Using systemic functional linguistics to explore digital technologies in educational contexts

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Using systemic functional linguistics to explore digital technologies in educational contexts

Abstract: Over the last decade, technological innovation has led to new pedagogic sites, such as online discussion forums and virtual 3D worlds. In these sites students and teachers use language and other meaning-making resources to engage in educational argumentation. However, there have been few studies which have systematically explored the role of lexicogrammatical and other semiotic resources in the making of meaning in these contexts. This is because the main body of research underpinning claims around the affordances and limits of online argumentation is located within sociocognitive paradigms. By drawing on the tools of systemic functional linguistics and, where relevant, systemic functional-multimodal analysis, this article therefore offers a fresh perspective. I show how such tools can illuminate both the overarching textual shape and structure of online discussion forums and the ways in which meanings are made through language and other semiotic resources.

Keywords: online argumentation; systemic functional linguistics; multimodal meaning; digital technologies; educational context

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1 Introduction

Technological innovations over the last decade have resulted in the widespread use of new pedagogic sites, such as online discussion forums and virtual 3D worlds. In these sites students and teachers engage in (among other activities) argumentation. This paper is concerned with the kinds of text and talk (realized through linguistic and other semiotic resources) that occur in these sites, arguing that the new technological contexts both shape and are shaped by the linguistic and semiotic resources used.

In order to illuminate this relationship between context and resources, I discuss (in line with the theme of this special issue) how systemic functional linguistics (SFL) provides analytical tools for considering, in a principled manner,
the new pedagogic environments, focusing specifically on electronic conferencing or online discussion boards.

By way of evidence and illustration I draw on four research projects conducted in the 2000s which used SFL to examine online argumentation. In the first half of the paper I reflect on the methodological innovations necessitated by the kind of data and contexts being investigated. In the second half I synthesize and draw out the most significant trends and findings from across the four studies, noting how these findings both relate to, and go beyond, current insights into argumentation derived from research in the fields of education and argumentation. In turn I consider

- patterns of student engagement;
- the role of tutors/teachers;
- the degree to which claims are challenged and developed;
- the use students and tutors make of semiotic resources (beyond language).

Furthermore, given that SFL is designed to be an “Appliable Linguistics” (Halliday 2007) and thus to respond to real-life language-related issues, I conclude the article by considering the implications of the findings for educational practice as well as future research.

2 Online educational argumentation

Over the last decade or so, advances in technology have led to a proliferation of new electronic modes of communication. In turn, these have led to a diversity of pedagogic spaces in which educational argumentation can be enacted. They include e-mail discussion lists, electronic conferences or discussion boards, wikis, blogs, virtual 3D worlds, and audio and video conferencing. It has been argued that these new digital media are influencing the way we use language as well as language itself (Danet and Herring 2007). In school and university contexts it has been argued that such media provide different kinds of opportunities for students to engage with both the processes and the products of educational argumentation.

In particular, claims have been made about the benefits of text-based and asynchronous electronic conferencing, compared to face-to-face interactions. Andriessen (2006), for example, proposes that it creates a space for “slow discussion,” arguing that students are able to reflect on and deepen their views on issues, and that teachers/tutors can more easily and effectively monitor and intervene in the learning process. Claims about the benefits of this form of conferencing nevertheless remain contentious, with some empirical studies showing that they...
can lead to a low quality of argumentation in terms of students’ propensity to
disagree with or respond to each other (e.g., Jeong and Joung 2007).

Debate around the affordances and benefits of online argumentation is
underpinned by a body of research which is primarily located within sociocogni-
tive paradigms. These studies use a wide variety of categories to code the mes-
sages exchanged by students and teachers in line with their particular research
focus. Thus Schellens and Valcke (2004) have distinguished between task-related
and non-task-related material, whereas Felton and Kuhn (2001) have focused on
the use of transactive and non-transactive statements and questions. Argumenta-
tion sequences and interaction patterns have also been examined (e.g., Leitão
2000; Baker 2003). Significantly, few studies have used linguistic frameworks
and tools of analysis to consider the overall textual shape and organization of
online discussions (i.e., from the perspective of the functional stages participants
move through) and few have considered the role of lexicogrammatical resources
in the making of meaning in these contexts.

Aside from overlooking the role of lexicogrammatical resources in realizing
and exchanging meaning in online argumentation, the sociocognitive studies
referred to above have also tended to ignore how, beyond language, new com-
puter tools and programs are leading to the use of a different set and combination
of semiotic resources as a means of communication (Jewitt 2006). For example,
meaning-making modes such as visual images and various types of graphics have
begun to play a more prominent role in online asynchronous and synchronous
interactions. However, to date, the primary focus in the literature has been verbal
data.

This article aims to move the debate on computer-based argumentation for-
ward by showing how systemic functional linguistics and, where relevant, sys-
temic functional-multimodal discourse analysis (as it has been referred to by
O’Halloran 2008) can use systematic analysis of large empirical data sets to gen-
erate major insights into how
– online discussions are structured and staged across a number of hours or
days; and
– participants deploy lexicogrammatical resources (sometimes in interaction
with nonverbal ones) in the context of online discussions.

3 Research contexts and data collection

The online argumentation data which underpin the discussion in this paper
were collected over seven years (2001–2008) in the context of four research proj-
ects, each focusing on a different educational sector and subject/disciplinary
area. Although each project had its own distinct research questions, a common aim was to investigate the overarching architecture of online discussions and to identify the linguistic patterns and resources deployed by participants when making meaning in these contexts. One key pedagogic feature that ran across Projects 1–3 was the use of online discussions to prepare students for a subsequent related written assignment: students were expected to be motivated (though not obliged) to participate. The complete text record of the forums in each of the four discussions was linguistically analyzed for the overall text structure and key aspects of meaning making.

3.1 Project 1 (Masters in Education)

This research investigated three discussion forums (a total of 37,055 words) at the beginning of a Masters in Education (Applied Linguistics) distance course at the Open University, UK. Within the forums, which lasted two to four weeks, the students (between 10 and 20 in each group) were asked to discuss factors affecting language learning (see Coffin and Hewings 2005; Coffin et al. 2005a, 2005b for reports on this study).

3.2 Project 2 (School History)

This Project, funded by the UK ESRC, focused on two classes of Year 9 UK history students (aged approximately 14 years) from two different schools, both of which were studying the rise of the Nazi Party. The classes were allocated to five asynchronous discussion forums, containing equal numbers from each school (approximately 11 students per conference). During a three-week period the students discussed the following question, deliberately phrased to elicit an argumentative response:

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1 In making ethical decisions we were guided by the ethical codes of practice of the British Association for Applied Linguistics (http://www.baal.org.uk/goodprac.htm). The proposals were also approved by the Open University’s Human Participants and Materials Ethics Committee. Data for all four projects were stored as required by the 1998 Data Protection Act and all names were anonymized. In the case of the school history project, all staff working with students had Criminal Records Bureau clearance.

2 ESRC (The Economic and Social Research Council UK) ref: RES-000-22-1453. A report of the study is available at www.esrcsocietytoday.ac.uk. See, too, the project Web site at http://arguinginhistory.open.ac.uk/index.cfm.
The most important reason why the Nazis came to power in 1933 was that they had Hitler as a leader. Do you agree?

The data comprised a total of 8,368 words.

3.3 Project 3 (Undergraduate Health and Social Care)

This study (funded by the HEA) investigated undergraduate discussion forums in the context of a distance course, “Perspectives on Complementary and Alternative Medicine (CAM),” at the Open University, UK. Sixteen groups (of approximately 15–25 students) participated in five discussion forums held at different points in the academic year. Each conference lasted for approximately three weeks and was organized around different discussion tasks, designed to prompt debate. Data comprising a total of 49,223 words were gathered. Below is a sample task:

For this tutorial try and respond to the question:
How realistic are the assumed benefits of statutory regulation?

3.4 Project 4 (PhD in Educational Technology)

This small-scale pilot study investigated two small groups of (3–5) educational technology doctoral students who chose to hold their tutorials in Second Life, a 3D virtual world. Although discussion forums in Second Life are text based (and thus similar to the discussion forums investigated in Projects 1–3), an important distinguishing feature is their synchronous nature: the discussions analyzed lasted just over an hour. Furthermore, Second Life enables students (and teachers) to interact with each other in the form of “avatars” or animated personas (with pseudonyms). These avatars can move through space and arguably provide the embodiment and “human” presence absent in electronic discussion forums. The data comprised a total of 3,305 words.

3 HEA (Higher Education Academy). A report of the study is available at http://www.heacademy.ac.uk/ourwork/research. See also the project Web site at http://argumentation-hsc.open.ac.uk/.
4 Systemic functional linguistics: tools, issues, and innovations

SFL provides a set of analytical tools for investigating in detail how language works to make meaning in relation to context. Unlike traditional form-oriented approaches to language, it focuses not only on clause-level grammar but on whole texts (or “discourse”). It is therefore well adapted to analyzing arguable propositions as they are construed at clause level, as well as analyzing how they are built upon and elaborated to form stretches of written text or co-constructed and negotiated through dialogue and oral debate (see Coffin et al. 2009a, for an accessible introduction to SFL). Furthermore, in online argumentation where use of color, font size and type, visual images, space, and gesture may make significant contributions to the argumentation process, tools from the related field of multimodal studies (Kress and Van Leeuwen 2001) can be drawn on.

In the four projects reported on here, the verbal conference data were the primary focus but, where relevant, additional semiotic resources were also investigated. Furthermore, in order to aid the understanding and interpretation of the linguistic/multimodal data, questionnaire and interview data were also used. These data focused, in particular, on teachers’ and students’ perspectives on argumentation and the role of the new computer tools in supporting it. We were interested in seeing how such data might either corroborate the linguistic data or reveal mismatches in perception and linguistic behavior.

4.1 Genre analysis of discussion forums – issues and solutions

As stated earlier, a common aim of the four projects was to better understand the overall structure of online discussion forums. From an SFL perspective, textual structure can be investigated and modeled using the concept of genre, with genre being defined as a staged, goal-oriented social process. Genre analysis identifies the functional stages (as realized through particular discourse-semantic and lexicogrammatical patterns) that participants move through in order to achieve their purpose within a given social context. In school history, for example, a student may set out to challenge a commonly held viewpoint, and in so doing move through the stages of outlining the position to be challenged, presenting rebuttal arguments and putting forward an alternative interpretation. In SFL, such a genre would be categorized as one of the family of arguing genres and, more specifically, a challenge genre (Coffin 2006).
Over the course of the four projects it became clear that the discussion forums did not simply equate to one or other of the arguing genres identified to date in the SFL literature, i.e., analytical or hortatory exposition, discussion or challenge (see Martin and Rose 2008). Rather, in line with the fluid and open-ended argumentation process within an online environment, participants variously moved between the different arguing genres – at times arguing the case for a proposition (exposition genre), and at other points discussing alternative perspectives (discussion genre) or challenging an existing position (challenge genre). These arguing genres could be action oriented (hortatory) or analytical.

Furthermore, although in all four projects the online discussions were set up as forms of debate with tutors/teachers requiring and/or encouraging students to put forward different points of view (supported by evidence), not all students recognized this purpose or achieved/complied with it. Thus there were numerous sections of online text that SFL analysis would characterize as an explanation or recount genre. In addition, the community-forming and technical dimension of online discussion entailed stretches of text comprising genres that were not argument related. As a consequence, participants moved through a wide range of stages realizing a wide range of genres, both arguing and non-arguing.

The fact that discussion forums serve as a space in which the purposes of tutors and participants may not always be in alignment and the fact that, in any case, there may be non-arguing purposes (e.g., community building or technical) that run alongside, or are embedded within, the main argumentation raises a number of challenges for genre analysis. These are discussed below.

### 4.1.1 Elemental, macro, and embedded genres

Early SFL genre analysis (in the 1980s) tended to focus on single, clearly bounded elemental genres such as recounts, discussions, or procedures and was mainly applied to planned written text. Later research took an interest in accounting for how familiar elemental genres combine to realize larger ones or, in Martin’s (1997) terms, “macro genres.” Through the course of the four research projects, it has become clear that the concept of macro genre is a useful means of accounting for the complex combining and layering of purposes and functional elements of

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4 Across the four projects the primary focus was on the arguing genres which unfolded within the discussion forums. While recognizing that genres whose overall purpose is to build community relations or to raise and solve technical issues play an important role in discussion forums and that they often unfold alongside or become interwoven with the arguing genres, to date, they have not been extensively examined in terms of staging and lexicogrammatical features.
discussion forums as they unfold over time. Let us take Project 2 data as an example of how complex layering can occur in discussion forums. The task prompt in the discussion was:

The most important reason why the Nazis came to power in 1933 was that they had Hitler as a leader. Do you agree?

Within each of the five conferences this prompt provoked a number of genres (construed collectively by the participants) which in combination formed a discussion macro genre (alongside other genres). Figure 1 illustrates the structuring of a discussion macro genre formed in one of the conferences.

Working from the bottom up, Figure 1 illustrates the nesting structure of arguing genres within the larger macro genre. Thus, embedded elemental genres may serve as stages within larger elemental arguing genres, which in turn realize macro genres. The following compressed or mini recount is an example of the former. Here the recount functions to support an earlier claim (concerning Hitler being the only one who the Munich Putsch listened to) and thus is “rank shifted” to serve as a stage within an argument genre.

**Macro genre (discussion):** to consider different points of view on why the Nazis came to power

**Elemental genres:**
Exposition genre — Hitler was an effective leader.
+ 
Discussion genre — There were a number of important reasons why Hitler came to power.
+ 
Challenge genre — The most important reason why Hitler and therefore the Nazis came to power in 1933 was the Wall Street crash.

**Genre stages within arguing genres:**
e.g., claim, support, recommendation, position.

**Embedded elemental genres:**
e.g., recount or explanation genres (often in compressed form) function as support for a claim

Fig. 1: The layering and combining of genres
(1) Before they weren't in the race but after they began to gain votes and even more came when Hitler returned to the Nazis.5

Although not shown in Figure 1, other genres also occurred, alongside the discussion macro genre, within the overall conference. For example, biographical recounts were found which lay outside the discussion macro genre structure.

It should be stressed that complicating any easy identification of clearly bounded and cohesive elemental genres is the asynchronous and interactive nature of the conferencing (in Projects 1–3). Asynchronous discussion disrupts the canonical unfolding of discrete elemental genres. Stages from one genre may become interleaved with stages from another and the order in which participants post their texts and the subject headings they use may confound attempts by a researcher (or indeed conference participant) to accurately identify which textual elements belong to which genre (and therefore which line of argument). In particular, the interactive nature of online discussions means that it is not always clear or predictable how a discussion will unfold. For instance, a recount put forward by one participant may – or may not – be recognized and/or recontextualized by another as support for a claim in an argument genre.

4.1.2 Mini genres

It is important to note that in online conferences elemental genres may be small in scale. Across the data in Projects 1–4 it was rare, for example, to find an exposition genre that moved through a thesis, arguments, and position structure (as more typically occurs in written argument “products”; see Coffin 2004). More common was a claim + elaboration structure which therefore might be better described as a “mini” or “compressed” exposition genre. In some cases, a claim stage with no further elaboration occurred. Equally there were frequent occurrences of short explanations (only 2–3 clauses long) with no clear integration into an arguing genre. These appear to be a regularly occurring feature of arguing macro genres within discussion forums and therefore need to be built into any genre/macro genre description.

5 All excerpts from conference data preserve the original text including typos and other errors.
4.1.3 Genre stages

In order to manage the interwoven, nonlinear, and dynamically changing hierarchy of macro genres, genres, and genre stages, the best initial solution seemed to be to focus on the functional stages the participants moved through rather than consider the higher order genre structuring. The genre analysis across all four projects therefore focused on this. The identification of the stages (such as Claim, Counterclaim, Issue) was informed by previous SFL research into argument staging, and new stages were identified in line with the disciplinary nature of the data. For example, an Observation stage was common in the education data and Counterfactual Explanation in the history data.

4.1.4 Dynamic, collaborative structuring

Initially (Project 1) genre analysis was overlaid with a (simplified) exchange structure perspective. That is, in order to capture the co-constructed nature of the genre, data were analyzed in terms of initiation and response stages (Coffin et al. 2005a). However, this did not sufficiently account for the dynamic, interactive/dialogic build-up of the arguing genres over time. For example, analysis did not show how a claim might be supported over time through subsequent (and in some cases preceding) functional stages (often distant in time and space).

In Projects 2–3, therefore, data were entered into an Excel spreadsheet and each claim stage was listed and numbered. Figure 2 (using Health and Social Care data) shows how stages relating to a claim could be shown in the column below, in the order that they occurred in the discussion. It also shows how, in parallel, other claims unfolded (i.e., mini arguing genres). The participants who realize the genre stage are indicated by initials in the left-hand column, with T representing the tutor/teacher.

The use of Excel spreadsheets made it possible to generate diagrammatic displays of the discussion forums across time (as exemplified in Figure 2). As visual summary charts they provided a useful visual overview of the macro architecture of the discussion forum, including the temporal sequencing and (sometimes dialogic) interaction of different argument (or other) genres unfolding in parallel (see North et al. 2008 for further discussion of the methodology). This provided a basis to then consider linguistic realizations.

4.2 The lexicogrammar analysis of discussion forums

Within SFL genre analysis, in order to reveal the inner workings of a genre, there is a commitment to detailed linguistic analyses of the stages writers and speakers
move through. As Bateman (2006) argues, it is this fine-focus linguistic work that reveals the real functional dynamics of genres and as such serves as “an incisive theoretical tool for picking apart the fine interplay between instantial linguistic behaviour and generic ideological and sociological configurations” (Bateman 2006: 178).

In Project 1 the focus on lexicogrammatical analysis was the way in which participants exchanged, challenged, and referred to different points of view, and for this the SFL APPRAISAL: ENGAGEMENT framework was used (Martin and White 2005). The findings of this study (Hewings and Coffin 2004) together with those of the genre-staging analysis led to a focus, in subsequent projects, on how students frame their claims (as discussed in Section 5). This focus was deemed relevant because the genre-staging analysis indicated that (across all data sets), in many cases, claim stages were not elaborated to form “fully fledged” argument genres. It therefore seemed important to try and account for these isolated argument
stages and, ultimately, to reflect on their relationship with the wider educational and sociocultural context.

Given the size of the data sets in Projects 2 and 3, corpus linguistic methodology – concordancing – was used as the way into the analysis. The items searched for were partly determined in advance, as hypotheses about plausible linguistic realizations, and partly drawn from the data, when unexpected ways of expressing claims were noted. One category of search looked for sequences of the form I + verb of mental or verbal process (or similar), e.g., I think (that) . . . , I have found (that) . . . I guess . . . . Other search categories were determined and explored using similar methods. Wildcard characters were used to maximize the flexibility of these searches (for example, I @ think* would find I think, I tend to think, and I was thinking). Owing to the use of “textese” (primarily in the school conferences), searches on I fink, I tink, etc., were also run. The lexicogrammatical analysis helped to identify patterns of meaning making that have a number of implications both for educational practice and future research. These are discussed in Section 5.3.

4.3 The multimodal analysis of discussion forums

As noted earlier, meaning-making modes other than language have begun to play a more prominent role in some discussion forums. While multimodal analysis was not a stated aim, over the course of the four projects, it became apparent that while some students and tutors used regular black font, others used color and a range of font types and other graphic devices. Furthermore, in Project 2 visual images were integrated into the arguing process, while in Project 4 the 3D environment provided many of the semiotic resources absent in asynchronous discussion forums, including movement, space, gaze, and posture. The methodological question thus arose (retrospectively) as to whether semiotic modes other than language need to be systematically integrated into any analysis of online argumentation. Pilot projects using systemic functional–multimodal discourse analysis (SF-MDA) were therefore conducted to analyze the data in Projects 2 and 4. The aim here was to begin to consider how language combines with other semiotic resources in online argumentation and the degree to which nonverbal data may impact on the process, sum, across the four projects, each investigation necessitated methodological innovation in order to better understand the way

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6 Textese refers to the abbreviation of words in texting environments. Common examples include LOL (Laughing Out Loud) and GR8 (great). Use of textese was common in the history data though less so in the other conference data.
meanings are made in online environments. This included the dynamic mapping of dialogue/interaction viewed through the lens of an online discussion macro genre, the use of a concordance to detect key meanings for further investigation, and the combining of multimodal and linguistic analysis to reveal intersemiotic meaning making.

5 Significant trends and findings

As reported in greater detail elsewhere (e.g., Coffin and Hewings 2005; Coffin et al. 2005a, 2005b, 2009b, and 2012; Coffin and O’Halloran 2009; Hewings and Coffin 2004; Hewings et al. 2009; Painter et al. 2003), SFL analysis provided a number of insights into how meanings are made and exchanged in virtual discussion sites and where and how this is done more effectively as well as less so. Synthesizing the findings from across the four projects, this section puts forward claims relating to four broad areas which I take to be the most significant. As discussed below, these findings show both resonance and discord with findings in the wider (nonlinguistic) literature, as well bringing new insights.

5.1 Patterns of student engagement: power and status

Claims have been made that asynchronous discussion forums provide a democratic space in which participants can participate more equally (Fischer et al. 2002). Dysthe (2002), for example, argued that a key factor in the success of the electronic tutorial she investigated was its “symmetrical interaction” where, due to the non-participation by the tutor, “none of the participants have more authority or power than the others” (2002: 341). Across the four projects reported on here, however, there was considerable disparity in the patterns of individual engagement observed. The linguistic evidence suggests that, invariably, differences in power and status emerge – among students and between students and tutor.

In Project 1, for example, it emerged that there were correlations between patterns of engagement and academic achievement: whereas twelve of the fourteen students forecast GCSE grade C or above contributed to the forums, only four of the fourteen forecast grade D or below did.7 Furthermore, when the genre stages which weaker students performed were compared to those that higher achieving

7 In the United Kingdom, GCSE are public exams taken at approximately age 16 years. A grade C or above would be considered a good pass. These data were only available from one school.
students performed, there were stark differences in their functions and the role they played in the genre organization of the forum. Table 1 shows the variation between Nicholas (predicted to get a low grade) and Rachael (predicted to get a high grade). In general, these patterns were typical of the higher and lower achieving students as a whole (in Project 1). While not assuming any simple causal relationship, it is nonetheless important to consider the implications of this, particularly against a background of claims (especially those that are commercially driven) that technology is an educational solution and is an effective means of engaging more marginalized students.

Table 1 and the genre analysis on which it is based shows that Rachael has a repertoire of arguing resources which enables her to contribute to the construction of argument genres (as well as those we have termed “solidarity” to refer to their purpose in community formation). It is not only the quantity of stages Rachael contributes, but also the way these are then used by other students to develop the argument process that gives her considerable influence and thus power within the discussion forum. Furthermore, it could be argued that her verbal dominance is amplified through her use of visual resources: her distinctive and “marked” choices in color, size, and type of font as exemplified in the following extract:

(2) (original text: shocking pink font against green background)

hAnNaH U R r GhT lO!!! ThEy w ErE StRnGeR DaN OtHa pRtYs n dA NAzIs cLd
pRoMIs MrE WhIcH OtHa pRtYs ClDnT!! wHiCh iS WhY ThE BeCmE So
pWeR fUl!! 4 ExAmplE tHeY SaId dAt tHeY WID DeAl wId dA UnImPlOyMeNt
If pPl VoTeD 4 dEm!! ~X~X~X~X~X~X~X~

While theorizing the semiotics of color within an SFL-MDA framework is only beginning to be developed, it has been argued that color does a great deal of
interpersonal (as well as ideational and textual) work, for example, gaining attention, signaling creativity, making one’s self prominent, and so forth (Van Leeuwen 2011). In this case Rachael’s use of shocking pink on a green background is bold and arresting and is presumably designed to gain the attention of fellow students.

SFL-MDA of the Second Life discussion (Project 4) suggested that a similar phenomenon may be at work (though far more extensive and systematic research is needed to explore this further). In this 3D context it was the semiotic resource of space (rather than color or font) that, arguably, played a role in constructing interpersonal relations. To illustrate the point, Figure 3 is a screen shot of Second Life where students chose to meet on Philosophy Island to debate the concept of identity. The screen shot has been annotated to show how the circular spatial arrangement for the discussion (deliberately organized in this way by the participants) established different degrees of social distance/closeness through its insider/outside boundaries which may have, in turn, affected participation. Certainly, it was interesting to note how Shunya, a non-student “outsider” avatar who stood with folded arms outside the discussion circle (see the rectangle annotation), engaged only minimally in the discussion (a total of 3 stages out of a total of 114).

While it is not possible to make a strong claim that Shunya’s lack of engagement was directly related to the spatial layout of the discussion (a number of other factors being in play), it is nevertheless a reminder that physical arrangements within a virtual space often replicate and mirror real world arrangements and, in so doing, simply contribute to the maintenance of (rather than radical
departure from) the status quo of real world, face-to-face social roles and relations, and the inequalities of power and status deriving from these.

From a student perspective, the interview data revealed that one factor in explaining unequal participation may be the permanent nature of text-based talk. Furthermore, there is an absence of modes which are available in a face-to-face discussion (such as the use of intonation and facial expression) and which can be used to soften any countering or challenging. As one undergraduate student, Jenny, put it:

I think that does hold me back, if it had been face to face and you know because online you don’t know what anybody looks like, you don’t know what their views are, when you are face to face you have got some idea of how they are going to take something.

It should be noted, however, that for some students the opposite was true: they felt liberated by not having to fight for the floor and for secondary school students, in particular, the familiarity of text talk (through their experience of mobile phone instant messaging) gave them confidence to take part in exchanges without unduly worrying about spelling, punctuation, or structure.

5.2 The role of tutors/teachers

The role of a teacher/tutor in influencing the nature and quality of online discussions is one that has been extensively debated and explored in a wide range of literature over the last fifteen years. On the one hand, many researchers have emphasized the importance of a tutor role, with Swan (2001: 309) for example concluding that there is “a heightened need for instructor activity and interaction in online environments.” Lim and Cheah (2003) have set out a number of roles that teachers should play during asynchronous conferencing, namely: setting meaningful tasks; providing technical guidance; participating actively; keeping the discussion focused; drawing conclusions; providing content expertise; and recommending resources for extension of learning.

In contrast, it has also been frequently claimed that a less dominant role for the tutor is one of the perceived benefits of online discussions. (It is perhaps for this reason that the term e-moderator is often the preferred label.) In an early study by Marttunen (1997), in which a teacher-led e-mail group was contrasted with a student-led discussion, it was asserted that the latter was a superior mode for developing argumentation skills. Collison et al. (2000: 12) also warned against a tutorial style that attempts to “jump into” the dialogue, or “lead” the discussion in traditional ways.
In relation to the four data sets discussed here, very different strategies were used by the teachers/tutors (including within the same educational context). One of the most striking findings was simply the variation in the quantity of arguing stages contributed by a tutor in any one conference (see Table 2). In the case of the undergraduate forums in Health and Social Care, for example, whereas one tutor contributed 11 arguing stages in her conference, another tutor (in a parallel conference with the same pedagogic purpose and the same discussion topic) contributed 106.

An equally salient finding was the different degree to which the same tutors engaged in the discussion by building on the claims put forward by students. Some tutors, for example, did not develop student claims. Others did. In the undergraduate context, the frequency ranged from 18 instances from one tutor to zero from another. In the Masters in Education data, one tutor built on 6 claims realized by students and the other only 2. In the history data, the highest total number of stages made by a teacher in relation to student claims was 9 and the lowest 3.

The relative infrequency with which tutors built on student claims would seem significant given the potential impact on student motivation. In the undergraduate data, as an average percentage over two years, more than forty percent of claims in two tutors’ groups had no follow up and more than fifty percent in the two other tutors’ forums. In the interview data a number of students commented on the negative impact of this and it is a likely factor in explaining patterns of participation and engagement. As one student put it:

I got no response, so at least at a face-to-face tutorial you would get a response, you know if what you were saying was right or wrong. I mean because nobody wrote back ... I sort of lost my confidence and I thought I haven’t got anything valuable to say so I didn’t write anything.

Interestingly, in the doctoral online discussions no claims were left hanging. This is likely to be an effect of synchronous rather than asynchronous communication: just as in real-time, face-to-face discussions, it would be marked for there to be no follow-up. It may also be an effect of a smaller number of participants who as a

<table>
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<th>Table 2: Minimum and maximum number of tutor/teacher arguing stages</th>
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<td><strong>Asynchronous</strong></td>
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result engaged in a more focused (linear) discussion with fewer claims unfolding in parallel.

In relation to tutor/teachers’ use of argument prompts, the possible effect on the quality and quantity of arguing stages made by students has been discussed in some depth in Coffin et al. (2005a). An argument prompt such as But was this the most important cause? is essentially a question designed to stimulate participants’ views on an issue, i.e., to generate some type of arguing genre. It contrasts with an information prompt such as What were the causes of the 2nd world war?, which is more likely to elicit factual knowledge.

In the undergraduate data it emerged that there was a correlation between a high frequency of argument prompts and more sustained debate (i.e., a greater number of other arguing stages). The undergraduate data showed similar patterns. As Table 3 shows, a higher number of argument prompts correlates with a higher number of other arguing stages including a slightly higher number of claim stages.

In the doctoral data, in contrast, there were a total of 16 argument prompts but only 90 arguing stages. This is likely to be a consequence of a faster flowing interaction with shorter responses and less time for building and adding to a claim.

While it is not possible to attribute any simple cause–effect relation between the use of argument prompts and the degree of sustained argumentation, the general pattern of correlation cannot be discounted. At the same time, the use of an argument prompt is not in itself a guaranteed means of stimulating debate: close analysis of the lexicogrammatical realization of prompts and the stages preceding and following would suggest that the combination of prompts with other stages can make them more effective, or less so. In the postgraduate educational data, for example, one of the tutors developed a strategy which seemed particularly effective with his largely professional (English language teacher) audience. This strategy was to paste in a sentence or two from a previous student posting containing an opinion or personal experience. Solidarity with the quoted writer was then achieved by offering a comparable personal experience. This in turn

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<th>Table 3: Average number of stages across the 4 UG forums (2 per year)</th>
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<td>Arg prompt</td>
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constituted a preface for one or more argument prompts that extended the topic. By participating in the exchange of personal experiences, the tutor was able to build solidarity with the group and encouraged student camaraderie. At the same time, he was able to model the importance of using personal experiences as a springboard to extend a topic to a greater level of generality and abstraction.

Aside from tutors developing student claims and judiciously using argument prompts, a third set of stages that they could potentially use to enhance the quality of a discussion are those referred to as thesis (or position), recommendation (proposal for action), preview (foreshadowing the line of argument), and summary (synthesizing the main lines of argument). These stages make it possible to move to a higher level of abstraction and either predict or accumulate the meanings of the unfolding arguing genres. Across the four projects, however, it was extremely rare for teachers/tutors (or indeed students) to perform these stages. There was therefore a missing “top layer” of the discussion architecture. That is, unlike in a structured written argument which builds toward an overall position in a linear manner, in discussion forums different arguing genres tend to unfold in parallel. As previously discussed, this leads to a complex set of relations between arguing macro genres, elemental genres, and genre staging. It is likely, therefore, that for those engaging in the onward flow of the discussion forum it would have been difficult to gain a perspective on the direction a discussion was moving in as well as the various position/positions being reached.

Dispersal and an absence of synthesis appear to be a common feature of the conferencing environment. The genre analysis of 24 conferences conducted across a range of educational contexts would certainly suggest so. This does not mean it is a natural or inevitable feature – nor indeed educationally desirable. On the one hand, it may mean that, because there is little pressure to establish a stable or overarching point of view, students can freely explore a range of different viewpoints, which may in turn trigger new lines of thinking. On the other hand, one of the main advantages of text-based and time-delayed asynchronous discussion is the ability to pause, review, and reflect on the unfolding of a discussion. The absence of generalizing or integrating stages would therefore seem to be a lost opportunity for harnessing the potential of the technology.

5.3 The degree to which claims are challenged and developed

Across all data sets challenge and counterclaim stages were relatively infrequent (see Coffin et al. 2009b; Coffin et al. 2012 for further discussion). While it seems that there are a number of factors accounting for the relative infrequency, lexicogrammatical analysis revealed a particularly interesting finding: how tentatively
a claim is worded appears to have an influence on whether it will be challenged or not. That is, a claim which is construed as though it were categorical fact is unlikely to be challenged. In contrast, a claim construed more tentatively through modal resources such as *I think* or *maybe* is more likely to be challenged. The following two data extracts from Project 1 illustrate this.

(3) Hitler was lucky he was there at the right place at the right time this was luck  
(*This claim was left unchallenged*)

(4) *I think* they still would have had a chance because *maybe* someone else could have used the luck of the wall street crash to there advantage  
The nazis only came into power because hitler was very important

5.4 The use students and tutors make of semiotic resources

As discussed at earlier points in this article, the semiotic options (beyond language) which are available in discussion forums merit some reflection. Comparing the data across Projects 1–3 it became clear that, while the university students made virtually no use of modes other than language, secondary school students used visual images and graphics (namely different fonts as well varying font sizes and colors). In Project 4 preliminary analysis suggests that gaze, positioning, and movement through space (though not graphics as a consequence of the text options) were also used as resources, but more systematic analysis of these is required before drawing any firm conclusions.

It is important to recognize that graphics were not a resource exploited by the majority of students in Project 1, nor the two teachers (only 30% of the total messages were in a color other than the unmarked choice of black and less than 20% in font other than the unmarked choice of Verdana). Nevertheless SF-MDA suggested that graphics can be used, and indeed are used by some students, to make interpersonal and textual meanings which contribute to the argument process. For example, large font, upper case, and bold were sometimes used to amplify key points. Different colors were sometimes used within a single message to distinguish arguing stages from solidarity stages.
Another semiotic resource that was made use of in the history data was the visual image. Visual images were brought into play as a potential source of support for claims and thus played a role in ideational meaning making. For example, photos of Nazi mass rallies (such as Figure 4) were used by the teacher Mr. Thomas to prompt explanations of Nazi popularity:

(5) Mr. Thomas Hitler as a public speaker

The Nazi party organised large public meetings . . . There are some photographs of these meetings in Pictures, in a folder . . . Does this help to explain why the Nazis became so popular by 1933?

On the whole, students did not succeed in making effective use of the visual resources. One student, Raeesha, for example, used the photo in Figure 4 with the aim of supporting the claim that, had Hitler not made good speeches, then no one would have followed the Nazis. Here is her response to Mr. Thomas:
(6) Raeesha: yes it dus coz if it had not of bin 4 hitler makin such gd speeches den no1 wud of followed da nazis

However, the visual structure in the photo does not provide evidence of Hitler’s effectiveness at making “gd speeches”. Had Raeesha been trained in visual analysis, she could have more plausibly argued that the image provided evidence of Hitler’s ability to attract a large audience and/or his opportunities to influence large numbers of people.

6 Implications for future research and educational practice

In this article I have shown how in combination the macro perspective gained through dynamic genre mapping and the micro perspective gained through fine-focus SFL and SF-MDA illuminate key aspects of meaning making in online discussion boards (where the stated educational purpose is to debate issues). In this section I draw out the implications of the research findings both for future research and for educational practice.

6.1 Future research

Based on some of the complexities in analyzing the data from the four projects, further work is needed to test whether a hierarchical framework of macro and embedded genres adequately models the genre choices and patterns within virtual environments across a wider range of educational contexts. Furthermore, as argued earlier, the fine-focus linguistic analysis that reveals the meaning-making patterns of tutors and students and in turn wider social practices are a strength of SFL analysis. However, the data suggested that consideration of intersemiotic meaning making (e.g., the overlay of color on wording, etc., and the interaction of visual image with verbal claim) will be increasingly important as an expanded repertoire of semiotic resources is made available through ever-changing technologies. One area that may be particularly fruitful to explore here would be the intersemiotic realization of interpersonal meaning and the degree to which interpersonal meanings help to explain how alignment to a particular position shifts, develops, and deepens (or not).
6.2 Educational practice

In terms of educational implications, one of the most important findings concerns the discovery that digital divides seem less to do with access to hardware (until now the main focus of government policies) and more to do with differences in patterns of engagement. These patterns, it would seem, could at least partly be addressed by tutors and teachers having a better understanding of how discussion forums tend to work, and how they could work differently through different structuring techniques (by, for example, building in obligatory previewing and summarizing stages, or organizing specific threads which build fully elaborated argument genres which link to more abstract thesis/issue-related stages, etc.). Modeling the role of language in realizing stages and encouraging its use through specific activities and instruction would also be likely to have a positive impact on discussions. Developing students’ awareness of the graphological potential of electronic discussions would be similarly useful.

Interview data suggested that teachers and tutors are often unclear about their role in the new pedagogic forums and are unsure about how to intervene and to what extent. The following quote illustrates this:

I am sure there is a way that I could do this better and that’s, I am interested in finding out, I feel very new to it and very inexperienced about it and I feel as if I have been fumbling around in the dark with it.

Clearly there is much scope for professional development and reflective action research on the part of practitioners. In particular, encouraging teachers to use argument prompts judiciously and build on claims performed by students (particularly when other students fail to) is likely to have a positive impact. In addition, they could be encouraged to experiment with synthesizing stages and guide their students to do the same. This would seem to be an effective exploitation of what text-based discussion offers and which face-to-face discussion does not: an archive of claims and evidence, frozen in time. This, however, has to be balanced against the time demanded of those teaching in online spaces. One of the UG tutors made the following point:

8 In the United Kingdom, for example, the government’s Computers for Pupils and Home Access policies are designed to ensure the most disadvantaged students and families are provided with computers.
you can end up taking a lot of time and also the students, for example last year there was a student who . . . said that she was disappointed that she felt the tutor should be kind of giving guidance every Monday sort of thing and that is really unrealistic in terms of what we are being paid for. . . but if they over expect and I think that is one of the dangers of the E-system is that there kind of gets to be an expectation of a continual awareness which is you know quite a big thing really.

This quote shows in particular that research that unearths some of the most effective structures and patterns of exchange in online discussion forums could be invaluable in providing teachers (who have limited time) with a basis for how and when to intervene. It is for this reason that more fine-focused linguistic research of the type presented here is needed as a rigorous basis for maximizing the pedagogical potential of new technologies to ensure the best educational outcomes for all students and to work against the possibility of any digital divide.

References


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**Bionote**

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