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Metaphor use in educational contexts: Functions and variations

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1 Introduction and Definitions

This chapter aims to provide an overview of the research that has been conducted into the role(s) played by metaphor in a range of educational contexts, and to explain its variation across different genres and registers within education. I look at both spoken and written metaphor in educational contexts involving both children and adults, using either their first or second language. The term ‘educational context’ is taken to mean any communicative situation in which the intention is to extend the knowledge base of the recipient or to promote different or deeper ways of thinking about a given subject. Both formal and informal contexts are considered.

Metaphor serves a number of functions in educational contexts, one of which is to develop and frame new theories and ideas. An example of metaphor performing this function is the ‘brain as computer’ metaphor, which led to a number of theories about the way in which the brain works. When metaphor is used in this way, it is normally described as ‘theory constitutive’ (Boyd, 2002; Knudson, 2003). Metaphor is also used to fill terminological gaps (Black, 1962, Ortony, 1975), which means that much of the terminology that is highly specific to a particular discipline will be metaphorical. Another function of metaphor in education is to express complex ideas in ways that people understand (Sticht, 2002). When it is used in this way, it is usually described as serving an ‘illustrative’ or ‘modelling’ function (Semino, 2008). As we will see in the chapter, metaphor serves other functions in educational contexts besides these, and as such can be a useful resource both for the educator and the student. However, as we will see below its use is not uniform across all genres and registers, a fact which must be borne in mind when, for example, preparing students for entry into educational settings that use a language other than their own.

The organisation of the chapter is as follows: in Section 2, developments in the study of metaphor in educational settings are tracked in terms of content and research methods. In sections 3 and 4, critical issues and debates are introduced and examples provided from my own research in this area. A number of recommendations for future research are made in section 5, and suggestions for further reading are offered in section 6.

2 Overview of Relevant Research to Date

Evidence for the key role played by metaphor in educational contexts can be found in both written and spoken language, as well as in other forms of expression, such as images and gesture. It can be found in child and adult education, in first and additional language contexts, and in both formal and informal settings. A wide variety of research methods have been employed to investigate the use of metaphor in educational contexts. These range from discourse analysis, through corpus-based studies to more experimental studies designed to explore the extent to which metaphor presents a problem or studies involving different groups of students being shown doctored texts and asked to draw conclusions from them. Metaphor in educational discourse has also been studied from a multimodal perspective. This section

provides an overview of the most important research findings in these areas, beginning with the use of metaphor in children's education in a first language setting.

2.1 The use of metaphor in children's education

By far the most influential and in-depth study of the use of metaphor in education in general, and in children's education in particular, is Cameron's (2003) monograph on the use of metaphor by both teachers and pupils in a series of lessons delivered in a state primary school in the UK aged 9-11. I will begin by providing a detailed account of this study, as it laid the groundwork for more recent research in the area and introduced and addressed many of the issues arising in this field of research. The study consisted of a two-part investigation into the use of metaphor by teachers and pupils in a series of classes, including two mathematics classes, a geology class, a dancing class, and a grammar class, all of which were delivered at a British primary school. The first part of the study involved classroom observation. Audio recordings were made of the classes and Cameron analysed the metaphor use in these recordings. The second part of the study focused on the ways in which the pupils comprehended and interpreted the metaphors that had been employed by their teachers. In order to do this, Cameron employed a novel data-gathering technique, which she referred to as the Goal-directed, Interactive Think-Aloud (GITA) technique, which allowed her to examine the processes used by the students to interpret and learn from the metaphors. In this technique, students were encouraged to evaluate, in pairs, the suitability of a particular metaphorical text for children slightly younger than themselves. The approach was designed to draw their attention to the metaphorical language used in the text, whilst enabling them to distance themselves from any difficulties that they might themselves encounter.

Findings from the first part of the study allowed Cameron to outline the nature of metaphor in this context, the opportunities that it offers for learning, and the factors that help or prevent students taking advantage of these opportunities. In the various lessons examined Cameron found that the teachers made substantial use of metaphor in agenda management, summarizing sequences, and when providing evaluative feedback. It was also used in explanation sequences, and in sub-technical language. Metaphors were often used affectively to mitigate potentially threatening situations, such as the giving of negative feedback, or the presentation of potentially difficult material. For example, one teacher describes the characteristics of lava as being like 'sticky treacle', or 'runny butter'. The teachers also used metaphor to introduce new or difficult concepts, using language that the students would understand. These metaphors were designed to help pupils cross the gulf between their current levels of understanding and the levels of understanding desired by the teacher. In summarizing sequences, the use of metaphor often played a role in developing shared values and attitudes between teachers and pupils. Cameron points out that when it is used in educational contexts involving children, metaphor often serves an alignment function, whether to promote shared values, to simplify, or to mitigate potentially face-threatening situations. Where the students used metaphor, they tended to repeat, extend, or re-literalise conventional metaphors that had been used by the teacher, and to comment, occasionally in a somewhat subversive manner, on what the teacher had said. For example, in the following extract, the pupil plays with the metaphor that the teacher has used by re-using the vehicle term in a literal way:

- T (to the class) where does the time go?
 (to Louise) finished?
 L: (to T) I'm having trouble with this

T: You stuck? (.) right (.)...

... yes Paul?

P: I know where the time goes

Into the past

T: into the past (.) you're right ????

Quickly into the past

Cameron, 1993: 141)

In the second part of the study, which explored the children's understanding of the metaphors used by their teachers, Cameron found that the pupils were likely to notice nominal metaphors, and process them as such, whereas they were much less likely to notice verbal metaphors. The pupils often discussed the vehicles of the nominal metaphors at length, engaging in vehicle development and contextualisation, but when they were faced with verbal metaphors, they usually resorted to repetition and relexicalisation. In terms of understanding, the pupils' previous knowledge of, and involvement with, the vehicles appeared to be a key factor in their ability to understand how the vehicles related to the context. She found that the pupils were particularly likely to experience difficulties with verbal metaphors when they were combined with anaphoric reference. They often mistook the subject of the sentence for something else, a phenomenon that Cameron describes as 'topic reference shift'. For example, one of the pupils misinterpreted the metaphor 'it (= *heat*) doesn't escape into space' as 'none of *the atmosphere* can escape into space'. Cameron concludes that in these cases, the pupils' knowledge of the metaphor vehicle was unable to compensate for gaps in their topic knowledge. This is an interesting observation as previous research on metaphor comprehension has tended to emphasize the importance of gaps in their vehicle knowledge. The misinterpretations in Cameron's data tended to result from a combination of inaccurate topic knowledge, earlier misleading collocations in the text, and complex referencing between the sentences. Cameron warns that misinterpreted metaphors such as these may have detrimental effects on learning.

Cameron's work has been highly influential in the field of metaphor studies, but its influence lies mainly in the area of methodology. To the best of my knowledge, there have been no other detailed studies of metaphor use in either primary or secondary education, although there have been a number of studies of teachers' own use of metaphor to conceptualise the learning and teaching environment. These are discussed in more detail below.

2.2 The use of metaphor in adult education

In comparison with children's education there have been far more studies of metaphor use in adult education, where it has been investigated in depth from a number of angles. Extensive use of metaphor has been found in, for example, economics textbooks (Boers and Demecheleer, 1997; Henderson, 1982, 2000; McCloskey, 1986; Mason, 2002), in management science (Morgan, 1983, 2003) and in science discourse more generally (Brown, 2003; Mayer, 2002; Ritchie et al., 2006). Metaphor has also been investigated in university lectures. Johns (1996) looked at Science and Engineering lectures and found a substantial amount of colloquial language, much of which involved metaphor. His main finding was that metaphor was used primarily to serve evaluative functions, to emphasize not just whether the lecturer liked or disliked a particular scientific approach, but also to show whether or not he or she thought it to be central or peripheral, easy or difficult, reliable or unreliable, theoretical

or practical. More recently, Carew and Mitchell (2006) found that engineering lecturers used metaphor consistently to elucidate and evaluate ideas relating to sustainability. Corts and Meyer (2002) and Corts and Pollio (1999) found that lecturers use metaphor to express conceptually or emotionally difficult concepts and that when they do so, their metaphors appear to cluster together. Low, Littlemore and Koester (2008) followed up this work with a detailed study of metaphor use in three lectures in the British Academic Spoken English (BASE) corpus. They found that metaphoric density ranged from 10 to 13%, and that metaphors served a variety of functions, the most important of which were evaluation and discourse organisation. Like Corts and Meyer, they found a number of clusters, some of which were coherent, and they found that the more salient metaphors tended to be recurrent.

The use of metaphor in educational discourse is not restricted to spoken and written language. In their study of linguistics lectures, Mittelberg and Waugh (2009) found considerable evidence for the role of gestural metaphor in the teaching of grammatical concepts. For example, when talking about 'sentences', lecturers would hold their hands fairly far apart, with the palms facing each other. In contrast, the word 'morphemes' was accompanied by a gesture indicating 'small items' either in an open hand or a closed fist. Finally, embedded clauses were represented by the right hand wriggling downwards. All of these gestures reflect a metaphorical construal of grammatical features as bounded objects and involve a mapping whereby conceptual structure is mapped onto physical structure.

As with children's education, the reasons why metaphor is used in adult educational discourse vary. One reason for its use is that it serves to foster understanding. Mayer (1993) found that in science education, the use of metaphor led to a better understanding of abstract concepts, and Williams (2005), who investigated the benefits of using metaphors in teaching psychology to nursing students, found that the use of metaphors by the lecturer enhanced students' ability to understand the subject matter as well as their ability to memorise key concepts. Other researchers have commented on the motivational impact of metaphor. Although they did not actually put this to the test, Petrie and Oshlag (2002) suggest that metaphor can provide a useful way of re-engaging students who have become disaffected, as it can allow them to connect what they are learning with their own experiences.

Although it serves as a useful device in elucidating concepts and performing a wide variety of functions, the use of metaphor can at times constitute a source of confusion in adult educational contexts, although, as one might expect, the nature of the confusion is somewhat different from that found by Cameron in her study of metaphor in children's education. Serious problems were identified by Brooks and Etkina (2007) in their study of the role played by metaphor in the context of physics students and physicists talking and writing about the subject of quantum mechanics. They found that the language employed by the physicists encoded a number of different conceptual metaphors, and argued that this reflects a covert understanding by the physicists that each metaphor only has *partial* explanatory power. For example, physicists sometimes talked about quantum mechanics in terms of 'waves' (emphasising the fact that it is a 'process'), whereas at other times, they talked in terms of 'particles' (emphasising the fact that 'matter' is involved). They reported that the students found these mixed metaphors confusing. Their analysis of student writing and discussions showed that they often used them inappropriately, and that they tended to think in more literal terms than their lecturers.

The use of metaphor in academic discourse has also been found to be problematic for students who are working in their second language. For instance, research has shown that the use of metaphor by university lecturers can present considerable problems to international students attending their lectures. The first study to show this was Littlemore's (2001)

examination of Bangladeshi Civil Servants taking short courses in Leadership and International Development at a British university. She found that over 70% of the vocabulary items with which the students experienced difficulties involved metaphor and that, most crucially, when the students misunderstood the metaphor, they might still grasp the content of the lecture, but they misinterpreted the lecturer's stance. In a more in-depth follow-up study, Littlemore et al. (2011) investigated metaphor comprehension in international students from eight different countries, who attended four one-hour lectures from different disciplines and were tested on their understanding of the language used in these lectures. They found that metaphor accounted for 41% of the items that students found problematic on a self-report task. When asked to explain metaphors in the lectures, students were only able to explain 50.6% of them, and most interestingly, students were only aware of the problem in 4.2% of the cases. These findings suggest that metaphor in academic lectures is often misunderstood and that, by and large, students do not even know that they have misunderstood the meaning. This is important given the aforementioned findings concerning the range of important functions that are performed by metaphor. In addition to their various findings regarding the amount and the nature of metaphor in university lectures, Low et al. (2008), in their aforementioned study, also found that in the lectures they investigated, the metaphors were never explained. These findings suggest that metaphor should be a focus in the teaching of English for Academic and/or Specific Purposes. This theme is picked up in MacArthur's chapter in this volume.

2.3 Studies involving an explicit focus on metaphor in educational settings in order to improve learning

The fact that metaphor serves such important functions in educational discourse, and that it has been found to present problems to students (both native and non-native speakers), has led some researchers to investigate whether an explicit focus on metaphor in educational contexts has a positive impact on learning. The findings from such studies have tended to be encouraging. For instance, when Kamler and Thomson (2006) investigated the use of metaphor by doctoral students to conceptualise the learning process, they found that if students were encouraged to develop their own positive metaphors for learning, they were able to change their perceptions about difficulties that lay ahead, making them more positive about their ability to overcome these difficulties. More generally, in the context of academic skills training, Power, Carmichael and Goldsmith (2007) found that by encouraging students to identify the metaphors that underpin their particular disciplinary approaches and discourse they could help them to develop a useful framework for developing critical awareness and critique.

In the area of second language education, Littlemore (2004) found that a focus on metaphor in an English for Academic Purposes (EAP) context helped develop students' critical thinking skills. The participants in her study were thirty students studying for an MBA in Public Service Administration in an International Development department at a British university. They were divided into an experimental group and a control group. Both groups participated in a general "critical thinking" session. The experimental group was also given a "metaphoric awareness-raising" session, whereas the control group was given no such session. The aim of the study was to investigate whether or not the metaphoric awareness-raising session had any lasting effect on the critical thinking abilities of the students in the experimental group. Half of the participants were given a metaphoric awareness-raising session, during which they were introduced to conceptual metaphors and the ways in which they can shape thinking, and half were given a more general critical thinking session. After a

significant time lag of five months, both groups were given a critical thinking test which involved analysing several texts relating to their discipline, all of which employed conceptual metaphor to persuade the reader of certain ideas. The students who had received the metaphorical awareness training were significantly more likely than those in the control group to make explicit references to metaphor in their critical analyses. While none of the students in the control group made any reference to the underlying metaphor, of the fifteen students who had attended the metaphoric awareness-raising session, seven made explicit references to the underlying metaphor and used these references to support their critical evaluations. They were able to point out how the authors used metaphor to make sweeping generalizations, and to avoid discussing specific factors. They were also able to point out that metaphors can be understood on different levels, leading to different interpretations of the text, and they were able to point out limitations of the metaphors involved.

There have been some studies of the use of metaphor in teacher training programmes. These have tended to focus on the use of metaphor by the trainees to conceptualise the teaching and learning process, and findings suggest that trainees have found this beneficial (see, for example, Stofflet, 1996). Wan (2014) explored the use of metaphor to promote critical thinking skills among language teachers on an MA Education programme at a British university. Her study explored Chinese students' conceptualisations of academic writing by means of a series of metaphor elicitation tasks. It also considered the benefits of metaphor awareness-raising training and of group discussions of metaphors. She found that this training had a beneficial effect on the students, and noted how new metaphors emerged from the group discussion. Over time, the participants in the study changed their conceptualisations of the essay-writing process and developed their levels of metaphoric awareness over the course of the year. They benefitted from the group discussions of metaphor as they were able to use the metaphors produced by their peers to identify problems with their own essay writing, and refine their own metaphors. Finally, the students adapted the metaphors employed by their tutors and made them their own, and they questioned and improved their writing behaviour as a result of being exposed to other students' metaphors. Group discussions were perceived as being more valuable than the individual metaphor generation activities, which reflects the socio-cognitive nature of metaphor. This study is important as it underscores the essentially social nature of metaphor as a tool for thinking.

3 Critical issue and debates

There are currently two 'hot topics' in the field of metaphor and educational discourse. The first concerns the extent to which the use of metaphor can actually shape and influence thinking, and the second concerns variation in metaphor use across different genres and registers.

The question of whether metaphor use can shape or influence people's responses to the ideas presented in discourse is an interesting one. A number of studies have shown that by adjusting the use of metaphor in texts, it is possible to radically alter the ways in which those texts are understood, and to shape the recommendations that readers make on the basis of their reading of those texts (see, for example, Boers, 2000; Kamler and Thompson, 2006). One of the most well-known studies of this type is Boers (1997). He was interested in finding out whether undergraduate students of economics would respond in different ways to text about economic competition if the ideas in the text were framed using different metaphors. The participants (100 students of economics) were asked to read a short written text about a European company that was being confronted with a cheaper Taiwanese competitor. They were then requested to write down their problem-solving suggestions for the European firm.

They were told the assignment was meant to serve both as a writing task and as input for a class debate on the topic. Fifty participants received a version of the text in which the situation was described in terms of 'HEALTH', 'FITNESS', and 'RACING' metaphors, whereas the other fifty participants received a version in which the situation was described in terms of 'FIGHTING' and 'WARFARE' metaphors. Participants who had been exposed to the 'HEALTH', 'FITNESS', and 'RACING' metaphors were significantly more likely than the others to suggest reducing the size of the European company ('downsizing' the organisation) by laying off personnel ('slimming down' the organisation) or by closing down less profitable departments (using language which related to 'surgery' and 'amputations'). In accordance with the 'RACING' metaphor, they were significantly more likely than the others to recommend more innovation and research and development (in order 'to stay ahead of' the Taiwanese competitor). In contrast, participants who had been exposed to the 'FIGHTING' and 'WARFARE' metaphors were significantly more likely to recommend price cuts and start a 'price war' in order to force the Taiwanese out of the European market. Boers shows convincingly how these findings fit with the 'logic' of the metaphors. It is also interesting to note that Thibodault & Boroditsky (2011) have shown how such metaphoric framing can influence policy decisions, a finding that has clear implications for education, both in the field of Political Science and beyond.

Work in this field has been advanced in recent years by Krennmayr et al. (2014), who are interested in the interaction between the persuasive power of metaphor and its level of conventionality as well as the ways in which it is signalled. In order to test this, they used a text in which economics was described in terms of racing. They doctored the text so as to have four versions: one in which the metaphors were highly conventional and un-signalled; one in which the metaphors were highly conventional but signalled; one in which the metaphors were novel and signalled; and one in which the metaphors were novel but un-signalled. 'Signalled' metaphors were basically similes, and were indicated by the use of words such as 'like'. The hypothesis was that the racing metaphors would be more likely to shape respondents' thinking, and would thus have a positive impact on the participants' recall of the passage if they were novel and signalled. They found a significant effect for novelty but the results for signalling were less conclusive. They thus concluded that novel metaphors have the ability to shape a reader's mental representation of the content of a text, but this is less likely to happen if the metaphors are conventional.

The second area of debate in educational metaphor studies relates to the extent to which metaphor use varies across genres. This controversial topic was launched with Henderson's (2000) observation that non-expert publications such as *The Economist* have sometimes been used to teach the 'language of economics' for future students of Economics. One can see why teachers might use such texts as at first sight they appear more accessible and perhaps more 'fun' than the target texts. However, Henderson points out that there are serious problems with this approach as the metaphor use is completely different in these very different genres. *The Economist* is seen by economists as a current affairs weekly, and is thus not truly representative of the language that is used by economists in an academic context. Not only do the metaphors themselves differ between the two genres, but there is a level of immediacy in the metaphors used in *The Economist* which is not in standard economics textbooks.

More recent research has explored the different ways in which both the form and functions of figurative language do indeed vary according to genre and register (see, for example, Skorcynska and Deignan, 2006; MacArthur and Littlemore, 2011). Deignan, Littlemore and Semino (2013) showed how metaphor use is shaped at the level of genre by the role of the discourse community, communicative purpose and staging. They then focused on register, showing how there is considerable variation according to the field, which in educational

contexts, can be broadly interpreted to mean the discipline. They also identified differences according to the relationship between the speakers and according to whether the communication was primarily spoken or written, whether the metaphor was spoken or written; constitutive or ancillary; verbal or visual.

Most importantly, Deignan et al. (2013) showed how the different components of genre and register work together to shape overall metaphor use. They compared academic papers on the topic of climate change with articles on the same topic appearing in *The New Scientist*. They found very different uses of figurative language in the two genres, which, they argued, reflected the two different discourse communities, their aims, shared knowledge, assumptions and values (ibid., 123). The research articles used metaphor in precise, apparently community-sanctioned ways, with a highly restricted set of collocations. There were no explanations, and there were no extensions of source domain language. The metaphors in *The New Scientist* article displayed much more syntactic and lexical flexibility, and their meanings were much closer to the general, non-specialist senses of the words. A number of metaphors only appeared in *The New Scientist* and these tended to serve evaluative or persuasive functions.

4 Some examples of current research projects focusing on the use of metaphor in education

The largest current research project focusing on the use of metaphor in educational contexts is entitled: “*Metaphor use in one-to-one academic consultations in English: Implications for Spanish student mobility in Europe*” (FFI2011-22809). This project, which is being led by Dr Fiona MacArthur, at the University of Extremadura, Spain, involves a team of international researchers from the UK, Sweden, Ireland and Holland. Researchers in the project are conducting a comparative study of the ways in which metaphors are used in academic consultations with international students at European universities. They are also investigating the interactions between verbal and gestural metaphor in these settings. The focus is on Spanish Erasmus students, and the overall aim is to identify the extent to which metaphor impedes or facilitates understanding in the cross-linguistic educational settings in which these students find themselves. In order to do this, the researchers have gathered and analysed data from interactions in four countries. They have analysed the metaphors used in the academic exchanges, identified uses of metaphor that are more or less likely to lead to misunderstandings, and explored whether and how misunderstandings are resolved.

Interim findings from the project suggest that ‘sight’ metaphors are significantly more common in academic conversations than they are in spoken language more generally (MacArthur et al., in press). When the data are explored qualitatively, more details emerge. Both lecturers and students appear to be using sight metaphors (such as ‘focus’, ‘look’, ‘see’, and so on). As expected, the lecturers use a wider range of linguistic expressions within this field than the students, which may be partly a reflection of the fact that the dyads are dominated by lecturer talk (lecturers talk for approximately 70% of the time). They use gesture to disambiguate the meanings of these metaphors. The researchers are interested to see whether the dyads follow findings that have already been made for metaphor in native speaker exchanges. One observation that has been made for such exchanges is Cameron et al.’s (2009) observation that metaphors are often picked up on and elaborated throughout the conversation, which affords opportunities for the development of shared meaning. The researchers in this study are finding very little evidence of this. Metaphors used by the lecturers are very rarely taken up by the students, who tend to reply with minimal responses, such as ‘uhu’ and ‘OK’. Here is an example of one such extract:

- L yeah (.) so i mean in theory the seminars were there to: (.) test your knowledge from: the (.) or to <fast> give an opportunity for people to </fast> ask questions about the (.) the information in the <55> lecture </55>
- L <55> mhm </55>
- L and then maybe to extEND it a little bit so that there was something to discuss (.) so have a **look** at the readings
- S hm
- L and see if there's a polemic of any kind that <56> **comes out** </56>
- S <56> uhu </56>
- S do you **see** what i mean
- S yeah
- L and so (.) then THAT is the connection that you need to try and make in your mind (.) so where is the debate where is the discussion (.) 'cause that's the second half of your essay
- S so (.) the first half is just writing about the theory?
- L er the yeah (.) so the first half is present the theory <57> the second half is </57>
- S <57> to pre- to present </57> the main <58> ideas </58>
- L <58> er </58> these are the debates or this is a debate that COULD **arise** (.) out of this (.) theoretical **background** (.) this pers- these people have this **view** (.) these people have this **view** (.) this is what i think
- S okay (.) <59> so </59>
- L <59> do </59> youⁱ **see** what i mean (.) that's quite a **clear** (.)
- S so i <60> have to combine</60>
- L <60> so if if </60>
- S theory a:nd (.) <61> personal criteria </61>
- L <61> and discussion </61>
- S <62> <soft> (yes i can surely) </soft> </62>
- L <62> exactly and </62> the other thing is if you **look HARD** at (.) the (.) topic (.) and you think (.) there IS no debate here (.) it's just facts (.) it probably isn't going to be on the exam paper
- S okay

MacArthur et al. (in press).

As MacArthur et al point out, in this extract, the lecturer (L) uses a range of sight terms with metaphorical senses ('have a look', 'view', 'look hard at') and uses *see* to check that the student is understanding ('do you **see** what I mean'). She also uses words ('comes out', 'arise', 'clear') that can be described as being coherent with the metaphor of visual reasoning, as the object of mental attention becomes more visible or salient to the perceiver. Despite this extensive use of metaphor by the lecturer, the student (S) fails to contribute to the metaphorical framing of the task. She either responds minimally or simply rephrases what the lecturer has already said.

These findings suggest that when preparing students for their study abroad, it is worth focusing on the role of metaphor in spoken academic discourse, and training students to use it effectively in these settings. Lecturers at the receiving universities would also benefit from a

focus on metaphor when being trained in the reception of international students, as opportunities for communication are clearly being missed.

5 Future directions

There are a number of areas where more research on the role played by metaphor in educational contexts could usefully be conducted. Apart from a few notable exceptions, much of the work to date has focused on the use of metaphor in English-speaking educational contexts, and it would be interesting to find out whether the findings to date are applicable to other languages. In relation to this, it would also be interesting to follow up the MacArthur et al. (in press) study by investigating the impact of metaphor used on returning Erasmus students. MacArthur herself notes the value of comparing metaphor use in returning Erasmus students with metaphor use before they go to investigate the impact of the international educational setting on this important linguistic resource (MacArthur, 2014).

Another potentially useful future direction for research would be to evaluate the effectiveness of integrating the explicit study of metaphor into the teaching of disciplines where it plays a theory-constitutive role. This point is made very strongly in the case of architecture by Caballero (2014), who shows how metaphor informs all the stages of designing, constructing and evaluating a building, and is heavily involved in all communication with both colleagues and clients. Despite multiple instances of metaphorical language, and the fact that metaphorical thinking is implicitly built into programme aims, Caballero points out that students of architecture are never taught to use metaphor to conceptualise their buildings. If they were, they may be able to write more persuasive bids for buildings. She suggests incorporating an explicit focus on metaphor into architecture teaching in the form of a three-stage process, adapted from metaphor research. The process would involve metaphor identification, classification, in terms of its properties, and use, involving reflection on why architects use certain metaphors in certain contexts.

Other areas of educational discourse where research could usefully be conducted include the use of metaphor in different modes of expression. More consideration needs to be given to the way metaphor is used in spoken data, including gesture, as well as in visuals. This is particularly important given current developments in the use of MOOCs, virtual learning environments, and so on, where the boundaries between different modes of delivery and between ‘experts’ and ‘non-experts’ are becoming increasingly blurred, and where internationalisation and multilingualism are destined to become key test-beds for research into metaphor use.

6 Further reading

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