

Guest Editorial

**Researching argumentation in educational contexts:
new directions, new methods**

Caroline Coffin and Kieran O'Halloran

Centre for Language and Communication

Faculty of Education and Language Studies

The Open University

Walton Hall

Milton Keynes

MK7 6AA

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The ability to engage in reasoned discussion is a skill that is needed in many different workplace and community contexts. The capacity to argue effectively can enhance an individual's democratic participation in contemporary society through, for example, online communication with political representatives, or participation in the political blogosphere. Yet studies have shown that many citizens' argumentation skills are "only of the most elementary sort" (Kuhn 1991, 264). This is despite the fact that both the process (argumentation) and the product (argument) of putting forward and negotiating ideas and perspectives is a fundamental aim of education.

Educational argumentation, and the methods and tools of analysis for investigating it, are the focus of this special edition. In combination, the papers present an array of different means by which educational argumentation is currently being researched by key scholars in the field. The methods discussed have been shaped by a number of theoretical orientations and have emerged in a range of disciplinary fields, including linguistics, education, psychology, philosophy and computer science. Many have been influenced by recent developments in technology. Such research necessarily involves judgements concerning the effectiveness and quality of argumentation, as well as ideas on the development of new teaching-learning strategies, processes and resources. In this special edition, however, the focus is on methods for investigating the nature and meaning of argumentation as it occurs in educational contexts and on methods for investigating how it is taught and learned.

The modes of argumentation explored in the papers include both traditional face-to-face discussion and written assignments and the more contemporary, virtual modes of text-based conferencing and computer-simulated tutoring. Each paper in the volume discusses the distinct approach and framework(s) of analysis that the author(s) has developed in order to understand the way argument works in educational contexts. The papers provide insights into a range of argumentation practices involving diverse age groups across a number of subject areas including science and history in secondary schools, and university courses in biology, engineering, history, natural science, psychology and technology. Ultimately, all contributors aim to extend our understanding of argumentation in order to better inform approaches to teaching it and so enhance students' ability to argue. Given that a fundamental aim of education is to develop in students a critical attitude towards knowledge, and the ability to engage in reasoned debate (Terenzini et al. 1995), these are important goals.

In the following sections of the guest editorial, we set the scene for the papers that follow by discussing key trends in contemporary educational argumentation practices, pointing to how such trends are leading to modifications and innovations in research methods. Throughout the sections we also provide critical comment on what we consider to be some of the most significant issues which have emerged as a result of such innovations.

1. How are educational argumentation practices changing?

Over the last decade or so, two new and significant trends in the theory and practice of educational argumentation have come to the fore: the refocusing of attention on the dialogic dimension of argumentation, and the coming together of argumentation, problem solving and collaborative learning. Since these new trends have impacted on both the object of argumentation research and the means by which it is carried out, they provide an important backdrop for the articles within this special edition and for our own reflection in this editorial.

The trend to re-focus attention on the dialogic dimension of argumentation is a perspective particularly prominent within socio-constructivist and socio-cognitive theory. Within a socio-cultural perspective on cognition and learning, argumentation is seen as part of a dialogic process between learners and their peers or learners and experts. Following Vygotsky (1978), it is claimed that once the social argumentative dialogue is internalised, it will lead to the development of higher level mental processes such as critical reasoning and reflection (McAlister et al. 2004). Educational practices which are informed by such a view place considerable importance on students examining alternative positions in order to develop their argumentative reasoning and facilitate the process of conceptual change. For example, in this special issue, Simon reports how she and a team of colleagues have introduced argumentative dialogue into secondary school science. Through structured

group work students are encouraged to discuss and evaluate the competing explanations and accounts on which scientific theory is built. In another of the articles, Joiner et al. indicate how discussion between students from different subject disciplines enhances argumentation quality.

The second trend, which sees a strong link not only between argumentation and dialogue, but argumentation and problem-solving, has emerged within collaborative learning (CL). CL is a teaching-learning paradigm which developed in the mid-nineties (see Dillonbourg 1999) and which covers a wide range of approaches involving groups of students working together in order to reach shared understanding, to solve problems, or to create a product (see Littleton et al. 2000). Where collaborative learning uses computer environments to facilitate group thinking, it is referred to as computer-supported collaborative learning (CSCL) (Wasson et al. 2003). Within CSCL environments, argumentation has come to be viewed as a particularly important form of collaboration and has developed its own research strands – Computer-Supported Collaborative Argumentation (CSCA) and Collaborative Argumentation-Based Learning (CABLE). It is noteworthy that, within these approaches to argumentation, the role of confrontation is acknowledged: argumentation is perceived as involving “the confronting of cognitions and their foundations”. At the same time, since CL is founded on a cooperative attempt to resolve difference and revise opinions and beliefs, it is more than ‘mere incidence of conflicts’ (Andriessen et al. 2003, 3–4); it is often linked to complex problem-solving whereby learners construct and

balance arguments and counter-arguments in order to find resolutions to problems (Weinberger and Fischer 2006). In turn, such complex problem-solving is viewed as central to knowledge building with new knowledge derived from the argumentation process being integrated into existing cognitive structures. In the articles by Ravenscroft and McAlister, and Okada and Buckingham Shum we can see the use of computer-supported argumentation to facilitate conceptual change in the domains of science (both articles), and technology and psychology (Ravenscroft and McAlister).

The ability to ‘argue a case’ and to discuss alternative perspectives on an issue has long occupied an important place within educational activities and forms of assessment (for example, formal debates and the traditional ‘for and against’ discussion essay). Indeed, the idea that reasoned argument should lie at the heart of thinking and internal deliberation dates back to the early philosophers, Plato, Socrates and Aristotle, and was reiterated in the twentieth century in seminal publications (e.g. Toulmin 1958 and Billig 1987). However, from the new trends discussed above, it is evident that in contemporary educational practices there is much greater attention being given to argumentation as a way of thinking than in the past and, in particular, as a means of addressing and solving problems and refining conceptual understanding. A well-known researcher in educational argumentation puts it quite simply: “thinking as argument is implicated in all of the beliefs people hold, the judgements they make, and the conclusions they come to” (Kuhn 1991, 3). By extension, argument is implicated in theories about scientific and

social phenomena. And it is a renewed interest in the epistemological basis of disciplinary knowledge, alongside the recognition of the place of argumentation in new problem-solving approaches to learning, that has begun to influence educational practice.

Converging with the trends noted above have been changes in the sites and media involved in educational argumentation, primarily as a result of developments in (educational) technology. These technologies include electronic conferencing (sometimes referred to as 'discussion forums' or 'message boards'), and visualization software tools. As shown in a number of the articles in this special edition, these technologies facilitate new ways of practising argumentation, ways which are potentially dialogic, collaborative and directed towards problem-addressing and solving, as well as the exchange of ideas and perspectives. Of particular importance is the fact that the technologies make it possible to construct and represent argumentation not just through language but through electronic graphical devices.

2. How are research tools for investigating educational argumentation changing?

As perspectives on, and approaches to, educational argumentation have begun to change over the last decade or so, the focus of research has also begun to change and – as a consequence – so too have the tools employed by

researchers. A number of articles in this special edition exemplify some of the most recent methodological innovations. They include the development of frameworks for analysing argumentative dialogue in electronic discussion forums, and the development of software tools for visually mapping unfolding argumentation. The methods our authors work with, and which they discuss in their articles, reflect both the new orientation towards argument as a form of dialogue, collaboration and problem-solving and the new technologies. They can be grouped as follows:

- tools for analysing argumentation dialogue. These include tools deriving from a functional linguistic tradition and which have been extended for use in online environments (North et al.), discourse-analytical tools, originally developed by Kuhn (1991) and Felton and Kuhn (2001), and adapted by Joiner et al., and tools from philosophy, notably the work of Toulmin (see Joiner et al.; Okada and Buckingham Shum; Ravenscroft and McAlister; Simon);
- computer visualization tools and computer simulations (emerging within computer science and artificial intelligence) which are designed to understand how students argue, whilst simultaneously helping them to argue more effectively (i.e. ‘mediating tools’) (Okada and Buckingham Shum; Ravenscroft and McAlister; Simon);

- interviewing tools developed within the social sciences for establishing the role and meanings of argument in educational contexts (Mitchell et al.);

2.1 Toulmin's framework: some issues

Amongst the tools listed above are those derived from Toulmin's model of argumentation (Toulmin 1958), a model which has had wide-reaching influence on the field of educational research. While Toulmin's model was largely designed to offer a critique of formal logic, the six concepts comprising the framework (claim, data, warrant, backing, rebuttal and qualifier) have been used by argumentation researchers for describing and providing a quantitative picture of the structure of argument/ation. This is despite a number of problems identified in various studies over the last decade. Kelly et al. (1998), for example, raise the difficulty in deciding what counts as claim, data, warrant and backing while Fulkerson (1996) discusses the problems arising from the way in which chains of claims, warrants and backings may be embedded hierarchically. In Fulkerson's view, if the Toulmin model is to work as a useful heuristic, it needs to account for the fact that arguments operate as constellations of sub-arguments and that the claim in one stage may become the data for the next, a point that is discussed in North et al.'s paper. Another criticism commonly made of Toulmin's model is that it is not sufficiently dialogic (Andrews 2005), and therefore does not capture the interdependency

of moves between participants. Again this is a problem that is raised in North et al. and one that their framework attempts to resolve.

In response to methodological problems in using Toulmin's model (including those identified above), Simon shows in her paper the need for modifications to the way in which Toulmin's argument pattern (TAP) can be implemented when investigating spoken classroom data. For example, she discusses how some of the ambiguities in identifying components can be resolved by collapsing data, warrant and backing into 'grounds'. She also argues that contextual clues (such as those which emerge from listening to audio recordings) can be used to help resolve any ambiguities in deciding what counts as a claim or grounds.

In order to capture the quality of students' opposition in discussions, Simon and her colleagues have developed a TAP based scheme of levels. This scheme is based on the clustering and frequency of certain argument elements and has proved a useful tool in both the analysis of argumentation and in professional development programs. Nevertheless, as Simon herself points out, while the value of TAP as an analytical scheme is clear, its assessment of argumentative quality has limitations. While on the one hand, a series of challenges/rebuttals would seem to indicate a richer debate than one which consists of a series of claims, the quality of a challenge or piece of evidence may in itself be seriously lacking in substance or factual accuracy.

2.2 *Interpretative issues – under- or over-interpretation*

As noted by North et al. (this volume), research into electronic conferencing has moved from investigation of observable and quantifiable behaviours, such as the rate of participation or message length, to studies which categorise elements of the discussion to elucidate processes of knowledge construction, collaborative learning or critical thinking. They note that, with this shift, there have arisen methodological problems. For instance the relationship between claims and support can sometimes be problematic in that reasoning need not involve explicit markers. As a consequence, the analyst may supply or perceive links which were not intended by participants – in other words they may *over-interpret* the data.

The related issue of *under-interpretation* can occur through use of analytical schemes which necessarily reduce the complexity of communicative function. Consider the following from North et al. (this volume):

The function of an utterance is frequently ambiguous, even taking into account contextual information. In interpreting other people's utterances, we rely on a process of inferencing to make sense of what we hear; there is no privileged access to 'what the speaker really means'. And speakers themselves do not necessarily mean one thing: an utterance may simultaneously be performing several functions, or may be ambivalent between two mutually exclusive interpretations. An ostensibly humorous remark, for example, might also be a thinly veiled criticism; a piece of evidence apparently offered in support of another participant's claim could be

intended to undermine it. Such uncertainties are part of our face-to-face interactions, and they need to be accounted for in online environments as well...Categories of functional analysis are necessarily a simplification of what is a much more fluid exchange of ideas that may be only half-formed, in a context where participants are concerned about interpersonal roles and relationships as well as ideational content.

Since categories of analysis necessarily under-interpret functional complexity, then one could argue that they cannot capture the uncertainties and complexities of argumentative dialogue (whether it be online or face-to-face). Under-interpretation is indeed a fact of research life using analytical schemes. This is not a difficulty from our perspective, however, since for us the ultimate aim of argumentation research is not to capture every nuance of argumentative interaction. Instead, we see the ultimate goal of research into argumentation as interventionist, i.e. of specifying best practice to help students improve the quality of both their arguments and argumentation.

Whilst under-interpretation is a fact of research life, this does not have to be the case for over-interpretation: measures can be taken to reduce it. One way of doing this is to investigate argumentation quantitatively and comparatively over time using the same student(s). In this way, observations made by researchers about students' argumentation are necessarily *relative* rather than absolute. For example, researchers may be able to see that students use more rebuttals or evidence-based claims than they did before they were taught some principles of good argumentation. With a perspective on

quantitatively-based relative observations only, this helps guard against the temptation to project meanings into 'the mouth of an arguer' which they may not have generated (See also O'Halloran, 2003 and O'Halloran and Coffin, 2004 on overinterpretation and underinterpretation).

2.3 Meanings of 'argument' and 'argumentation'

Mitchell et al. (this volume) discuss the use of interviewing to better understand how teachers and learners use and interpret the term 'argument', reflecting on ways in which the interview 'can foreclose as well as open up opportunities for sense making around argument'. They show that there are often large discrepancies between understandings of the concepts of argument/argumentation by researched and researchers. Clearly, if there is no consensus amongst teachers, learners and researchers as to the nature of the phenomena that they are aiming to improve, this creates problems for interventionist work. The difficulties of getting students to appreciate the concept of 'argumentation', let alone 'educational argumentation', is reflected in the datasets in Tables 1 and 2. These datasets emerge from our ongoing corpus linguistic research into argumentation (Coffin et al. 2007; Hewings et al. forthcoming; O'Halloran 2007).

Tables 1 and 2 report the number of times lexical words immediately modify 'argument' and 'argumentation' respectively from The Bank of English, a 450 million word database of contemporary English language use, both written and

spoken. (By ‘immediately modify’ we mean with no words between the modifier and ‘argument’/argumentation’). As can be seen, in comparison to the use of ‘argument’, ‘argumentation’ is sparingly used. One might speculate tentatively, given this sparingness, that appreciation of the *process* of argumentation, is poor in the culture generally. This is ironic given that amongst the highest modifiers of ‘argument’ are those which *evaluate* ‘argument’ which is, after all, the product of argumentation, e.g. ‘strong’, ‘good’, ‘powerful’, ‘convincing’, ‘compelling’. Moreover, the variety of modifiers for ‘argument’ shows how slippery the concept of ‘argument’ is in ordinary use which, in turn, indicates how difficult it is for students to fix on particular ideas of ‘argument’ and why they may have confused notions of it (as evidenced in Mitchell et al.’s interview based study).

legal (189); strong (165); oral (156); good (155); political (144); main (139); heated (115); counter (97); powerful (93); convincing (91); economic (91); old (83); big (81); reasoned (81); closing (74); compelling (74); persuasive (72); moral (71); central (67); little (63); similar (60); best (59); rational (55); strongest (49); whole (47); logical (45); further (42); own (41); bitter (37); serious (37); public (34); valid (33); reasonable (31); beyond (30); fierce (30); general (30); real (30); furious (29); new (29); scientific (29); basic (27); final (27); major (27); written (27); better (25); domestic (25); intellectual (25); long (25); different (23); great (23); constitutional (22); ethical (22); familiar (22); family (21); original (20); philosophical (20); technical (20); theoretical (20).

Table 1. Bank of English frequency results (20 instances and more) for lexical modifiers of 'argument'

constitutional (5); rational (5) careful (2) develop (2) moral (2); racist (2); apologetic (1); competitive (1); consensual (1); courtroom (1); critical (1) democratic (1); dependency (1); develops (1); discard (1); dundee (1); elegant (1); era (1); ethical (1); extended (1); find (1); imperialist (1); industrial (1); institutional (1); involve (1); involves (1); labored (1); legal (1); logic (1); long (1); man (1); mundane (1); obscure (1); passionate (1); private (1); realist (1); reasoned (1); scheme (1); Talmudic (1); term (1); theoretical (1); traditional (1).

Table 2. Bank of English frequency results: lexical modifiers for 'argumentation'

2.4 *New technologies, new methods, new directions*

One intriguing issue that is apparent in Okada and Buckingham Shum and Ravenscroft and McAlister's articles is what might be termed the 'software paradox'. This refers to the way in which software, in the case of these authors the programs Compendium and Interloc, can be used to promote effective argumentation through its structured guidance, while simultaneously being used as a research tool to investigate the effectiveness of that argumentation, i.e., *a research tool to research itself*. In some ways, this is analogous to the

‘observer’s paradox’ where the researcher is investigating the researched whilst at the same time potentially having an effect on them.

Given that new software for improving argumentation will, no doubt, continue to be developed, might the ‘software paradox’ become a feature of electronic argumentation research? Interestingly, the Web 2.0 phenomenon, Wikipedia, which is a free, web-based, multilingual, open content encyclopedia project (www.wikipedia.org), sheds light on how the researching/teaching of argumentation dichotomy has the potential to be a feature of future electronic argumentation research. We explain this below.

A wiki is a technology for creating collaborative websites: in Wikipedia users are free to create an encyclopedic entry, which in turn can be improved upon by other users. Contributors to Wikipedia are encouraged to adhere to debate guidelines which, in turn, promote the formulation of reasonably clear-cut claims, backed-up by evidence etc., by Wikipedia editors. The debate guidelines, in effect, provide teaching of argumentation for a specific purpose – the co-writing of a ‘neutral’ article. Some examples of guidelines are listed below:

Handwaving

An assertion not supported by evidence; most frequently seen in articles for deletion discussions, when editors may assert that a subject is notable, but fail to make a convincing case. Such arguments are usually given less weight.

Climbing the Reichstag

A humorous way of indicating that an editor has over-reacted during an argument such as an edit-war in order to gain some advantage. This has similar consequences to – and is as unwelcome as POINT.

Point

"Thou shalt not deliberately skew any page, nor create or nominate for deletion any page, nor in any other way vandalize Wikipedia, in order to try to prove your point!"

Since most people are interested in rich, detailed, neutral, up-to-date Wikipedia entries, most contributors naturally acquiesce to/learn these guidelines. In effect, Wikipedia teaches skills of effective argumentation.

Wikis carry histories of discussion on various points which arose in the co-construction of the Wikipedia entry. This discussion history offers a record of argumentation for wikipedians to reflect upon and potentially to enhance their own contributions and justifications in the wiki. In turn, this discussion history can be used as a research tool to collect data on Wikipedia editors' argumentation and potentially to see to what extent their argumentation (and thus the Wikipedia entry) has improved as a result of other wikipedians alerting them to argumentation guidelines. In other words, Wikipedia can be used as a research tool to research itself.

The Wikipedia experience is analogous to how debate is improved by the structuring/move guidelines of Compendium and Interloc; as Web 2.0 technologies increasingly become mainstream, 'the software paradox', we

would argue, is not one that looks like it is going to be resolved but could well become a 'productive tension' of some virtual life argumentative research. A final comment on Wikipedia: we feel it provides an inspiration for the design of *productive* argumentation research projects. Where the ultimate reason for debate is a valuable product, then meta-argumentative skills are much more likely to be acquired willingly, motivation for engaging in debate is likely to be higher, as is the pleasure in seeing how effective argumentation can help produce a worthwhile social/public good.

4. Concluding comment

Throughout the edited collection, it is made clear that researchers have not been able to adopt existing analytical frameworks and research tools unproblematically. Issues such as the use of pre-determined schemes as opposed to data-generated frameworks of analysis, and the need to achieve balance between capturing, on the one hand, the structure of argumentation and, on the other hand, the quality, have all been important stimuli in prompting a critical review of existing tools. Significantly, such critical examination and appraisal have led to a creative process of extending, adapting and, in some cases, replacing analytical frameworks and tools.

In sum, the papers in this special issue make an important contribution to a growing body of research into educational argumentation. They reflect a renewed interest in investigating the dialogic, collaborative and problem-

solving dimensions of argumentation and the need to extend and develop research tools to do so effectively. They also demonstrate a growing interest in the way new technologies can be harnessed both to analyse and to support and improve argumentation skills. In the last ten years or so, there has been no special issue (or indeed edited book) which has focused specifically on methods for researching argumentation in educational contexts. What we present here should help to meet this need.

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