrigued by the arguments levied by Kress and van Leeuwen (2006, p. 16) that there is a shift from the use of image to text in schooling. Kress and van Leeuwen (2006, pp. 16-17) argue that while the role of images has become more and more important in everyday life, in the school context the use images of is, nevertheless, considered subsidiarity to writing. Therefore visual multimodality became a part of the annotation scheme in order to examine how the arguments made by Kress and van Leeuwen (2006) hold in a situated context. As a result, the third set

consists of:

12. mode and mode salience

13. medium durability

Visual multimodality is assessed by mode, writing and/or image, and by mode salience (Bezemer & Kress 2008, p. 171), which is assessed on the same criteria as the language salience category to indicate which mode is dominant if both modes are present. Figures 8, 9 and 10 illustrate the assessment of mode:



Figure 12



Figure 13



Figure 14

Figure 12 contains a sticker plastered to a cabinet door, indicating the location of a fire hose. It contains only image. Figure 13 contains a metal sign with the letter 'C' painted on it, indicating the area of school in question. It contains only writing. Figure 14 contains contains both writing and image in a

complementary form placed on a door, used to indicate a male lavatory. Concrete poems are interpreted firstly as images and secondly as text. The writing is considered more salient than the image if it is in the ideal position by code preference. The assessment of multimodality is supplemented by the assessment of the durability of the medium of distribution (Bezemer & Kress 2008, p. 172), namely the spatially defined frame (Backhaus 2007, p. 66). Durable materials include 'hard' materials as well as 'soft' non-durable materials, such as paper, protected by other materials, for example by lamination. For example, the metal sign in figure 13 is a good example of durable materials, whereas the label in figure 5 is non-durable. This binary category is included due to the legitimacy and economic value associated with the use of durable materials as noted by Kress and van Leeuwen (2006, p. 225).

6.4. Agency categories

The fourth set of categories elaborates the role of schoolscape participants.

14. designer

15. issuer

16. audience

This tripartite categorization of agency deviates from the top-down and bottom-up dichotomy present in much existing LL research (cf. Ben-Rafael, Shohamy, Amara & Trumper-Hecht. 2006). Taking cues from Derrida (1987, 1988), the designer (writer) is not necessarily identical to the issuer (signatory) of the items in landscapes and with regards to the audience, akin to postcards, items in landscape can be read by any recipient, yet they are not necessarily addressed to everyone. For example, the fire blanket

holder in figure 9 is designed by an external company, but issued by the public institution. Exemplifying audience, the labels in figures 5, 7 and 8 are intended for the students, in order for them to find the specific items. They are, of course, visible to everyone, but that is hardly worth categorizing separately. This categorization of agency seems to function in the context of schoolsapes due to the confined nature and the small number of possible agents, namely teachers, students, teachers and students (collaboration), public (the school as an institution) and (unspecified) external actors.

6.5. Function categories

The fifth set of categories examines the different functions of materialized discourses:

- 17. genre
- 18. indexicality, symbolization and iconicity
- 19. representative function

Similarly to what Amos (2016, p. 133) refers to as the communicative function and the field, the genre category classifies the items by their shared features and patterns of similarity, based primarily on the communicative purposes that define content and style (Swales 1990, p. 58). To name a few, adapting the use category presented by Gorter and Cenoz (2015a, pp. 155-162), schoolsapes can contain items in genres such as school management (see figures 13 and 14), classroom management (see figure 5, 7 and 8), teaching material, commercial, graffiti (see figures 1, 2 and 4) and decoration, of which the first and the second pertain to orienting in the school and classroom, the third involves content that facilitates learning, the fourth is tied to the provision of commercial information, advertising or

promotion and fifth is related to aesthetic purposes. In addition, to name a few more, other genres can be student works, differentiated from decoration by having been created for more than aesthetic purposes, regulatory, marked by the “dos and don'ts” as characterized by Gorter and Cenoz (2015a, p. 155), and the health and safety, distinguished from the regulatory genre by the emphasis on fostering a safe environment (see figures 3, 9 and 12).

The category of indexicality, symbolization and iconicity is based on Scollon and Wong Scollon (2003). It functions to indicate whether the unit of analysis indexes something present in the landscape, namely population groups, or symbolizes something absent in the landscape (Scollon & Wong Scollon 2003, p. 119) or if it is an iconic representation of something (Scollon & Wong Scollon 2003, p. 133). In connection to the language categories, this addresses the issue with classifying surnames and brand names to languages. In the Finnish context, the label in figures 5, 7 and 8 index the presence of Finnish speakers, whereas in figure 10 and 11 Italian, English and German do not index speakers of that language. Moreover, the labels in figures 5, 7 and 8 not only index speakers of Finnish, but also contain symbolic uses of English. For such mixed functions, code preference is used to interpret the salience of indexicality or symbolization. For example, in figure 8, the item is interpreted as primarily indexical and secondarily symbolic judged by the composition: Finnish as the ideal and English as the real. This is the same in figure 5 despite the reversal in composition as Finnish is more salient in size. The fire hose sticker in figure 12 is interpreted as an icon.

Following Ben-Rafael, Shohamy and Barni (2010, pp. xvi-xix), schoolscape can be understood as representing or reflecting its structuration principles. The first principle marks power relations (Bourdieu 1972/1977, 1980/1990) between the actors present and/or absent in the landscape. The

second principle, collective identity, marks commitment to segments of population, such as ethnic, religious and regional identities. The author deviates from this by including national identities in the collective identity. The third principle reflects good reasons (Boudon 2001), the goal oriented considerations in order to attract the interest of others. The fourth principle pertains to presentation of self (Goffman 1956), distinct from good reasons by the emphasis on individuality in relation to others rather than goal-orientedness. In order not to contradict the stance on the individual as presented in this article, it is perhaps helpful understand the rationality behind the second, third and fourth principles through Lacan's (2007) mirror-image, as illusory claims to a performed stable identity and rational behavior. To exemplify the first principle, the fire blanket holder in figure 9 can be interpreted as reflecting power relations. It contains Finnish and Swedish, both national languages in Finland and mandatory on all fire extinguishers. The company information on it can be interpreted on the grounds of good reasons, catering to Finnish speakers. Figure 15 illustrates collective identity:

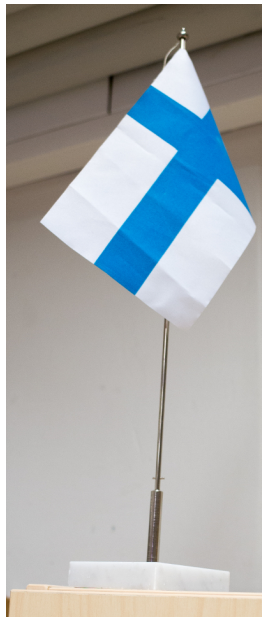


Figure 15

The flag of Finland portrayed in figure 15 stands for the national identity, as the symbol of Finnishness. The sticker on the side of the spot welder figure 10 contains Italian and English. It is best understood as standing for good reasons. Even in an Italian context, it would make sense for an Italian manufacturer to cater for a larger audience of welders than only Italian speakers. In figure 1, the admiration of a footballer is best interpreted as presentation of self. Transgressing the norms alone seems to suffice. One could, however, add that the minimal expression is probably for good reasons, catering for the widest potential audience.

6.6. Spatial categories

The sixth set of annotation categories pertains to spatiality:

20. spaces

21. people

22. unit

Spaces categorizes the observed space by its properties and intended use, including, but not limited to a corridor, an entrance, an ordinary classroom, home economics classroom or school yard. For example, the graffiti in figure 1 is in a corridor, whereas the sticker on the spot welder in figure 10 is an industrial arts classroom. This category subsumes the external position category presented by Barni and Bagna (2009, pp. 132-133) to indicate whether the unit of analysis is located outdoors or indoors as the space category entails this. The people category in Barni and Bagna (2009, p. 133) is adapted to classify the space by the group of people that use the area of school. This can be categorized by the level of

education, such as in the case of Finland the primary level (ages 7 to 13), lower secondary level (ages 13 to 15) and upper secondary level (ages 15 to 18), as well as mixed use by the level of education and public, accessible even to outsiders without formal authorization or understanding that the space is a restricted part of a school property. For example, the spot welder in figure 10 is accessible only to people on the lower secondary level. The unit category indicates which specific unit, such as a specific classroom or corridor, the item belongs to. For example, the items in figure 5, 7 and 8, are located in one of the two textile arts classrooms located in the school premises. Spaces may have the same function and be used by the same people, but exist as separate units, for example as two separate rooms. Therefore the purpose of the unit category is to make it possible to examine specific units of space and compare them with one another, adding further potential granularity to the analysis of schoolscales.

7. Multidimensional data analysis

The purpose of this article is to introduce a schoolscape specific data annotation scheme, not to examine the schoolscape used to develop the scheme. Subsequent articles will be dedicated to the examination of the schoolscape in question. Nevertheless, in order to illustrate the potential of the proposed data annotation scheme four figures based on the data are presented. Figure 16 illustrates languages in the schoolscape:

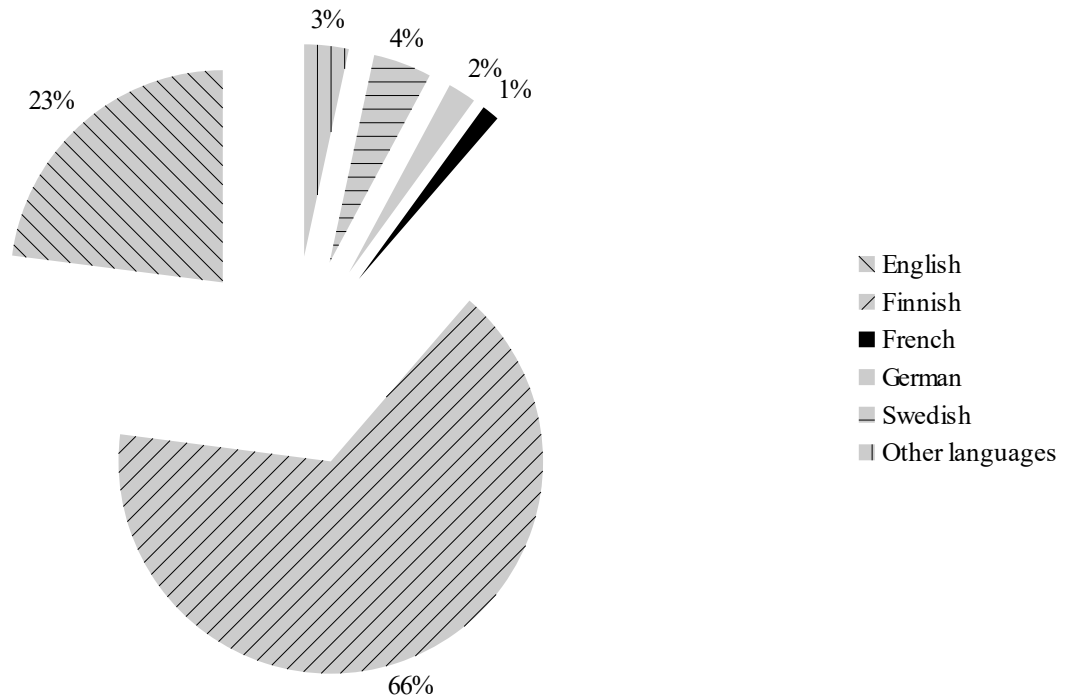


Figure 16: languages in the schoolscape

Based on a cumulative count of language instances (4607 tokens), figure 16 indicates the presence of languages in the schoolscape. It is a one-dimensional analysis and thus devoid of agency. The results are informative, but offer only a slice, an overview of languages present in the schoolscape. The same set of data can, however, yield further information when cross-tabulated with another nominal variable. Figure 17 illustrates the same set of data (4607 tokens) cross-tabulated with schoolscape participants:

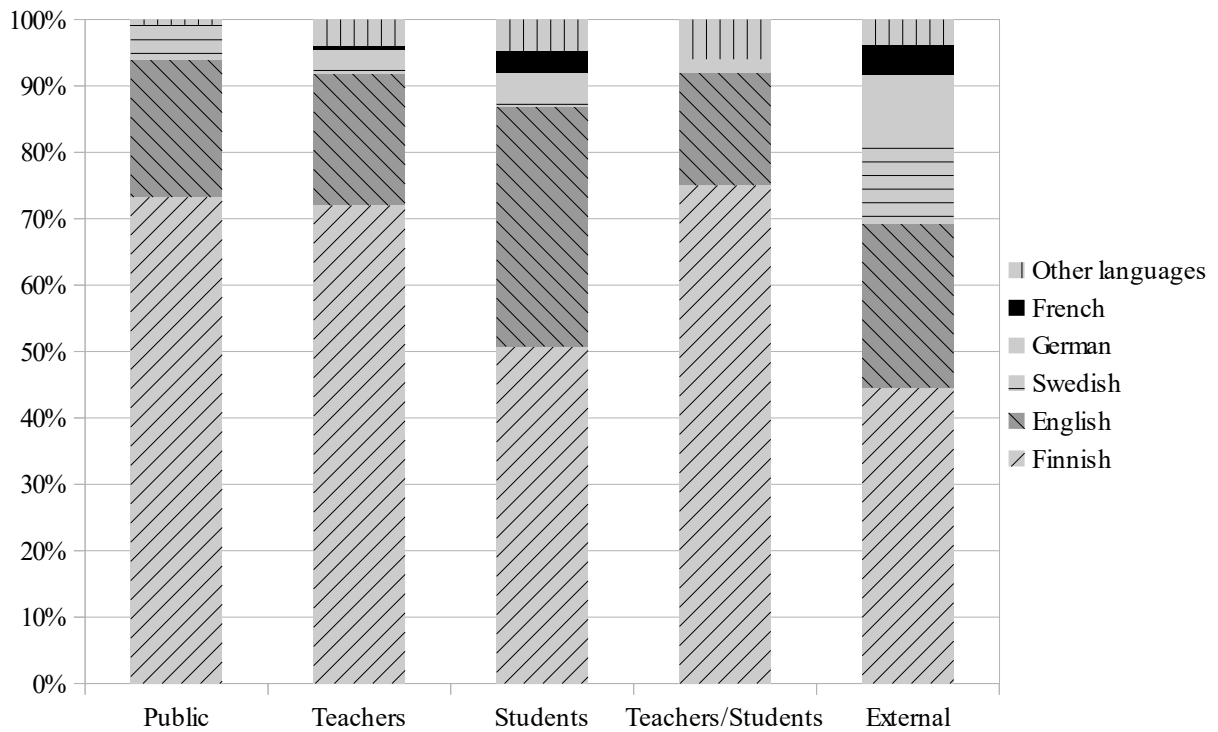


Figure 17: language use by schoolscape participants (issuer)

Figure 17 illustrates how the same data can be further examined when it is cross-tabulated, allowing comparisons within the data (subsets). It addresses what Samuels (1979, p. 52) refers to the absurdity of the absence of agency as presented in figure 17 while retaining the focus on languages. Figure 18, illustrates the data as further examined:

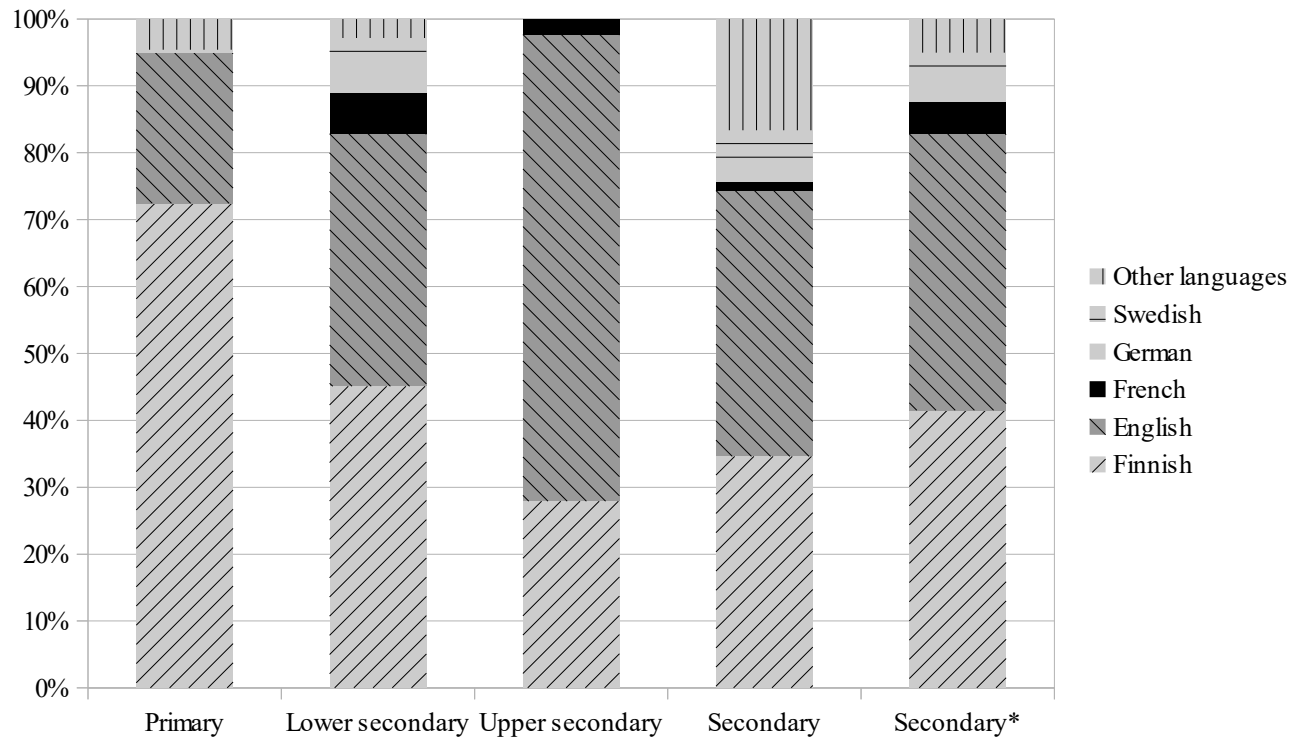


Figure 18: language use by students as issuers by level of education

The data presented in figure 18 consists of the student (issuer) category designated by the level of education primary, lower secondary, upper secondary, secondary (undifferentiated) and secondary (cumulative). It addresses language use among students that is absent in figure 17. It provides information how language use by students differs by the level of education. Similar analysis could be done for the other participants presented in figure 17, as well as combined into a single chart, but that is beyond the scope of this article. In cross-tabulation, the nominal variable association can be assessed (chi-square, Fisher's exact) as well as the strength of the association (phi, Cramér's V).

Unrelated to the previous figures illustrating languages, figure 19 illustrates the full potential offered by

the inclusion spatial categorization of data:

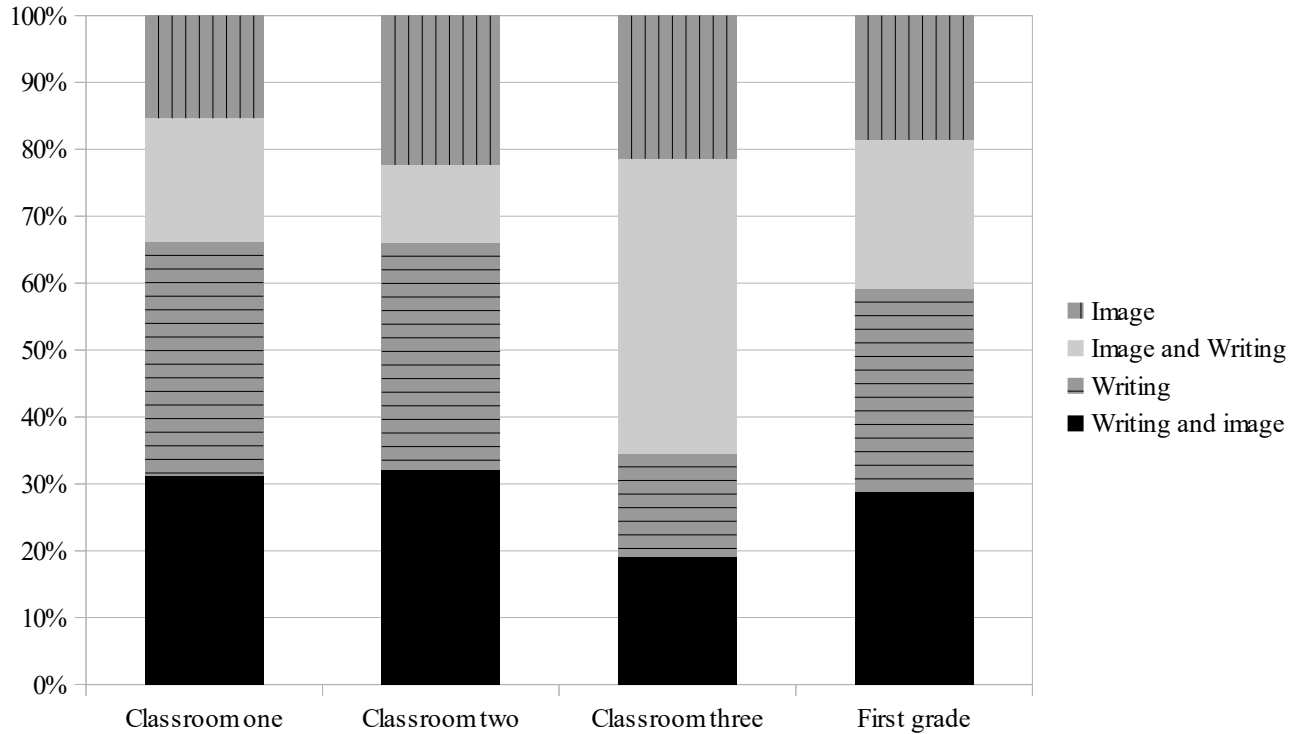


Figure 19: multimodality on the first grade

Figure 19 illustrates visual multimodality on the first grade. The overall data (n=382) is positioned on the column first from the right. It contains data limited to ordinary classrooms (space) on the first grade of the primary level (people). The other columns present data by parallel classes situated in separate classrooms (unit): classroom one (n=195), classroom two (n=103) and classroom three (n=83). It is evident that there are differences between the classrooms. It would not be possible to address internal differences in the schoolscape without the spatial categorization.

8. Conclusion

Amos (2016, p. 131) aptly summarizes the advantages and disadvantages of quantitative approaches in linguistic landscape research. On one hand, in contrast to the qualitative approaches, they fall short in the detail. There is no denying that. Each item can only be examined to a certain extent, providing only certain types of information applicable to all items. As items must be shoehorned into a limited number of categories, the subtle differences between items within those categories cannot be addressed (Rose 2016, p. 103). On the other hand, quantitative approaches can illuminate important trends and patterns, something that qualitative approaches cannot, as argued by Amos (2016, p. 131). As noted by Blommaert (2013, p. 2), a quantitative approach can give a broad overview and protect research from erroneous generalizations. Moreover, a quantitative approach may, perhaps, also even be a prerequisite in LL research, as outlined by Blackwood (2015, p. 40). Dewsbury (2012, 2015) notes that our habits orient us in a certain ways, driving us to pay attention to certain things in the landscape while ignoring others. Furthermore, combined with prior knowledge, it is arguable that by having more information on the landscape, it is easier to speculate what is left out (Laihonen 2015, p. 191-192) or denied of its presence (Rose 2016, p. 102). It seems that one tends to be drawn by the presence of foreign, even unexpected languages at first, but in the presented data they are telling of their absence rather than their presence.

As presented in this article, as well as by Amos (2016, p. 152), it is arguable that quantitative approaches have yet to reach their limits. It should, however, be noted that the limits are not transcended by expanding the number of items examined in hopes of objectively depicting landscapes, after all, as discussed by Ronai (1976, pp. 126-127), landscape is in the eye of the beholder rather than

simply out there. Merely increasing the number of examined items may instead lead to object fetishism, as argued by Duncan (1990, p. 11). This should not, however, result in a retreat to subjectivity, as noted by Duncan (1990, p. 12). Moreover, the limits are not transcended by simply adding more annotation categories. As discussed by Krippendorff (2013, pp. 82-83), in order to improve the potential, the categories should complement one another and be relevant to the conducted research. This emphasizes the importance of the research design. As presented in this article, as well as by Amos (2016), it is possible to add granularity to quantitative LL studies, as well as to expand the number and type of questions one seeks the landscape to answer. This does, of course, necessitate large sets of data, which makes it resource intensive both during data gathering and annotation. In the schoolscape context, the large scale of data gathering can be deemed as problematic by the authorities and lead to an impasse, as experienced by the author when querying the possibility of conducting research in different jurisdictions, likely due to unease over large scale data collection. Nevertheless, as landscape can be understood as “an archive full of clues”, as described by Meinig (1992, p. 16), it seems disadvantageous to focus only a small number of clues, in spite of the resource intensiveness. Therefore it can be argued that quantitative approaches are valuable if not necessary in schoolscape research, regardless of the indicated limitations. In summary, it is, perhaps, therefore best to argue for a middle ground between empiricism and theoreticism, as argued by Duncan (1990, p. 15) and exemplified by Schein (1997).

The purpose of this article has been to evaluate schoolscales and provide a model to examine them, not only what they are, but also what they do. Schoolscales are particularly important to study due to the substantial influence of educational institutions over the individual in the formative years of life. As a type of landscape, the schoolscale is a diagram or an abstract machine that, in the words of Deleuze

and Guattari (1980/1987, p. 142), “does not function to represent, even something real, but rather constructs a real that is yet to come, a new type of reality.” Marsh (1864, p. 10) argues that for the observer the hardest thing to learn is to see what it is before him or her; the eye only sees what it seeks. The issue with landscape is, as elaborated by (Mitchell 2002b, pp. vii-viii), that it is a matter of apperception and its power is subtle and continuous. Rose (2006) notes that it offers dreams of presence. Similarly, Ronai (1976, p. 127) argues that it instills an illusion of harmony, an a(n)esthetic. By focusing not only on what the eye seeks but also what it does not, quantitative approaches to LL can help the researcher undermine the a(n)esthetic, to find what is present and what is absent. Further potential can be achieved if the model is applied to different schoolscapes, allowing comparison of schoolscapes, which could be of use to education policy planners in different jurisdictions.

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