Spatial Turn in ELT

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Are you familiar with thought experiments? What if I asked you how many doors there are in your house, could you tell me?

Of course, if you understood the question, you would be able to do so, probably by moving about in your imagined house, counting all the doors, and then responding with the approximate number of doors.

What about the one where I instruct you not to think of the pink elephant? You couldn’t not do it, could you? Why couldn’t you follow my simple verbal instructions?

Verbal processing is connected with spatial thinking and visualization in expansive and inexorable ways. We have always at least tacitly recognized this, but we take it for granted, perhaps because spatial thinking is often interpreted as something we engage with passively, automatically, and subconsciously. After all, the spatial constituted three out of four of Aristotle’s laws of association, but he did not think very highly of them\(^1\). He viewed these laws as the domain of common sense, and preferred to occupy the more rarified realm of philosophical thought and discourse (Boeree, 2000). In the last 30 or so years, the spatial has become salient in various disciplines due to the advent of robust information systems that incorporate the spatial perspective through visualizations and mapping. These information systems are called Geographical Information Systems (GIS) and their influence on other disciplines has been described as the “spatial turn” from the title of my paper (Ayers, 2010; Guldi, 2011a, 2011b, 2011c, 2011d, 2011e). In the context of English Language Teaching and Learning, the

\(^1\) Although for this he is often credited as the father of psychology (Boeree, 2000).
movement towards the spatial is probably best described as a *spatial trajectory* rather than a *spatial turn*, as methodologies have been heading towards the spatial ever since the early days of the grammar translation method and audiolingual approach. The publication of Gardner’s *Frames of Mind* (1985) was a powerful catalyst in this regard. Whether the theoretical foundations of Gardner’s theory were sound or not, multiple intelligences effectively led to greater interest in engaging different “intelligences” in the learner, and promoted multimodal approaches. With the recent proliferation of multimedia and digital literacies, spatial thinking has taken on more meaning in our culture and society. For instance, as many people know, the 2013 Oxford Dictionaries’ word of the year was “selfie”, a word used to describe a photograph taken of oneself by oneself. Do you know what the word of the year was for 2015? An emoji. No, not the word “emoji” but an actual emoji—a picture that represents a feeling or emotion—in this case, the laughing face with tears. In addition, 2015 marked the first year where a comic book was accepted for a dissertation at the prestigious Teachers College of Columbia University—probably the first instance ever, as a lesser college would never have touched such a disruptive notion. (As everyone knows, words rule academia.) It seems the spatial has never been more relevant, but it is the same as it ever was.

This paper will explore the connection between verbal and spatial, moving from general to specific, and concluding each specific section with practical resources that you can use to utilize spatial thinking and visualization in your classes.

**Theoretical foundations**
Although inexplicably controversial, it seems obvious that spatial thinking and visualization have primacy in our evolution—spatial thinking predates verbal thinking and provides a foundation for cognition. Newcome and Frick wrote of the evolutionary and adaptive importance of spatial thinking, that it gave us the ability to make and use tools. Perhaps by virtue of being necessary for survival and existing for a long time, spatial thinking and processes are mapped to regions throughout the brain (Gersmehl & Gersmehl, 2007). Furthermore, Gaddis (2002), a historian, posited that pattern recognition, a function of spatial thinking, is the “primary form of human perception” and many neuroscientists regard pattern recognition as the *only* thing the brain does at a molecular level (Bush, 2015; John, 2015). From an evolutionary perspective, the first symbols we internalized were images, and Vygotsky argued that all knowledge started as visible social interaction that was “gradually internalized by the learner to form thought” (Sawyer, 2014, p. 10). Somewhere along the way, we developed the ability to speak and use language, and the origins of this development remain highly contested and unresolved (although in some disciplines and traditions, such as postmodernism in literary theory, the matter is quite resolved). The present connections between verbal and nonverbal processing, however, have been described and supported in the literature. For example, the dual coding theory attempts to explain human cognition by asserting that we use two functionally independent but interrelated modal-specific multimodal representational systems: verbal and non-verbal (Paivio, 1983).
In other words, language and mental images (or sounds, smells, etc.) are inextricably tied to one another. Paivio asserted that the relationship between the two systems is many-to-many (2010), which implies that when we see a word or an image, we think of other words or images related to that stimuli. Sadoski and Paivio (2001) point out that both systems influence one another organically, both in language reception and recovering it for production, and spatial thinking has been described as the perfect complement to verbal thinking (Carroll 1993; Bornstein 2009).

**Impact on English language teaching and learning**

If we accept the premise of DCT stated above, then we naturally begin to wonder what impact on the teaching and learning of English language. The interconnectedness of verbal and spatial processing has a clear impact on the following areas of language learning, recall and usage:

1. memory
2. understanding

3. expression/extension

Methodology

Research should be done regarding the second and third areas\(^2\) listed above to verify, describe and elaborate upon the connections between visual and spatial, as well as the connections between theory and practice.

Regarding memory and understanding, the appropriate level of analysis would be the individual mind, since each of these topics describes a cognitive phenomenon. Cognitivist and neuroscientific approaches would likely be appropriate, in the context of random sample, controlled experiments. The last section, however, largely deals with sociocultural and extended theories of cognition and learning, and therefore a broader, more holistic level of analysis would be appropriate. Approaches related to activity systems and situated learning would likely be appropriate to test the points made in this section.

Impact on memory

People have been exploiting the connection between words and imagery in order to gain profound powers of memory recall for a very long time. For example, we know that Greeks used imagery mnemonics to memorize long speeches or epics, a tradition which goes back at least 2500 years (Paivio, 1983). These practices were based on the common knowledge that images of things were easier to remember than words, and this assumption was consistently confirmed by 20\(^{th}\) century experimental research (Paivio, 2010). For example, Levie and Lentz (1982) reviewed over 50 experiments that compared the use of images versus

\(^2\) There is already a prolific amount of research regarding the influence of spatial thinking on verbal and textual memory.
using text alone, and determined that the human brain processes images faster than text and that images are more likely to be stored in long term memory. Furthermore, Anderson (1978) also concluded that imagery and concreteness play an important role in memory for text, and Denis found that subjects who received imagery in their instructions remembered more than subjects who did not receive the same kind of instructions (1984). Lastly, another study found that constructing or processing a supplemental map—a kind of mental model or image—improved memory for the related text (Dean & Kulhavy, 1981).

**Connections to practice:** These findings have important implications for the learning of new lexis, and lead us to the obvious conclusion that one should utilize images and visual stimuli to reinforce new lexis—even abstract nouns or concepts. Furthermore, there is a useful website for independent learning and self-study of lexis called *memrise* ([www.memrise.org](http://www.memrise.org)) which utilizes the connection between word and image in order to teach lexis more efficaciously. It supports user-produced memes, which can be an image, a funny saying or story, or both, in order to help the learner remember the language item. *Memrise* is clearly based upon the principles of dual coding theory (although it also features some facets of gamification, which has its origins in behaviorism).

**Impact on understanding**

The role of spatial thinking and visualization in communicative understanding cannot be overstated. Stevick (1986), for instance, goes so far as to say that language is only communicative when it causes a modification of images in the hearer’s mind. We put forth the notion that engaging the spatial processing of students is helpful for their comprehension of lexical items and grammar. There is literature to support this notion. For example, Kaufman and Brooks (1996)
noted that verbally-based curriculum alone was insufficient and did not engage the “diverse strengths” of the non-native English speaking student population in their study (Kaufman and Brooks were proposing curriculum reform and advocating more collaboration between teachers in TESOL and STEM disciplines in the United States). Additionally, Eylon and Rosenfeld (1990), in their study of a young learner program in Israel that emphasized “visual cognition”, found that visual and tactile modes facilitated the acquisition of verbal communication; engaging these modes led to greater outcomes particularly for “non-social and non-communicative” students. Finally, Mayer determined that the use of mental models (e.g. diagrams, clusters, etc.) facilitated retention of ideas and generalization of key principles from explanatory texts (1989).

One particular area of language where spatial thinking facilitates understanding is prepositions. Many non-native speakers of English have a difficult time with prepositions, and their usage cannot be easily generalized into a set of rules. However, prepositions are overwhelmingly spatial in nature (e.g. by, over, under, above) and therefore would benefit from spatial approaches. Of course, prepositions are not always used in spatial contexts, they are often paired with nonspatial verbs or nouns, but a study by Kranjec, et. al., found that people cannot divorce the spatial meanings of the prepositions even when used in nonspatial contexts (2010). In other words, the spatial is fundamental to the meanings of these words. Thus, we argue, a solid spatial understanding of the root preposition can help scaffold learner understanding of more complex and abstract uses of the preposition.

Another language item that benefits from engagement with spatial thinking is “there is/there are” versus “it is/they are”. Language learners have
trouble with the strange grammatical construction of “there is/there are” because these expressions feature the nontraditional subject “there”. It is, in fact, rather strange to think about why we use this phrasing—we take for granted how strange it is. “There is” and “there are” are quite spatial in nature—“there” refers to location, after all—and, in practice, they emphasize the whole picture or frame, whereas the alternatives, “it is” and “they are”, emphasize the objects in question, as though they exist in a vacuum. Notably, when we teach these forms, we often engage students with pictures and have them describe what is in the picture. Therefore, a connection has already been made to practice, but we highlight this example in order to retrofit the theory.

**Connections to practice:** As the literature suggests, language items such as prepositions benefit from concrete reinforcement using images. A sound spatial understanding of prepositions, furthermore, can help students contend with permutations of greater complexity. One way to apply this would be a set of laminated cards with images that correspond to prepositions. No doubt, many astute language teachers already use such tools. Additionally, engaging students with images and pictures can help them to understand the pragmatics of using “there is” or “there are” instead of “it is” and “they are”. Another recommendation based on the literature is the use of maps and clusters to augment traditional texts as these have been shown to be efficacious both in terms of retention and comprehension. Extending this into the teaching of grammar, the use of spatial models would be efficacious for the teaching and learning of time-bound grammar concepts, such as the perfect verb conjugations.
Again, many if not most teachers already use such visuals in their board work, but for those that do not, please consider it.

**Impact on extension/expression**

*When the flower arranger arranges the flowers, he also arranges his mind and the mind of the person who looks at the flowers*

-Old Zen saying.

The emphasis of this portion of the paper is once again on the relationship between the verbal and spatial processing, but this time we are more focused on how these processes interact with the environment in the form of expression. In this section, we will take the view that expressions of verbal and spatial thinking are mediating tools which shape our experiences in the world. Another way of putting it is that these cognitive processes interact and extend out into the world.
This is not an original idea, of course. It goes back to at least Vygostky, who, in his research on young learners, noted that during children’s pre-abstraction phase speech accompanies action. At that stage, the children could not yet internalize symbols and therefore “young children name their drawings only after they have completed them” (1978, p. 27). After children have developed the ability to abstract and internalize symbols, children decide in advance what they will draw and speech comes to precede action and function as a sort of “aid to a plan that has been conceived but not yet realized in behavior” (Vygotsky, 1978).

Another example comes from a study by Hermer-Vazquez, et. al., (1999) on prelinguistic infants which found that language was necessary for subjects to complete a task that required them to combine both geometric (shape, location) and nongeometric (color) cues in order to solve. Prelinguistic children were shown where an object was hidden, and were subsequently disoriented so that they had to combine the clues that had been available to them. They failed to accomplish the task, whereas older children had no trouble since, the investigators concluded, they were able to combine the geometric and nongeometric cues, as they would in a sentence such as “behind the long green wall”. This evidence suggests that it is our verbal abilities that enable us to integrate different kinds of information. Language is a tool that allows us to combine and integrate our other tools.

Whereas the above studies focused on young learners, Schön’s work on reflection-in-action focused on practitioners engaged in more expert, higher-order thinking. The phenomenon Schön describes is analogous to the ways the previous studies describe the interaction between language and action, actor and
environment. He described *reflection-in-action* as being a kind of reflective “conversation with the situation” (1985, p. 26). Schön’s exemplars came from the design studio, and he presented the interactions of an instructor named Quist and a student named Petra. The episode is noteworthy in the sort of language that Quist uses and the role that the language has during his activity. According to Schön, Quist uses a “metalanguage” that accompanies his actions and serves to describe some features of the process he is demonstrating. Schön describes this linguistic activity as more than just a narration or reframing of Petra’s problem, but rather a reflective “conversation with the situation” (Schön, 1985, p. 44). The designer makes moves, and through these moves discovers “new problems” which in turn lead to “new potentials”; in short, “the designer’s moves talk back to him” (Schön, 1985, p. 48).

Finally, there is Clark, who interprets language as a kind of “mind-transforming cognitive scaffolding” (2008) of which he describes three benefits:

1. merely labeling the world affords us new and greater “computational opportunities” and allows us to notice more patterns in nature;

2. encountering or recalling structured sentences supports the development of rarified levels of expertise;

3. linguistic structures give us the benefit of metacognition, allowing us to reflect on our own thoughts, characters, and “our limited but genuine capacity to control and guide the shape and contents of our own thinking”.

(Clark, 2008)
The above literature suggests that we can interact with the world physically and verbally, and these modes of interaction overlap in complex ways and complement one another. They are an extension of mind.

We would like to focus on two areas that are of particular relevance to English Language Teaching (ELT): 1) metaphors, and 2) maps.

While the perspective of geographic determinism would assert that the environment directly or indirectly influences the language we speak, and by extension the metaphors we use, and the position of linguistic determinism, as put forth by Whorf, would suggest that the language we use shapes the environment, Lakoff and Johnson (1980) seem to take a middle ground where language is informed by culture—indeed it is culture-bound—but also helps to shape it. In metaphors we can witness the relationship between verbal and spatial, and we can also see the interaction with culture and environment.

Aristotle described metaphor as giving some thing the name of another, and this is still true. Metaphor is the semantic/spatial (spatial in that it usually involves images) interruption of our conceptual system. Lakoff and Johnson, among others, describe this as \( x = y \), but they are quick to point out that this is a tenuous, culture-bound relationship. For instance, time may equal money (time = money) in America, but other cultures may not treat time in such terms. In their thorough linguistic exploration of metaphor, Lakoff and Johnson dedicated an entire chapter to spatial metaphors. One of the more noteworthy conclusions

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3 “The essence of metaphor is understanding and experiencing one kind of thing in terms of another” (Lakoff & Johnson, 1980, p. 5).
4 Indeed, they write that in some cultures the future is considered to be in front of us, whereas in others, the future is behind us (Lakoff & Johnson, 1980).
they came to was that “most of our fundamental concepts are organized in terms of one or more spatialization metaphors” (Lakoff & Johnson, 1980, p. 17).

Maps are similar to metaphors in that they are an area of interaction between the verbal and spatial. We can ascertain this even in the name of the field geography, which literally means earth writing. But maps include more than just the typical static, two-dimensional displays we associate with the word. They tend to say something about the world and often provide a frame for an argument. Furthermore, as mentioned in the previous section, mind maps and clusters are sound methods of augmenting textual understanding. Additionally, a GIS can incorporate layers of data that can be hidden or displayed in order to highlight or de-emphasize certain features or patterns. In general, maps are just another form of semantic and symbolic representation, and in a classroom can be used to augment textual meaning and/or generate discussion.

**Connections to practice:** We owe a huge debt of gratitude to Howard Gardner. The impact his theory of multiple intelligence has had on English Language Teaching, whether or not the theory is valid, has been great, and as a result we can now find many useful resources and materials for engaging spatial thinking while teaching ELT. There are several recent articles in *English Teaching Forum* that are very useful and engage students’ spatial thinking. I’d like to highlight a couple of them. Baker recently wrote about engaging students’ visual literacy through the use of photography in class (2015). Another useful example is Carter’s *Teaching Descriptive Writing through Visualization and the Five senses*. Other useful resources include the Cambridge books *Imagine That!* and *Teaching Unplugged: Dogme in English Language Teaching*, which are both filled with ways of engaging students’ visual imagination and making the connection between
spatial and verbal thinking. One activity I recommend from *Teaching Unplugged* is the “Pocket Pecha Kucha” which asks students to empty their pockets or bags, etc., and to choose three objects from these contents. They will then talk about each object in short increments, perhaps a minute each. Other students in the small group listen and then ask follow-up questions at the end. The use of these physical objects in the course of speaking practice helps to connect the content of the class to the students’ lives, and mediate the students’ learning.

With regards to maps, there is an inspiring unit on geography in Cambridge University Press’s *Discussions A to Z* book, which is for the intermediate level. I’ve found that students really enjoy these map-related activities, and it provides a simple way of thinking about maps critically as they are introduced to the concept of projections and they are forced to compare their conception of the world with the projection of the world in the book. It can be used to highlight empirical shortcomings as well and the idea that there is no objective truth, but only perspectives. Furthermore, I’ve compiled a short list of websites that feature useful maps that can be used to highlight language features or to generate class discussions:

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<td>Places where famous books from American literature were set.</td>
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<td><strong>The obsessively detailed map of American literature’s most epic road trips</strong></td>
<td><a href="http://www.atlasobscura.com/articles/the-obsessively-detailed-map-of-american-literatures-most-epic-road-trips?utm_medium=lookalikeEmailUS1percent-originalHL">http://www.atlasobscura.com/articles/the-obsessively-detailed-map-of-american-literatures-most-epic-road-trips?utm_medium=lookalikeEmailUS1percent-originalHL</a></td>
<td>As the title suggests, this map describes road trips featured in some of the most famous novels in American literature.</td>
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<td><strong>9 animated maps that will change the way you see the world</strong></td>
<td><a href="http://www.businessinsider.com/maps-countries-territory-2014-4">http://www.businessinsider.com/maps-countries-territory-2014-4</a></td>
<td>This web page features an assortment of animated maps that compares the size of different countries in ways that are very illuminating.</td>
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Conclusion

We cannot ignore the connection between verbal and spatial processing, nor overlook the efficacy of incorporating a spatial element to our teaching practice. The advantages of engaging the verbal and spatial together are three-fold. The application of spatial modes to the teaching of English would be efficacious in the following ways: positive impact on memory for language learning, retention and recall; positive impact on the understanding of lexical and grammatical forms, including prepositions or the perfect aspect; and transformation of mediating tools.
References


