



Research paper

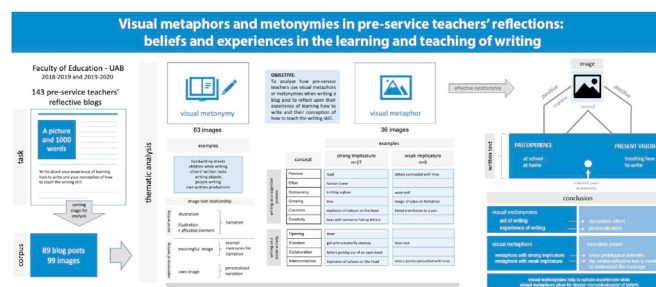
Visual metaphors and metonymies in pre-service teachers' reflections: Beliefs and experiences in the learning and teaching of writing

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HIGHLIGHTS

- Visual metaphors and metonymies are analysed to understand their function in pre-service teachers' reflective writing.
- Visual metonymies have a decorative function and reveal affective attitudes.
- Visual metaphors have an evocative power that pre-service teachers must develop in their written reflections.
- Visual metonymies help to narrate learning experiences, while visual metaphors allow for deeper conceptualisation of beliefs.

GRAPHICAL ABSTRACT



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ABSTRACT

This study focuses on visual metaphors and metonymies in a Catalan teacher education context and analyses how 143 pre-service teachers use them when reflecting on the learning and teaching of writing in a blog post. The results of a thematic analysis show that pre-service teachers use visual metonymies and metaphors to help them think metacognitively about their learning experiences and become aware of their own beliefs. Visual metonymies are more frequent and are used as decorative illustrations in relation to the reflective text. In contrast, visual metaphors are less frequent but allow for deeper conceptualisation of pre-service teachers' beliefs.

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1. Introduction

Visual information in diverse forms is ubiquitous in our contemporary lives, especially in digital environments where we can find a variety of multimodal texts. The increasing spread of multimedia instant messaging tools such as WhatsApp and social

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media networks such as Instagram or TikTok have made visual information an essential part of digital communication. In this context, images play an important role in strengthening the messages. If they are used as visual metaphors or metonymies, they even have the power to attract users' attention by playing with different levels of meaning.

The power of images in research studies permeates several areas of knowledge, such as anthropology, sociology, psychology, pedagogy, and has gained ground in applied language studies. Language teacher education is not exempt from the importance of the visual as we observe a steeply increasing number of research on the use of images to analyse various aspects, such as students' process of language learning, teachers' process of teaching practice, teachers' beliefs and teachers' identity (see the diversity of international studies in Kalaja & Melo-Pfeifer, 2019). Thus, the present study is rooted in this field of research, in which the visual medium is the basis for eliciting beliefs and narrating experiences, and developed in the context of teacher education in Catalonia (Spain).

The primary educational context in Catalonia is based on a multilingual curriculum that has been implemented since the 1990s. In primary school, the majority of subjects are taught in Catalan (see *Act no. 1, of 7th of January, on linguistic policy, Generalitat de Catalunya, 1998; Llei 12/2009, del 10 de juliol, d'educació, Generalitat de Catalunya, 2009*). Current legislation stipulates that students have to master the two official languages (Catalan and Spanish), and a third language (mainly English). Primary teachers must study a four-year university degree in primary education in order to access the Catalan education system. Some subjects are taught primarily in Catalan, and some in Spanish and English. Pre-service primary teachers receive the basic training needed to teach 6 to 12-year-olds, including theoretical and practical knowledge following a reflective practice approach.

This study addresses the issue of how reflective practice is fostered in teacher education in a Catalan University. The objective of this study is to analyse how pre-service teachers (PSTs) use visual metaphors or metonymies when writing a blog post to reflect upon their experience of learning how to write and their conception of how to teach the writing skill. The following questions guided the research study to achieve this objective: 1) What kind of visual metaphors and metonymies do PSTs use with the images they include in their blog posts? 2) What beliefs and experiences do the different types of visual metaphors and metonymies portray? 3) How do visual metaphors and metonymies contribute to expressing emotions in relation to their beliefs and experiences on the learning and teaching of writing?

Before presenting the results and discussion, three areas of relevant literature are presented to help us delineate the methodology, analyse the collected data, and to connect previous research with our findings.

2. Literature review

This section provides the theoretical background of this study by discussing assumptions about: (1) the use of metaphors and metonymies and their visual counterparts, (2) the use of images and visual metaphors in teacher education, and (3) teachers' beliefs about the teaching of writing.

2.1. The use of metaphors and metonymies and their visual counterparts

Cognitive linguists understand metaphors not just as a part of language and communication but as a fundamental part of the way people think, reason, and imagine (Gibbs, 2006; Steen, 2007). This view of metaphor goes beyond its literary use as it is understood as

a cognitive phenomenon. According to Conceptual Metaphor Theory (CMT), metaphor is primarily a mode of thought (Lakoff & Johnson, 2003) that connects two or more conceptual domains, the concrete domain (source) onto the domain of experience (target). While metaphor functions by expanding our understanding, metonymy uses one entity to stand for another that belongs to the same conceptual domain. Forceville (2009, p.56) points out: "In short, in metaphor we get A-as-B; in metonymy B-for-A". The visual metaphors are those images that have no literal meaning, for instance, learning (A) is represented as travelling (B) that is usually portrayed by roads, paths, road signs, etc. (Paiva & Gomes Junior, 2019). However, the metonymic image of a pen or pencil (B) stands for the act of writing (A). Metonymy is also an association created between meanings which are contiguous because it could indicate, among others: a) an effect for cause, b) an object for user, c) substance for form, or d) place for the event (Lakoff & Johnson, 2003, pp. 38–39). Metaphors and metonymies, either visual or verbal, often overlap (Jiménez-Muñoz & Lahuerta-Martínez, 2017; Urios-Aparisi, 2009). The metaphor "The pen is mightier than the sword", coined by Edward Bulwer-Lytton in 1839 for his historical play *Cardinal Richelieu*, emphasises that writing has more influence on people and events than the use of violence. This metaphor includes two metonymies: the pen and the sword, respectively associated with writing and violence.

Lakoff (1993) argued that a metaphor is not mainly a figure of language; thus, it is not solely restricted to the verbal domain. Metaphors can be expressed in diverse representational systems or modes, such as the visual mode (Forceville, 2009; Müller & Cienki, 2009). Visual metaphors are commonly studied in advertising (Forceville, 2008; Phillips & McQuarrie, 2004; Urios-Aparisi, 2009), cartoons or comic books (El Refaie, 2003), films (Coëgnarts & Kravanja, 2014) and even in fashion (Uno et al., 2019). In comparison, visual metonymies have attracted less attention but some researchers have started to explore their visual mechanisms (Feng, 2017; Forceville, 2009; Moya, 2013). Others have even explored the multimodal interactions of both visual tropes (Kashanizadeh & Forceville, 2020; Pérez-Sobrino, 2017; Urios-Aparisi, 2009).

Studies on visual metaphor and metonymy in advertising have yielded insights into key concepts relevant for our research study. One relevant issue discussed in the literature is the complexity of interpreting visual metaphors (Spooren, 2018) and how people process them (Forceville, 1996; Phillips, 2003; Sorm & Steen, 2013). The familiarity of a visual metaphor is a key part of how the message is understood and how well it gets across to the audience. "The more frequently someone has encountered a metaphor in which a certain source domain is used to communicate a certain characteristic, the more conventional this metaphor becomes" (Hodiamont et al., 2018, p. 169). Certain visual metaphors are used relatively frequently, but some which are novel require an effort to identify the characteristics of the source domain to be mapped onto the target domain. The information that is implicitly communicated by the visual metaphor to an audience is an implicature (Phillips, 1997) which can be weak or strong depending on the degree of cognitive processing required to understand the amount of implicit information. When the visual metaphor is strong, it has an obvious meaning, and when weak, it is less obvious (Callow & Schiffman, 2002; Forceville & Clark, 2014). In those cases, some verbal anchoring is necessary for full interpretation. In our study, both types of visual metaphors were identified to understand how the PSTs reflect on the written text in their blog posts to interpret them.

Visual metaphors in media are usually monomodal (Forceville, 2008): their target and source are entirely rendered in visual terms. However, in our data, the source domain is visual, through an image, whereas the target is written, and both provide the conceptual message (the learning and teaching of writing skills).

One relevant aspect of the data of this study is how the visual element can interact with the written element in the multimodal text of the blog post, which expands the information of the written text (Catalano & Waugh, 2013).

2.2. The use of images and visual metaphors in teacher education

In language teacher education, written forms of reflection like narratives, journals, and portfolios (Mann & Walsh, 2017) have often been used to help improve PSTs' critical reflection (Pedro, 2005). Nonetheless, Kalaja and Pitkänen-Huhta (2018) point out the phenomenon of the *visual turn* in recent applied language studies in which different types of visual data complement verbal data. In language teacher education, images have an enormous potential to explore iconic and semiotic information, and possible metaphorical meanings for teachers' reflection (Besette & Paris, 2020).

Metaphors provide insight into teachers' conceptions and assumptions about teaching and teaching practice. Metaphors have long been used as an instructional device in PST education to describe teachers' beliefs about learning and teaching, to reflect on teachers' roles, to foster reflective practice and to raise PSTs' and in-service teachers' awareness of professional practice (Alger, 2009; Mahlios et al., 2010; Massengill Shaw et al., 2008). In addition, other research studies examine mentor teachers' and PSTs' pre-conceptions of mentoring relationships (Izadinia, 2017) or focus on in-service teachers' self-constructed metaphors about teaching and their schooling experiences (Erickson & Pinnegar, 2016; Massengill et al., 2005).

The use of images in teacher education is a device used to reveal beliefs about teaching and teacher identity (Besette & Paris, 2020; Pujolà & González, 2022; Saban et al., 2007). Language teacher education is not an exception, although research in this field is less frequent and relatively new in comparison to research based on data collected with written or oral texts produced by teachers (for a review, see Basturkmen, 2012 and Barcelos & Kalaja, 2013). There has been a recent increase in studies using visual methodologies to reconstruct beliefs about language learning and teaching in initial teacher education (Birello & Pujolà, 2020; Kalaja & Melo-Pfeifer, 2019; Melo-Pfeifer & Chik, 2020). They include the use of drawings to elicit teachers' beliefs about language teaching (Borg et al., 2014; Brandão, 2018; Kalaja et al., 2013), the use of images in an online language teacher education context (Ribas & Perine, 2018; Chik & Breidbach, 2011a & 2011b) and the use of images and multimedia data to explore teachers' self-concept as a second language learner (Mercer, 2014). Birello & Pujolà (2020) have used images in blogs in a previous study to explore the beliefs of PSTs about writing, exploring the relationship between the images and their reflective text. In this study, they conclude that PSTs establish varied relationships but only in a very limited number of instances do they use visual metaphors. However, in those cases, it was seen that the visual metaphors allowed them to deepen their reflections conceptually. Likewise, Brandão (2021) argued that visual narratives articulated through metaphors capture how PSTs "imagine, live out and re-imagine teaching" (p.10). Thus, using visual metaphors and metonymies allows PSTs to explore their communicative potential and can be a helpful strategy to foster metacognitive reflection.

Visual metaphors have also been used to articulate teachers' conceptions of learning and teaching in teacher education (Hamilton, 2016; Johnson, 2001). Hamilton (2016) researched how PSTs selected digital images as metaphors to represent teacher identity and teaching. In her study, student teachers were required to label each of their metaphorical images and produced short written abstracts for each image. She identified three themes in her

data, namely teacher and teaching as guide and guiding, teacher dispositions, and the multiplicity of teaching. Visual metaphors could introduce different degrees of implicit information and expand complex and opaque meanings. That is the reason why when working with images in teacher education, many authors (Besette & Paris, 2020; Ribas & Perine, 2018) combine visual and textual data, which help to deepen PSTs' and in-service teachers' reflection. From our research perspective, working with images also helps to clarify the interpretation of visual metaphors and metonymies and foster visual literacy. Some research has focused on the study of metaphors and metonymies in multimodal language learning histories (Paiva, 2011; Paiva & Gomes Junior, 2016, 2019). However, to our knowledge, no research has been found which studies the affordances of visual metonymies for teacher education purposes.

2.3. Teachers' beliefs about the teaching of writing

The research on teachers' beliefs about teaching writing shows that their beliefs can hinder or favour writing instruction (Graham, 2018) by influencing decision-making and teaching practice (Fives & Buehl, 2012, 2014; Pajares, 1992). Teachers' beliefs about how students learn to write directly influence their practice (Graham, 2019) and impact on the time that teachers dedicate to writing in class and the efforts and the resources that they use to teach writing (Graham, 2018). These beliefs include judgments about the worth and utility of writing, whether writing is an enjoyable activity, and whether students are competent and effective writers (Graham, 2019). In the school stage, students acquire knowledge and also develop certain beliefs about how to write through instructions, collaboration, feedback and mentoring (Graham, 2019). They are building a set of beliefs about what, how and when to teach writing based on their own learning experiences, such as what they saw in the classroom as students at different school stages and the various methods their teachers used. This affects their ideas of good practice and has been described as the "apprenticeship of observation" (Lortie, 1975, p.61). PSTs enter university with their personal beliefs and attitudes, negative in many cases due to the prescriptive ways in which writing is taught at school (Hall & Grisham-Brown, 2011). Three main strategies are key to changing a negative attitude: the importance of teachers' self-reflection, the university instruction strategy and the new writing experiences, which can help to shift to positive beliefs and attitudes (Zimmermann et al., 2014) and can enhance their confidence in the teaching of writing (Hall et al., 2020).

In the case of in-service teachers, some studies carried out in different educational contexts have revealed that many teachers consider the initial preparation they received at university to be inadequate (De Smedt et al., 2016; Parr & Jesson, 2016; Veiga Simão et al., 2016). However, they also point out that those teachers who report feeling more prepared use more effective teaching practices (Brindle et al., 2016; De Smedt et al., 2016; Gilbert & Graham, 2010). At the same time, studies with PSTs at university in Spain have shown that they believe that they receive little feedback on their work and that the content of the text is more highly valued than the discursive aspects, although they value academic writing assignments very positively (Castelló et al., 2012; Castelló & Mateos, 2015; Corcelles et al., 2015). Thus, they do not consider themselves confident writers who are prepared to teach writing skills.

3. Methodology

This study followed a qualitative approach (Creswell & Poth, 2017) to identify the type of images used, the concepts conveyed through the images, and how PSTs' metacognitive reflections are

made explicit. There are several ways of researching visual data, depending on the focus of analysis: compositional interpretation, content analysis, semiotics, psychoanalysis, discourse analysis, critical discourse analysis, ethnography, and digital method (Rose, 2016). Our study analysed images for their content, focusing on what the images depicted (Kalaja & Pitkänen-Huhta, 2018; Rose, 2016). This was complemented with the written data to clarify the interpretation of the visual metaphors and metonymies.

3.1. Data collection

The data were collected during the academic years 2018–2019 and 2019–2020 with third-year PSTs from a Faculty of Education in Catalonia (Spain). They participated in a methodology course on language teaching, delivered in Catalan, with special emphasis on the teaching of writing at the Elementary school stage. In total, 143 students (115 females and 28 males) between 20 and 21 years old participated. Each PST was asked to write a reflective blog about the main topics tackled in the subject. One of the researchers is also the tutor of this course. All PSTs in the study have signed an informed consent and permission to publish captures from their blog posts that portray written text and images taken by themselves or from free stock media websites. The study analyses the first task of the course, called “A picture and 1000 words”. The PSTs were advised firstly to choose an image and then to write a text in Catalan of a maximum of 1000 words. They had to explain the meaning of the image, to discuss its selection and to reflect upon their concept of how to teach the writing skill and their experience of learning how to write. The PSTs had one week to complete the task. They did not receive any previous preparation about how to create and use a blog but were provided with video tutorials and a guide by the tutor. They were free to choose the content management system to build their blogs.

3.2. Data analysis

The analysis protocol for coding followed an inductive approach and adopted the following successive steps (Saban et al., 2007; Wan et al., 2011): (a) naming/labelling, (b) sorting (clarification and elimination), (c) categorisation, and (d) analysing the visual metonymies and metaphors from the data. In the first stage, each blog post was assigned a code to ensure its anonymity. In the second stage, we eliminated the blog posts that did not contain images and then we selected only the images with the photo format. Finally, 45 images were discarded in the sorting stage based on the following criteria: a) photos referring to reading and not writing, and b) comic strips. As a result, the corpus of analysis consisted of 89 blog posts and a total of 99 images. In the third stage, the images were classified into metonymies and metaphors, taking into account the literal meanings (metonymies) and non-literal meanings (metaphors) they portray based on Forceville's (2009) definitions. The group of metaphors was subclassified into two groups, with strong and weak implicature by the two researchers independently. Moreover, two independent coders were also asked to classify visual metaphors into these two categories, according to the following definitions: “Weak implicatures require a greater degree of cognitive processing compared to strong implicatures, since the metaphor that is created requires a higher amount of implicit information” (Callow & Schiffman, 2002, p. 41). The inter-rater reliability rate was estimated with the formula “Agreement/Agreement + Disagreement” (Miles & Huberman, 1994) and the level of agreement reached between the individual ratings of the independent raters and the ratings of the researchers was high: $37/37 + 3 = 0.92$.

A thematic analysis (Moser, 2000) was followed, which helped

researchers to categorise data from the meanings set forth by the PSTs in each metaphorical and metonymical relationship with the written text of their reflections. The two researchers compared their results and reached an agreement. All the examples of reflective text included in the findings section were translated into English from Catalan by the authors.

4. Findings

This section is divided into three subsections: the first one focuses on the use of metonymies, the second one on the use of metaphors, both in relation to the PSTs' beliefs about the teaching and learning of writing. The last subsection presents how metaphors and metonymies emphasise PSTs' affective attitudes towards the teaching and learning of writing.

4.1. The use of visual metonymies to reflect on writing

Out of the 99 images that form the corpus of the study, 63 images are classified as visual metonymies. Visual metonymies directly illustrate one of the central themes of the PSTs' reflection, in our case, their experience of learning how to write, i.e. they portray either the literal meaning of the act of writing or their particular experience of writing (Fig. 1).

Regarding visual metonymies, PSTs chose different images that can be classified in the following groups: *Handwriting sheets* (N = 21), *Children while writing* (N = 20), *Others' written texts* (N = 7), *Writing objects* (N = 6), *People writing* (N = 5), and *Own written productions* (N = 4). The act of writing is metonymically depicted by images of pens, pencils, written texts, notebooks, computers, typewriting machines (Fig. 1 bottom left), or images of children while writing (Fig. 1 top left) which can be understood as metonymy of writing as an action. In Fig. 1 top left, the pen and paper in the child's hands stand for the writing process and the expression on his face stands for boredom of the repetitive writing activities they had to do in formal education. In Fig. 1 bottom left, the typewriter, the notebook and the pens metonymically stand for the different actions of writing (typing and handwriting). In those cases, images have a purely decorative effect since they could well be replaced by similar ones without changing the actual reflection of the accompanying text. On the other hand, there are some visual metonymies that depict their own written productions (Fig. 1 bottom right) or images portraying themselves. They illustrate PSTs' experience of writing and particularly refer to their personal childhood learning experience developed in their written text. In those cases, these images help PSTs to recover their memory of their learning process as if it were a stimulated recall. Likewise, the visual metonymies that portray handwriting worksheets (Fig. 1 top right), which represent one of the most frequent activities in the Primary school stage, allow PSTs to recover an experience they reinterpret from their current informed perspective as PSTs in their university education. PSTs use these visual metonymies to express their beliefs about writing and how to teach to write, emphasising the communicative aspect of writing and the fact that writing must be learned in a context with a meaningful purpose. Some visual metonymies (26 images) reflect their past experience and serve as counterpoints to their current beliefs.

In contrast, there are six visual metonymies using images of themselves or other people that relate to PSTs' positive experience of learning how to write outside school (i.e. learning with parents, with grandparents or writing a personal diary). They show a contrast between the formal school instruction that was compulsory, with the freedom and creativity of the writing practices outside the school that they considered more meaningful (e.g. writing a personal diary).

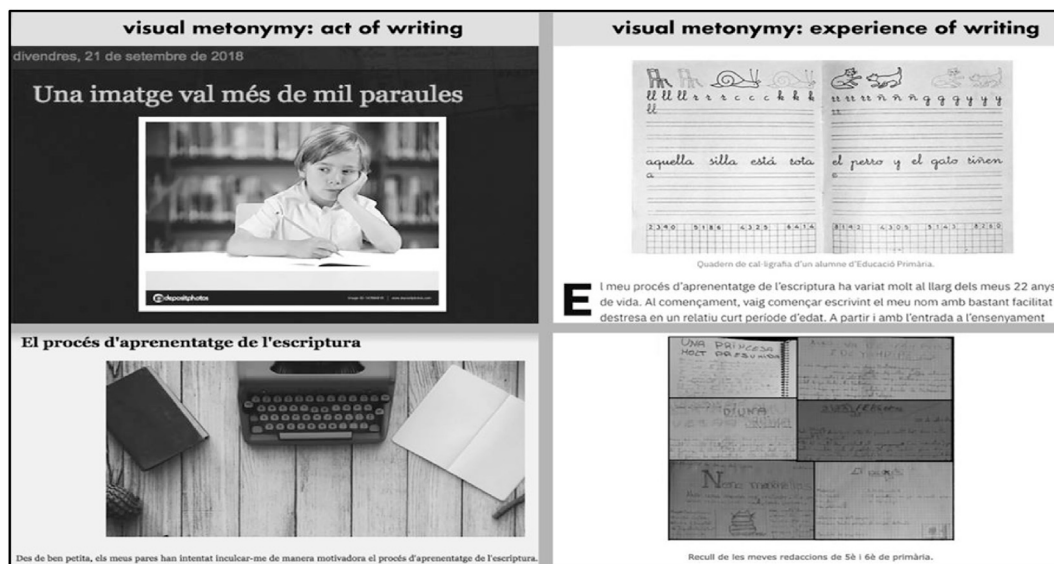


Fig. 1. Examples of visual metonymies.

With regards to the image-text relationship in visual metonymies, four different approaches are identified depending on how the reflections are articulated in the text. Regarding the visual metonymies as the act of writing (Fig. 1), two types of approaches are established. In the first approach, images contain a direct message and do not need any explanation to understand the key concept of writing; for example, the objects shown in Fig. 1, bottom left. In this case, the function of the image is decorative, as if it was a pure illustration, and does not provide much more information. The second approach is the case of images that provide a little more information such as the affective state of boredom (Fig. 1, top left). In this case, it also illustrates a very clear message (notebook and pen = writing and child with a bored expression = boredom) to understand the key concepts. In these cases, the written texts accompanying the image narrate the learning activities in which the PSTs do not position themselves critically but include an affective element.

In the case of visual metonymies as the experience of writing, the affective element is central in the personalisation of the message and two different approaches are also identified. The first one refers to those images that illustrate the handwriting sheets that collect their own writing experiences using that specific meaningful material. These are memories that are not very positive as the PSTs describe these activities as mechanical and monotonous, although sometimes they justify their use. The second type, on the other hand, includes images that illustrate the students' writings in which the emotional and affective element is more prominent since they help them to personalise their reflective text. Although the texts that accompany these images continue to be a narration of what happened in their learning process, a feeling of pride emerges to show what has been achieved by portraying their own written production. In both cases, these visual metonymies have been personalised and help them to expand the message of their reflections.

4.2. The use of visual metaphors to reflect on writing

In the cases of the 36 visual metaphors, 27 images are considered as having a strong implicature (Fig. 2 left) since the message provided by the visual metaphor is conventionally accepted and coincides with the concepts outlined in the written text. Only nine

are considered as having a weak implicature (Fig. 2 right), whose text is needed to disambiguate the possible diverse meanings of the images in relation to the core theme the PSTs want to reflect upon.

The visual metaphors that the PSTs used are very heterogeneous. The metaphors that have a strong implicature show prototypical leitmotifs that allow the meaning of the metaphor to be understood easily through the image. The metaphors that have a weak implicature refer to concepts which are not so transparent and one needs the written text to clarify the message the PSTs want to convey. In this case, the lock (Fig. 2 right) may suggest that learning how to write opens learners to new spaces for creation and development. Instead, the PST uses this image as a metaphor to describe an experience of a teacher-centred methodology in which the Primary teacher was the only person who had the key, i. e. the only person who could decide how and what to write. On most occasions, all types of metaphors convey more than one concept that the PSTs develop in the written text accompanying the image. This text provides the key to understanding the metaphorical meaning that conceptualises their beliefs on the teaching of writing. Table 1 summarises the conceptual representations of the visual metaphors used by the PSTs in two large groups: the conceptualisation of writing as a cognitive process and as a social activity.

When writing is conceptualised as a cognitive process, among the visual metaphors that are summarised in Table 1, both with strong and weak implicature, the most frequent ones refer to the concept of learning to write as a process. This conception of process is related to varied visual metaphors which emphasise actions in progress such as the development of a person as a literate individual or the process of composing a text, and even the effort that these processes imply.

With reference to visual metaphors with strong implicature, images portray the prototypical belief that writing is a process, using mountains, pyramids, ladders, stairs, and roads. For instance, in Fig. 2 (left) the student addresses the concept of writing as an unfinished process in one's lifelong learning, reaffirming the concept of the image with the word "Unfinished" at the beginning of her text. On other occasions, the portrayed process reflects directly on the phases of the act of writing: planning, translating and revising. This is the case of Fig. 3 (left), in which the image of knitting a glove serves as a simile to help the student to compare

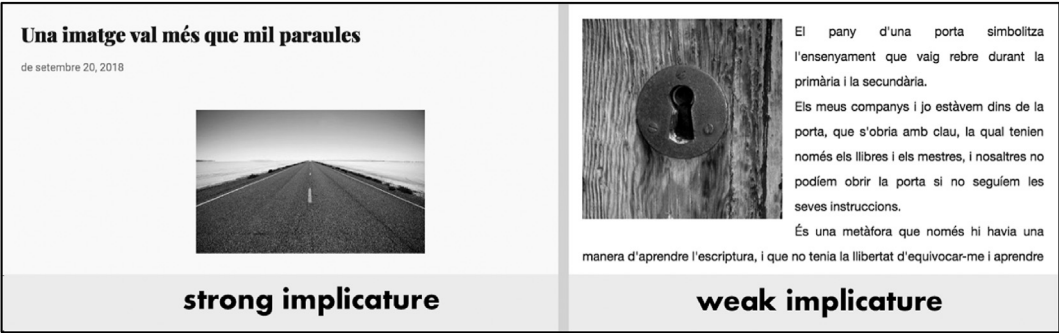


Fig. 2. Types of visual metaphors.

Table 1
Visual metaphors: Key concepts and their visual representation.

Writing skill	Key concept	Visual metaphors representation	
		Strong	Weak
Writing as a cognitive process	Process	Road/A man climbing a mountain/Mountain/Staircases/Ladders/ Knitting a glove/Boat with someone fishing for letters/Sketches of a building/Puzzle/Hands of a child and an older person playing the piano/Tightrope walker's feet walking on a rope/Handwritten names from different periods/Pyramid	Letters connected with a chaotic tangle of black lines from which the word "interest" appears/Watermill/Umbrella/Hummingbird flying/Image of cubes in formation (bottom in chaos, top well-ordered)/Watercolour with circles with straight lines from the bottom connecting them
	Effort	A man climbing a mountain/Human tower/Pyramid/Staircase with an arrow/Notebook with crumpled paper balls	
	Composing	Human tower/Sketches of a building/Knitting a glove	Watermill
	Growing	Staircase with an arrow/Tree	Image of cubes in formation (bottom in chaos, top well-ordered)
	Emotions	Explosion of colours on the head of a person/Letters coming out of an open book	Blood transfusion connected to a pen/Letters connected with a chaotic tangle of black lines from which the word "interest" appears.
Writing as a social activity	Creativity	Window/Boat with someone fishing letters/Objects out of a child's head/Sketches of a building/Hands of a child and an older person playing the piano/Letters coming out of an open book	
	Opening	Door(s)/Ladder on a wall to help to jump to the other side/ Explosion of colours on the head of a person/Eyes closed-Eyes open/Window	
	Freedom	Road/Boat with someone fishing for letters/Girl with a butterfly shadow	Door lock/Colour points with threads
	Collaboration	Mountain/Letters emerging from an open book	
	Interconnection	Explosion of colours on the head of a person	Colour points with lots of ravelled lines connecting them

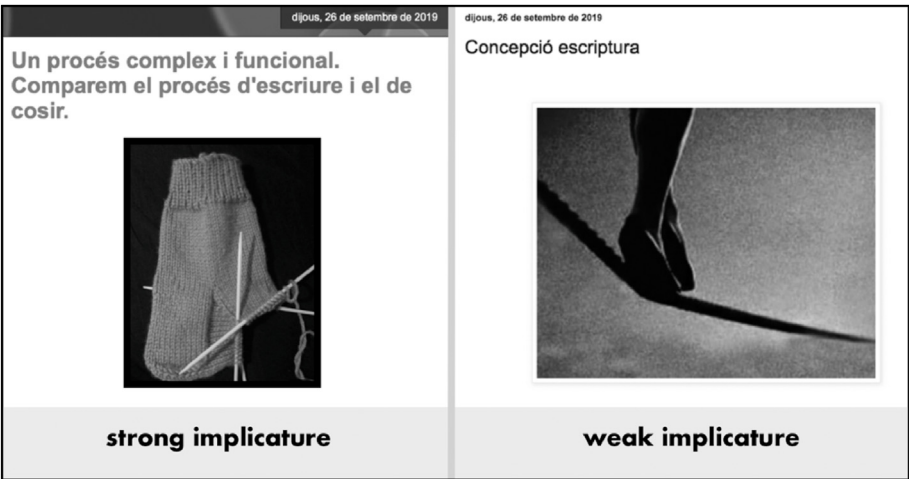


Fig. 3. Visual metaphors to convey the writing process.

the process of knitting to those writing phases. The third reference to a process refers to aspects that go beyond the technicalities of writing to achieve a feeling of satisfaction in the process of writing,

as in the case of Fig. 3 (right), such as time, concentration, reflection, organisation, and research.

The images portraying a process metaphor are also related to

other concepts such as a pyramid with the concept of effort, climbing a mountain with the concept of collaboration to reach the top, a road with the idea of freedom and a staircase with the ideas of growing and effort (see Table 1). The PSTs also conceptualise writing with the most intimate sphere of the person, emphasising the concept of creativity and indicating it as a means to express feelings and different moods. These are represented, for instance, by coloured images or coloured objects that come out of a person's head, and an open window or coloured letters that come out of a book (see Fig. 6). This complexity of meanings that PSTs attribute to their visual metaphors allows a complete and articulated vision of their interconnected conceptions, which cannot be pigeonholed into a single one.

In relation to writing as a social activity, the PSTs also conceptualise writing, although to a lesser extent, with the idea of freedom and openness to the world: a way to empower people and an insight into the literate society that provides PSTs with the necessary tools to interact in society. Only a few instances refer to the writing objective of collaborating and interconnecting with other people.

In the case of visual metaphors with weak implicature, the written texts that refer to them are more complex conceptually as they need to establish a clear relationship between their experience, their beliefs and the image they have selected. For example, in Fig. 4, the image could imply an interpretation of a Spanish idiomatic expression “la letra con sangre entra” (literally translated as “writing goes in with blood”, meaning “no pain, no gain”) which emphasises the effort in the process of learning. However, the written text helps us to understand the meaning that the PST wants to portray, that is to say, her belief that writing, represented by the blood, is an essential part of her life as it allows her to express her feelings and positive past experiences outside school.

Visual metaphors, either with strong or weak implicature, convey a complexity of meanings. They help to trigger the PSTs' core concept of teaching the writing skill and, together with the written text, help them expand the concept by refining their metaphorical reflection. For example, in the case of the prototypical metaphor of the tree that represents growth (Fig. 5) the PST expands the metaphor in which writing is the seed “that we plant so that it can grow when we water it as we learn how to write”. Planting and watering the seeds represents the process of learning to write, the parents and teachers who accompany the student in this process are the water, the sun and the nutrients. “Then the



Fig. 5. Example of visual metaphor with expanded meaning.

branches come out when we already know the spelling system of the language, how to say sentences, how to conjugate verbs and to understand the grammatical structures”, that is to say, to have the command of the linguistic knowledge to be able to write a text. Finally, the leaves of the tree represent the final written products. In those cases, there is a powerful bidirectional link between the text and the visual metaphor.

The expansion effect prompts the PST to provide meaning to the component parts of the metaphor so as to make it more transparent and allows them to delve into their core beliefs. Similarly, in two cases, PSTs resort to the multimodal strategy of editing the image to reflect their learning experience with a visual metaphor that is more meaningful and to deepen a visual conceptualisation of their learning experience. In Fig. 6, the PST includes an edited photo that she considers representative of her learning process. This image allows her to show her positive attitude that goes beyond the book, beyond the boundaries of formal training. The image as a whole

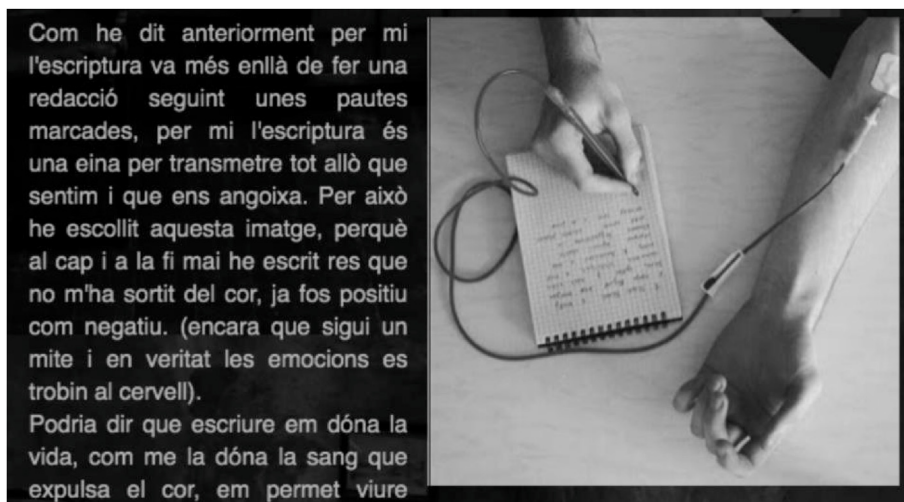


Fig. 4. Visual Metaphor expressing emotion.



Fig. 6. Visual metaphor of an edited photo.

creates a metaphor but if the different elements of the image are analysed, some visual metonymies can be identified: a book = writing and reading, some letters in different colours emerging from the book = creativity of writing, and a smiling girl = positive experience. The image composition of different visual metonymies creates a visual metaphor, referring to the key concepts of creativity and passion for writing, which help her to deepen her reflection. This is a clear example of a metaphor composed by several metonymies. The edited image and the written text are intertwined in a way that helps to develop her reflection in a more personal creative manner.

The image-text relationship in visual metaphors is usually complex so it is necessary to read the text accompanying the image to understand the meaning that the PST wants to convey. The discourse of the written text is also more articulated than in the case of visual metonymies. The text is not just a summary of their experiences; it also usually explains key ideas that help show their thoughts about how writing should be taught and learned.

4.3. Affective relationship between visual metaphors and metonymies and the written text

Both visual metonymies and metaphors help PSTs express emotions and feelings concerning their learning experience in writing. When talking about past experiences at school, the images

selected mainly have a negative implication of dissatisfaction. Only a few cases report a positive past experience, mainly at home with family members. However, when images refer to their present and future vision as teachers and how they intend to teach writing in their prospective school career, these images mostly portray a positive message.

Regarding visual metonymies, most images have a neutral emphasis ($n = 28$) illustrating a mere description of the process that they experienced in learning how to write, which coincides with images with a more decorative function. They are followed by images that shadow a reflective text which reports disillusionment in their experiences ($n = 23$). In the written text, adjectives such as “traumatic, mechanical, boring, repetitive”, or “not very motivating” are used, and nouns such as “frustration” or “loss of interest” to describe that upsetting school experience. Only 12 metonymies are used to emphasise a positive experience. When the PSTs use more than one image, the written text is more articulated since they distinguish different moments of their lived experience. For example, there is one case in which a PST first presents an image showing a handwriting worksheet, implying a negative school experience of mechanical and rote learning. She then uses another image showing her as a child sitting in front of a computer, an aspect that she relates to the social and communicative function of the act of writing which she values positively. Another example is the case of a blog post with three images that represent three types of writing activities. The first one is a handwriting worksheet with the same negative emphasis. The second image portrays a text that has a communicative objective and represents what the PST considers to be a good way to teach the writing skill at school. The third image shows a shopping list which represents the use of writing in real life and also implies the involvement of families in the school learning process.

PSTs also use visual metaphors to portray their emotions. Nineteen metaphorical images help them trigger a reflective text that reports their beliefs on the importance of the teaching of writing as an essential skill in the children's individual development and their conceptual views on how to teach writing as prospective teachers (Fig. 7). There are only four cases where they take

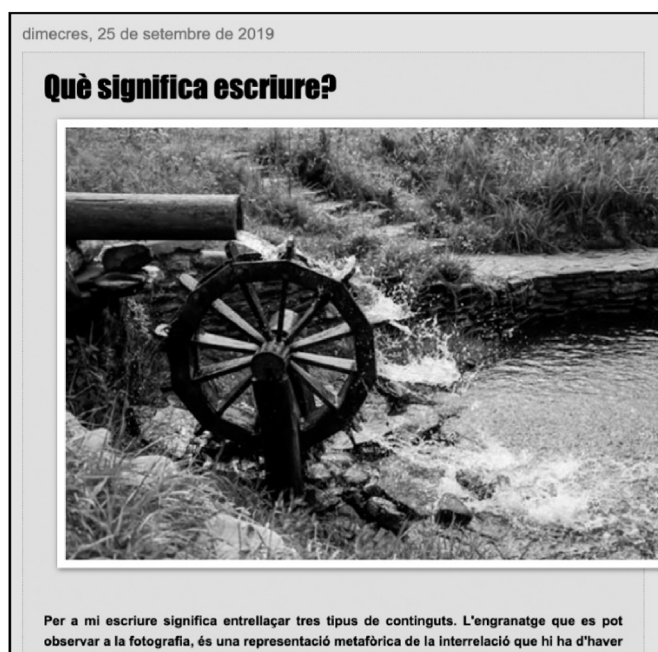


Fig. 7. Metaphor with positive emphasis.

a more neutral perspective in expressing their beliefs. In contrast, some PSTs use visual metaphors to highlight their experiences in the past, either positive ($n = 9$) or negative ($n = 4$). Out of the nine images that show positive emotions, five help them to recall different enjoyable moments of their learning experience. When the emphasis is positive, the PSTs in our data use nouns such as 'interest', 'passion', 'curiosity', 'imagination', 'creativity', 'happiness', 'motivation', 'desire', 'autonomy', 'independence'; verbs such as 'love', 'have fun', 'like', 'discover'; and adjectives such as 'free' (I feel free) and 'autonomous'. These concepts relate closely to the metaphorical meanings of the images.

In Fig. 7, the PST expresses a positive vision of the concept of writing ("I have metaphorically represented writing as a watermill, because I see it is an essential and vital activity for the human being, same as harnessing water"). She also establishes the relationship between different parts of the watermill and different aspects of the process of writing. For example, the purpose of the watermill construction ("the need to bring hydraulic energy to the city") is related to the communicative goals of the written text. The place where it is constructed ("a watermill in a place where there is no river has no reason to exist") refers to the communicative situation that should be always considered when writing a text.

In contrast, Fig. 2 (right) is an interesting example of a metaphor that accompanies a text expressing a negative school experience. The type of teaching she came across was teacher-centred and her teachers were the only ones "with the key to open that door lock". In her text, she values her past learning experience negatively as she did not feel free to write whatever she wanted or even commit errors. She was not allowed to correct herself, and thus did not have room for improvement. This weak visual metaphor also allows her to point out that she did not have the opportunity "to have the key to open the door of knowledge". Although, in principle, the image of the door lock could suggest a positive emphasis with the idea of writing as an act to open doors, the PST turns the idea around to express the limitations and the closeness of traditional teaching.

Among the cases when PSTs use visual metonymies and metaphors with a negative emphasis, we found a couple of examples of reflecting on learning difficulties (dyslexia, dysgraphia, etc.) and how their teachers were not able to deal with them properly; thus, they did not take into account the emotional impact on their learning processes.

5. Discussion

Using images as visual metaphors or metonymies to conceptualise any aspect of teaching is a useful communicative resource that allows PSTs to express ideas beyond the written text. Adding this multimodal resource helps them to prompt their ideas and connect thoughts and reflections to better understand teaching (Hamilton, 2016). As this study has shown, PSTs can articulate their thinking in different ways through the use of multimodal modes. They can exploit the affordances of these visual tropes to express their beliefs and to describe their experiences with different levels of complexity. In our data, the PSTs use them in their blog posts to make associations between contiguous meanings of an "A for B" in metonymies, as in images in Fig. 1, or expanding meanings of an "A as B" in metaphors (Forceville, 2009), as in Figs. 2–7.

Visual metonymies, in most cases, refer to a specific technique or procedure of learning and teaching writing. They are the preferred visual tropes chosen by PSTs in our data (2/3 of the total) to describe their learning experience. The majority of these images have a decorative effect (Fig. 1 top and bottom left), do not provide much extra information in their reflective process and are mainly used as a prompt to stimulate their memories. The use of visual metonymies does not allow PSTs to elicit their complex system of

beliefs, and they focus on a single concept or experience. However, some visual metonymies (Fig. 1 top right) express a conceptual change in how PSTs perceive their learning experience from a new, informed perspective as PSTs that reflect their actual beliefs of how writing should be taught in children's education. The relation of image-text regarding visual metonymies shows four different approaches which, in fewer cases, expand the meaning of the text by adding little information or display an affective attitude (Fig. 1 top left). Visual metonymies provide a simple association of contiguous meanings. The written text does not deepen in conceptual knowledge but stays on the surface of the narration of their positive or negative learning experiences.

The PSTs describe their negative experiences visually and through the written text, revealing their conceptions of the writing skill (Fig. 1). This result is in line with studies on negative beliefs and attitudes of future teachers about writing (Hall et al., 2020). However, in our data, the PSTs also show their intention to change this teaching dynamic in the cases where the image prompts a positive attitude. This conceptual change is induced by what they have already learned about the teaching of writing in their studies at university. In line with what Zimmermann et al. (2014) affirm, the actual change of attitude from their negative experience at school is derived from a teacher education program that takes into account both conceptual and pedagogical tools. In our study, the program engages PSTs in a practice of prompting a metacognitive reflection with visual metaphors or metonymies that confronts their conceptions with their experiences to start this process of change.

Unlike visual metonymies, visual metaphors, both with a strong and weak implicature, are mostly used to express positive feelings and attitudes towards writing. There are some exceptions such as in the door lock example (Fig. 2, right). In this case, the PST establishes a relationship of contradiction between the image and the written text (Nöth, 2001), thus making the message that she wants to convey even more powerful. Visual metaphors, although less used in our data (1/3 of the total), are an effective communicative means for the development of PSTs' metacognitive reflection. In fact, they help teachers to elaborate their conceptions deeply, revealing their innermost beliefs, which are the most influential in shaping teachers "instructional decisions" (Phipps & Borg, 2009, p. 380). Moreover, visual metaphors are employed to represent the PSTs' root metaphors that help their core beliefs to emerge, which according to Borg are the more stable and powerful (Birello, 2012).

Visual metaphors in our data portray two main basic concepts of the learning and teaching of writing as a cognitive process or as a social activity. The most frequent and prototypical visual metaphors are related to the key concepts of writing as a cognitive process, and they are interpreted in three different ways. The first one relates to the conception that writing is considered a recursive process in three phases: planning, translating and revising (Hayes & Flower, 1980). The second one refers to the common belief that writing is a very long and complex process that involves effort. The last one sees the process as an essential part of growing as a literate individual. This concept of process has been represented with different metaphorical images and with different meanings (see Table 1), which demonstrates the multiple affordances of visual metaphors to reflect upon the same concept. There is also evidence of the idea of writing as a social activity (Bazerman, 2016) and the visual metaphors that represent this conception are mainly with a strong implicature. The social conception of writing relies on images that highlight the advantages of collaborative writing that helps one to learn with others (Storch, 2019), considering teachers and families as facilitators (Leavy et al., 2007). It also provides students resources and skills to reflect upon and learn from the world around them (Massengill Shaw et al., 2008) which, in our

data, is related to the idea of writing as a way to unlock opportunities represented with a core metaphor of “doors” that lead to freedom within a literate society.

The complexity of visual metaphors sometimes occurs when the metaphors include one or more visual metonymies and they overlap (Jiménez-Muñoz & Lahuerta-Martínez, 2017; Urios-Aparisi, 2009) as in Fig. 6. The process of composing and editing the image implies that the PST has purposefully planned it before so as to conceptualise the meaning she wants to convey in her reflection. In this regard, editing images instead of downloading them directly from the internet engages PSTs in a deeper process of conceptualisation by personalising a metaphor.

Regarding the text-image relationship, the visual metaphors add a level of abstraction and complexity to the reflective thought to a greater extent than visual metonymies. The metaphorical message is always more complex than the metonymic one. Using these metaphorical images helps account for the complexity of the teacher's thinking (Pajares, 1992) and highlights relationships that may be difficult to explain only through a verbal code. Visual metaphors can help PSTs deepen the written reflection expanding new meanings from what they express in their written text. In all the cases in our data when a visual metaphor is introduced, both the visual metaphors and the written text are intertwined in complex conceptual connections that reflect the complexity of the teacher's thinking. Visual metaphors have a complex evocative power that PSTs need to develop in their writing to personalise their reflection and clarify their conceptual connections. In the case of visual metaphors with strong implicature, the message that the image portrays makes it easier to relate it to their written reflection. Notwithstanding, this message should be still clarified as the visual metaphor may have different core meanings. In contrast, the evocative power of visual metaphors with weak implicature should always be unpacked with the written text to clarify the multiplicity of potential meanings (Fig. 7). This clarification process obliges PSTs to conceptualise the components that form the visual metaphor and to detail the personal interpretation of the image in the text. In those cases, the reflective process that the PSTs have to go through is a conceptual exercise of a deeper awareness of their beliefs (Farrell, 2006).

According to Saban et al. (2007) and Bessette and Paris (2020), images are a very useful means to elicit students' beliefs and conceptions and in combination with the written reflection are fundamental for their professional development as future teachers (Kalaja et al., 2008, 2013; Ribas & Perine, 2018). Unlike the results of Birello & Pujolà, 2020, in which PSTs rarely used visual metaphors, this study, in which PSTs were asked to search for an image first, has revealed more frequent use of metaphorical images. This fosters a more well-structured discourse that reveals their initial processes of becoming mature professionals, trying to apply what they are learning in their degree. By using an image with a visual metaphor first, our PSTs were prompted to argue the meaning attributed to the image to a greater degree, especially when they used visual metaphors with a weak implicature.

Visual metaphors have formative, empirical and analytical value (Brandão, 2021) because they provide a space for reflection and help PSTs to make sense of their process of becoming a teacher. In our data both visual metonymies and metaphors provide those essential values for teacher education. They are a source for narrating teaching experiences and snapshots of PST development. However, visual metaphors add a creative value that helps PSTs to deepen their thinking process, connecting concepts, beliefs and learning experiences, together with the emerging beliefs prompted from their teacher education at university (Borg, 2003).

6. Conclusions

The implications of this study are twofold. On the one hand, it delves into the use of visual metonymies and metaphors that PSTs use when asked about their experience of learning to write. On the other hand, it delves into beliefs about the learning and teaching of writing.

Both visual metonymies and metaphors within the blog posts become essential components that convey the core meaning of reflection, and determine the tone of the written text, its structure and the selection of the ideas to be developed. In particular, visual metaphors have the affordance to help PSTs to go beyond the literal meaning of the images, thus creating new conceptual relations and new meanings, which allow them to deepen their reflective processes. The use of visual metaphors and metonymies in the training of PSTs encourages their reflection on their own learning processes and helps them relate teaching issues. It also helps them to become aware of the beliefs and concepts that will determine their future teaching practices. Not only does the innovative experience presented in this study provide insights into the use of visual metonymies and metaphors as an aid for the development of PSTs' metacognitive reflection but it also shows its full potential for teacher education.

The beliefs about the learning and teaching of writing that emerge in activities of this type allow PSTs to be aware of the changes that are taking place in their training process. They collect their ideas, experiences, and doubts, which testify to the progress they are experiencing and of the new concepts and practices that allow them to modify their ways of thinking and conceiving the teaching of writing. The use of images, especially when including visual metaphors, adds an added value to this reflection process.

Although this study was conducted with two cohorts of PSTs in one university, it has potentially far-reaching implications for teacher education. It offers an insight into how multimodal texts increase the opportunities to reflect on what PSTs think and believe. In addition, the task of developing multimodal texts with visual metaphors or metonymies allows PSTs to develop their digital literacy. Further research is needed in this specific area of using visual metaphors as tools for teachers' metacognitive reflection and should consider a comparison of the PSTs' posts written in different moments of the course or even along their degree. This longitudinal research can help understand how visual metaphors change throughout their process of learning and how these help them to express their beliefs when configuring their professional development.

The findings of this study delineate some fundamental ideas and implications for future teacher education when using digital environments for reflection. The use of blogs to collect the visual and written reflections of PSTs helps them to visualise ideas and to represent a further step in their reflection process. Teacher education in our present digital context must combine multimodal discourses to connect knowledge from theoretical concepts, new writing experiences and new pedagogical approaches. Thus, PSTs' awareness of tensions and doubts about their belief systems regarding teaching, which is the first step in their professional development, is fostered beyond the written word. While visual metonymies have the potential to be a possible starting point for a reflection in which experiences are narrated and their beliefs emerge, visual metaphors allow for a deeper conceptualisation of their beliefs and help them to broaden their understanding of their experiences.

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Author statement

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Data availability

The data that has been used is confidential.

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