Students' engagement in reflective tasks: an investigation of interactive and non-interactive discourse corpora

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Abstract

Reflective learning, a practice carrying relatively high educational value, has been with us for some time. Its popularity has grown to the extent that it is often adopted unquestioningly by educational practitioners. However, there are some important questions to be asked in relation to reflective practice. In reality, its impact on improved and enhanced learning and practice, and ultimately its educational value, cannot be known without further examination, research and consideration. This paper uses evidence from a range of spoken and written corpora to gain some insights into the discourse of reflectivity as it is used by students and educators. The data, collected in a third level educational context, involves students performing tasks widely believed to promote reflection. The spoken data comes from student teachers discussing practice language lessons and their general studies, and the written data comes in the form of student essays, online blogs and online discussions from student teachers, language students, and computer science multi-media gaming students. The corpora are firstly examined for engagement in reflection using levels of contribution and interactivity (quantitatively measured through word counts and utterance length). Secondly, comparative frequency lists are used to generate key lexical items (verbs, adverbs, adjectives, nouns) suggestive of reflective discourse. The analyses suggest that the amount and type of reflection is influenced by the discourse mode, the task, the participants and power dynamics. Ultimately, the objective of this paper is to take a first step towards suggesting a more tangible framework for examining the relatively elusive practice of reflection for educational purposes. In an attempt to do this, it raises some questions and generates further hypotheses for follow-up research investigation.

1. Introduction and context

Many have argued the merits of reflective practices and promoted its implementation in a range of ways across third level fields of study, most notably: teacher education, language learning, business studies, and health sciences (see, for example, Calderhead 1987; Beyer 1991; Schön 1991; Griffiths 2000; Alger 2006; Allard et al. 2007; Rhine and Bryant 2007). This paper examines higher education, where reflective learning means contemplating general or specific contexts, practices, scenarios, problems, or issues, directly or peripherally relevant to the discipline of study. The purpose of such deliberation is to solve problems or improve practices. Given that higher education in many contexts places a very high value on critical, independent and analytical thought, and promotes the inclusion of social and ethical dimensions in the process, it is unsurprising that reflective learning is commonly implemented. One can easily find many permutations of reflective models which involve the stages of problem identification, contemplation, investigation, analysis, and change implementation. Very often, as well as encouraging our students to apply such a process to discipline-specific problems to be solved, we also encourage them to progress to a metacognitive plane. We do this by asking them to think about how they actually moved through their initial reflections in an attempt to raise awareness of effective and non-effective techniques that might be applied to future endeavours. The complexity of such a

process can place high cognitive and emotional demands on students, and we would suggest that it needs to be approached with more consideration and caution than is often currently the case.

Strong arguments have been raised in relation to the implementation and effectiveness of some reflective modes of learning (Akbari 2007; Hobbs 2007). Such accounts, which are outlined in more detail below, compel educational researchers to ask some important questions in relation to reflection, among which the following are key: What are the real and tangible elements of reflection? What does it mean to reflect effectively? How can reflection be evaluated in terms of process and resulting application? In reality, its impact on improved and enhanced learning and practice, and ultimately its educational value, cannot be known without attempting to address these questions. This paper aims to raise these complex questions and attempts to begin to answer them using evidence from a range of discourse corpora. The data, collected in a third level educational context, involves students performing individual and collaborative tasks which have been designed specifically to promote reflection. It includes face-to-face and online discussions among student teachers, language students, and computer science multi-media gaming students. The corpora are examined for evidence of participation and reflection. Relative frequency lists reveal linguistic markers around key elements of reflection such as narration, evaluation, attitude and affective engagement. Ultimately, the objective is to take a step towards suggesting a more tangible framework for examining the relatively elusive practice of reflection for educational purposes. This paper treats the data more specifically in a quantitative way and at a generic level, and we acknowledge at the outset that much more needs to be done to address the issues around reflection in academia, some of which we aim to address in future publications from this on-going research.

2. Reflective practice in educational contexts

Reflective practice as a theoretical framework for development in professional contexts was formalised by Schön (1983), who targeted its suitability and use for teaching and learning in two of his later books (Schön 1987, 1991). Bartlett (1990), in particular, has attributed Dewey's work (1933) with having a strong influence in the form of some of his key principles such as: the importance of social context, an interest in and ownership of a problem to be resolved, the use of systematic procedures, observations, and experience, testing ideas through practice and the implementation of new courses of action. Not only is reflective practice presented as a tool for progression and improvement at a personal level, it has been suggested that many professions now require formal evidence of reflection and development for continued eligibility for membership (Schön 1991). More specifically, within teacher education, from which much of the data in this study emanates, it is described as the process whereby a student teacher learns more about teaching and learning through reflection and consideration of their own and other teachers' classes. This is a dynamic process where the 'teacher is actively reflecting and exploring' (Wajnryb 1992b, 9), therefore, student teachers learn through the construction of personal meaning, and through the constant reassessment of their thinking in varied situations. Novice teachers reflect on what they have experienced and then generate their previous knowledge to make informed decisions and subsequent changes to their own teaching. This is a voluntary process where the teacher's wish to reflect on his/her teaching must come from within. Autonomous learning is also connected to this as the teachers are responsible for and take control of their own learning (Wajnryb 1992a). Another aspect of reflective practice is that the teacher educator coaches the student

teacher or initiates peer coaching and this can be carried out through reflective journals, personal stories and group discussions (Ferraro 2000). Reflective practice can therefore be beneficial to student teachers in that they may gain a better understanding of their own and others' teaching, and also develop professionally through their reflections.

A number of underlying assumptions exist in the implementation of such a model in teaching. Richards and Lockhart (1996, 3-5) outline the five which they consider to be core in their approach:

- an informed teacher has an extensive knowledge base about teaching
- much can be learned about teaching through self-inquiry
- much of what happens in teaching is unknown to the teacher
- experience is sufficient as the basis for development
- critical reflection can trigger a deeper understanding of teaching.

Zeichner and Liston (1996, 47) present the five dimensions of reflection, which include: rapid reflection, repair, review, research, retheorizing and reformulating, and indeed these are not too far removed from models of action research, which have been presented as an alternative to traditional supervision of teaching (Bailey 2006, 333). These are all very elaborate models and frameworks, often suggested for use on the practicum of a teacher education programme. However, there are many other arenas in which reflection is promoted in a more general sense and without the strict implementation of any particular model, and these are some of the contexts from which the data in the present study grew. They often consist of strictly the reflective part of such frameworks, but systematic implementation of testing and action plans for the purposes of improved practice may not be integral to the process.

Inevitably, with the continuous growth and use of information and communication technology in all educational contexts, particularly at third level, research suggests that 'Multimedia holds potential to help teachers improve their practice by providing opportunities to reflect recursively and collaboratively on strategies useful in classroom discourse, and likely in many other areas' (Pryor and Bitter 2008, 2678). Such reflection and collaboration can then be used as a support system for student teachers at the early stages of their careers, and this is important because 'Beginning teachers, like other classroom instructors, work independently for most of the day and have little opportunity to converse and collaborate with other teachers in their building' (Romano 2008, 53). In light of this, Romano's study focuses on discussion fora used to enable further collaboration between teachers. This study, carried out on 10 first-year teachers, found levels of high and low interactivity during the online sessions, but despite the mixed levels of interactivity, it found that the teachers felt they were indeed benefiting from each others' discussions in that they were encouraging each other to reflect, and gaining advice from each other. The author therefore finds that 'online discussions have a potential for encouraging cognitive development during the initial year of teaching practice' (Romano 2008, 63). Another study on teacher education carried out by Arnold and Ducate (2006) used the community of inquiry model (Garrison, Anderson and Archer 2000) to evaluate discussion fora. Student teachers in this study participated in discussions aimed primarily at enhancing reflection. The results suggest that not only did students improve their understanding of various topics, but they also exercised social as well as cognitive presence in their discussions. Through questionnaire data, the study concluded that in 96% of cases, peers introduced each other to standpoints that would

not have previously been considered, thus broadening perspectives on various topics, and possibly signifying mentoring and scaffolding, and cognitive skills' development.

Some studies also conclude that computer mediated communication (CMC) is being increasingly used in teacher education for professional development because of 'the importance administrators place on the use of technology in today's classrooms' (Arnold et al. 2005, 538), and because it allows for reflection, higher-order thinking, support and mentoring. A study carried out by Arnold et al. (2005) investigated how online interactions can support community building and professional development. The research examined social activity within online discussions with the aim of highlighting social presence as an influencing factor in the development of cognitive thinking. The researchers propose that such interactions can also be of benefit to student teachers as they are a vehicle for encouragement, support, bonding, identity forming, as well as the possible integration of technologies into teaching. They point out that 'In no other field has CMC had the potential to enhance instruction so dramatically since communication is at the core of both FL instruction and CMC' (ibid, 542). Their study involved two courses on which they investigated how online interactions can assist student teachers. The first course under scrutiny, which is of relevance to this article, consisted of conversations through online reflective journal discussions between two groups of students. The students were not given specific topics, as they wanted to promote deep reflection, however, some questions geared at provoking reflection were offered. The results of this study demonstrated that there was a high degree of social presence through interactive devices such as encouraging and giving support and advice, through affective devices such as humour, and disclosing information, which enabled bonding and community forming, and finally, through cohesive devices, using first names, or phatic comments. Within this study, they found that the students did construct a social community, where they shared experiences and supported each other, which in turn enabled reflection on their roles as teachers (Arnold et al. 2005).

Online interactions have also been advocated for their potential to encourage reflective practice and peer mentoring in disciplines outside of traditional teacher education (Garrison, Anderson and Archer 2000; Kamhi-Stein 2000; Romano 2008; Schlager et al. 2009), and they have similar findings of social engagement, support, deeper thinking and reflection. One highly relevant thread in the research discussion is the relative benefit of different online modes. While it has been found that the asynchronicity of discussion fora and blogs promotes reflection (Putnam and Borko 2000; Tu 2002; Preece and Moloney-Krichmar 2003; McPherson and Nunes 2004), those who engage in the transitory nature of synchronous chat discussions do not accrue the same benefits (Lapadat 2002; Preece and Moloney-Krichmar 2003). This is unsurprising as chat discussions are held in real-time, are spontaneous, and therefore reflect the transient nature of speech. On the other hand, asynchronous discussion forum and blog postings may be more similar to the written medium, where members have time to think about what they are writing, allowing, and perhaps even promoting, more considered deliberations. All of these results are very interesting in light of recent critical accounts of reflective practices, which question the actual impact they have in terms of improved teaching and learning. The fact is that despite studies such as those just discussed, there is a very specific lack of research which has directly examined the link between effective teacher reflection and actual improvement in teaching and learning in classroom contexts (Griffiths 2000). Akbari (2007, 192), in particular, has strongly questioned the implementation of reflective practices in ways which lack critical dimensions and focus on retrospection. Such criticisms make

studies like the present one all the more imperative in helping us to understand the nature of what happens in student activities which have been specifically designed to promote reflection, and ultimately to evaluate their benefits. In itself, this preliminary research moves us to the second or third rung of the reflective practice ladder, by gathering, examining, and reflecting on data to give a basis for the development, testing, modification and improvement of task design and implementation in our own teaching practices.

3. The data

The discourse data used in this study were collected in a third level educational context, and include both written language and transcribed speech, stored as computerised databases. The corpora are collections of language from student-performed academic tasks, which were aimed explicitly at promoting reflection. Some of the data emanates from contexts where tasks are performed by students in conjunction with peers or tutors (the interactive corpus) and some where they work individually (we call this the non-interactive corpus). The interactive corpus contains approximately 115,900 words. It is made up of a spoken component of face-to-face interactions which includes the POTTI (Post-Observation Trainer Trainee Interactions) and Group Discussion sub-corpora, both set in a teacher education context. POTTI contains 82,000 words of dyadic teaching practice feedback between student teachers and supervisors. The Group Discussion corpus consists of 20,200 words of a peer mentor and student teachers discussing the general area of language teaching and pedagogy, collected from one cohort of students. The second part of the interactive corpus consists of online interactions in the form of Chat (7,500 words) and Discussion Forums (6,200 words), collected over a three-year period from cohorts of MA students, with the same peer mentor in each case. In these virtual environments, student teachers and a peer mentor interacted and discussions were themed around topics related to language teaching and pedagogy. All of the interactive data emanates from an MA in English Language Teaching programme.

The non-interactive corpus consists of approximately 96,000 words, and is made up of two sub-corpora, namely Blogs and Essays. The Blogs corpus includes 55,000 words, and derives from two contexts. Firstly, from students on the teacher education programme outlined above, who are using blogs as reflective diaries and shared these only with their peer mentor, who did not comment on them. The second set of data emanates from final year students on a BSc in Multimedia and Computer Games Development, who were asked to blog their reflections on the course, react to content and lectures, and offer additional ideas within the subject area. The Essays corpus consists of 41,000 words, and this data includes second-year Language and Technology students' language learning reflections. An overview of all data (211,900 words) used in this study is presented in Table 1 below (rounded to the nearest 100 words).

Table 1. Overview of corpus data for this study

Interactive (115,900 words)				**Non-interactive (96,000 words)**	
Face-to-Face		**Online**			
POTTI	***Group Discussion***	***Chat***	***Discussion Forum***	***Blogs***	***Essays***
82,000 words	20,200 words	7,500 words	6,200 words	55,000 words	41,000 words

One cohort of students	One cohort of students	Three cohorts of students	Three cohorts of students	One cohort of students	One cohort of students
MA Teacher Ed. Teaching Practice Feedback	MA Teacher Ed. Mentor – Student Teacher Discussions	MA Teacher Ed. Mentor – Student Teacher Chats	MA Teacher Ed. Mentor – Student Teacher Discussions	MA Teacher Ed. Student Teacher Reflections + BSc Gaming Learner Reflections[1]	BA Language Language Learning Reflections

4. Participation and interactivity in the interactive discourse

As a necessary and insightful precursor to the analysis of the linguistic data in the corpus collections, this section briefly illustrates and discusses levels of engagement in the various contexts under scrutiny. In the essay and blog tasks, students engaged by completing the tasks to the required contribution level, which was specified in advance either in numbers of words or blog postings required and, with the exception of the teacher education blogs, carried a percentage assessment value. None of the interactive contexts carried an assessment value per se, and so such extrinsic motivation for participating is not present, and indeed not all students from particular cohorts involved themselves. However, in line with social constructivist views of education (Vygotsky 1978; Wertsch 1990), a fair assumption is that those for whom reflection has been set as a task must engage linguistically in the associated activities in order to demonstrate that they are effectively partaking. In other words, as well as investigating the quality of contributions, one must logically establish that contribution actually takes place. This is especially important in contexts where more authoritative tutors and peer mentors also play a part. To this end the Face-to-Face and Online corpora were examined for participation levels per contributor and also for levels of interactivity. *Wordsmith Tools* (Scott 2004) provides the means by which statistical data can be generated, as well as allowing the data to be separated by speaker. Both of these functions were used in the generation of the results in the remainder of this section.

The results from POTTI, based on all 14 one to one feedback sessions, show that, in total, tutor talk accounts for 63.57% and student talk for 36.43%, with little deviation in individual interactions. This shows that, on average, tutors speak almost twice as much as students. This is in line with previous findings of such contexts (Farr 2011), and although it may be less than what one might hope for, it is not the only finding to consider in this respect. Measures of interactivity are also useful for describing the participatory nature of different registers. Csomay (2002), measures number of turns per 1,000 words of discourse and suggests that fewer than 10 turns per 1,000 words is lowly interactive and more than 25 turns per 1,000 words is highly interactive. Poos and Simpson (2002) propose a three-tier system of discourse modes: monologic, interactive, and mixed. The POTTI data, qualifies as being highly interactive, which is somewhat more encouraging and gives a more holistic picture of one party speaking more than the other but within highly dialogic interactions. It contains, in 82,000 words 5,776 turns, giving 70.45 turns per 1,000 words, almost

[1] The BSc Blog data was collected by Liam Murray, Lecturer, School of Languages, Literature, Culture and Communication, University of Limerick, and is used here with his permission.

three times in excess of the required 25 suggested by Csomay as an indictor of high interactivity.

Table 2. Participation in the Group Discussion Corpus

Participant	Contribution in words	Contribution in %	Turns	Average words per turn
Discussion 1				
Peer Mentor	2487	21.37	302	8.24
Student 1	1366	11.74	74	18.46
Student 2	1423	12.23	104	13.68
Student 3	1769	15.20	123	14.38
Student 4	1702	14.63	70	24.31
Student 5	2119	18.21	130	16.3
Student 6	544	4.66	39	13.95
Student 7	200	1.72	16	12.50
Unknown speaker	26	0.22	13	2
Totals	**11,636**		**871**	
Discussion 2				
Peer Mentor	1487	17.37	239	6.22
Student 1	1041	12.16	41	25.39
Student 2	1971	23.02	126	15.64
Student 4	1871	21.85	66	28.35
Student 5	1877	21.93	129	14.55
Student 7	314	3.67	29	10.83
Totals	**8,561**		**630**	

The results of the Group Discussion Corpus are presented in Table 2 (Students 3 and 6 did not participate in the second discussion). These results show a much more even distribution between the reflecting group of student teachers and the peer mentor, who is acting as facilitator in the group discussion. In the case of Students 2, 4 and 5 in Discussion 2, the amount of peer mentor talk is even surpassed. This may reflect the relatively general nature of the discussion in a more relaxed environment, which contrasts with the more formal, directive and evaluative nature of feedback on one specific episode of teaching in which the student has performed. There may also be a perceived difference in the authority of the Teaching Practice (TP) tutor, vis a vis a peer mentor. The peer mentor has no formal hierarchical relationship with the students and is not in a position to evaluate or to chastise, at least not with any institutional weight or power. Both of these factors would seem to be more conducive to higher levels of participation. On the other hand, focusing on the relative distribution of talk between the student participants shows that although five of them contribute more than 10% to Discussion 1, a reasonable amount given a number of eight contributors in total, two fall well below that mark, with one contributing just .22%, debatably not enough to provide evidence of elaborate reflection. However, in Discussion 2 most participants contribute more than 10%, except for one, who contributes less than 4%. The peer mentor also manages to have shorter turns than all of the other participants in both Discussion 1 and 2, highlighting the fact that she is managing to play the part of facilitator, prompter and encourager quite well. Again, this corpus has 74.85 turns per 1,000 words in Discussion 1 and 73.59 turns per 1,000 words in Discussion 2, very similar to POTTI, placing it on the highly interactive end of the scale.

Turning to the online modes, Table 3 presents the results for the chat interactions, differentiated by student cohort over the three year data collection period. Looking at peer mentor participation relatively across all three years we see approximately 20% participation in Years 1 and 3, but that more than doubles in Year 2. This may be attributed to the fact that in Year 2 only one student, Amanda (pseudonyms used throughout), is participating at what might be considered a reasonable level and the mentor has to work very hard at coaxing a more even distribution or perhaps in contributing personally to fill the gaps. In addition, the flow of conversation in online chatting may often be difficult to follow due to frequent overlapping, so it is possible that the peer mentor needed to proactively maintain the continuity of interaction. Looking at student contribution, bearing in mind that it is much easier to lurk in online environments, we see a range of participation levels from 1.08% to 36.01%. Interestingly, only in the cases of Butterfly and Monroe in Year 1, and Osaru in Year 3 does a student participate more than the peer mentor, which may again signal a certain degree of deference even to someone in the role of a peer mentor who is not in a position to evaluate in any formal sense. The peer mentors' turns are longer than 14 of the 21 participants, perhaps indicating the need to be more explicit in a setting where physical and visual cues to context are absent or the need to provide background or illustrative information on which discussions can develop. Interactivity is high at 67.37 turns per 1000 words in Year 1, 51.37 in Year 2, and 67.33 in Year 3.

Table 3. Participation in the Online Chat Corpus

Participant	**Contribution in words**	**Contribution in %**	**Turns**	**Average words per turn**
		Year 1		
Peer Mentor	471	19.12	32	14.72
Butterfly	887	36.01	65	13.65
Lostdog	172	6.98	16	10.75
Fatjack	432	17.54	26	16.62
Monroe	501	20.34	22	22.78
Totals	**2,463**		**161**	
		Year 2		
Peer Mentor	767	42.82	33	23.24
Amanda	324	18.09	12	27
Eileen	140	7.82	8	17.5
Kimwho	87	4.86	7	12.43
Witch	176	9.83	13	13.5
Guessgold	74	4.13	5	14.8
Coolness	70	3.91	6	11.66
Leon	153	8.54	8	19.13
Totals	**1,791**		**92**	
		Year 3		
Peer Mentor	710	21.93	52	13.65
Limerickladyee	289	8.93	11	26.27
Osaru	685	21.96	43	15.93
Pixie	215	6.64	19	11.32
Roadrunner	110	3.40	12	9.17
Mr.C	86	2.66	7	12.29
Batman	492	15.19	45	10.93
McKenna	419	12.94	13	32.23

AlexCross	98	3.03	7	14
Olivia	99	3.06	5	19.8
2o2	35	1.08	4	8.75
Totals	**3,238**		**218**	

In contrast, in the online discussion forums, interactivity is low at 8.22 turns per 1000 words in Year 1, 16.49 in Year 2 and 12.92 in Year 3. Table 4 also shows much lower levels of contribution by the peer mentor than when in chat mode, with much shorter turns relative to those of some of the students. It may be that those in online discussion mode benefit quite a lot in terms of having a forum in which they have time and space to fully express their reflections, but the difficulty may be ensuring fuller participation from all members, with one contributing as little as 1.88%. Then again, there are arguments to be made for the benefits reflecting on others' experiences as well as one's own, as well as for silent reflections as a first step in the process.

Table 4. Participation in the Online Discussion Forum Corpus

Participant	**Contribution in words**	**Contribution in %**	**Turns**	**Average words per turn**
		Year 1		
Peer Mentor	148	4.68	9	16.44
Butterfly	2041	64.59	6	340.17
Lostdog	221	6.99	3	73.67
Fatjack	537	16.99	4	134.25
Monroe	154	4.87	3	51.33
Jackie	59	1.88	1	59
Totals	**3,160**		**26**	
		Year 2		
Peer Mentor	315	30.55	9	35
Amanda	258	25.02	2	129
Eileen	93	9.02	2	47
Leon	282	27.35	3	94
Kimwho	83	8.05	1	83
Totals	**1031**		**17**	
		Year 3		
Peer Mentor	243	12.08	11	22.09
Pixie	222	11.03	3	74
Osaru	835	41.50	3	278.33
Limerickladyee	70	3.48	1	70
McKenna	341	16.95	3	114
Roadrunner	186	9.24	3	62
Scruff	115	5.72	2	58
Totals	**2,012**		**26**	

Overall, it seems that the participants (tutor versus peer mentor with students), the communicative function/purpose of the interaction (reflection on a specific event in a feedback context versus more general reflection) and the mode (face-to-face versus online, and chat versus discussion fora) are influencing factors in levels of participation and interactivity. We now move to the linguistic data to explore the qualitative nature of reflective activities.

5. Frequency list indicators of reflection

One of the more objective ways in which the nature of corpus-based collections of discourse can be explored is through the generation and interpretation of frequency lists. Such an approach can effectively give very strong clues about the communicative function and nature of specific contexts. For present purposes, the focus is on potential indicators of reflection in each of the corpora under review. Reflective discourse in teacher education typically displays episodes of elicitation (in situations with two or more participants), narration, evaluation, and affective engagement (Farr 2011), many of which are closely aligned with the semantic distinctions conveyed by stance markers (Biber et al. 1999, 972). To identify indicators of these categories, frequency lists were generated from each corpus individually and relevant items were extracted under four grammatical categories: verbs, adverbs, adjectives, and nouns. The top twenty most frequently occurring items in each corpus were used to form a combined top frequency item list in each case of 20-30 words.

5.1. Main verbs as indicators of reflection

Main verbs as markers of epistemic and attitudinal stance (Biber et al. 1999) are found frequently in the corpora under scrutiny. Table 5 illustrates relative frequencies per million words (all forms of the verbs, adverbs etc are counted on this and the following tables in this section). Looking at the totals, a pattern seems to be present, with interactive modes showing very high totals of between 25,000 and 33,000 occurrences, and the non-interactive written modes are lower at around 18,000. Several verbs are responsible for these differences including: think (used more as a hedge in spoken and online modes in *I think* structures), know (for the same reason using *you know*), want (skewed by POTTI in structures discussing planned future actions such as *I want to do x next time*), need (again skewed by POTTI in directive tutor statements like *you need to…*). On the other hand, individual words seem to be favoured in the different modes, for example, in the essays one can find relatively high numbers around words like *find* and *reflect*, whereas the discussion forums like better *believe* and *prefer*. And some words occur only in one of the modes, for example, *reflect* is only found explicitly in the blogs and essays.

Table 5. Main verbs across the corpora (words per million)

	Interactive				**Non-interactive**	
	Face-to-Face		**Online**			
	POTTI	***Group Discussion***	***Chat***	***Discussion Forum***	***Blogs***	***Essays***
THINK	8438	9030	8933	9483	4226	2302
KNOW	4804	6802	5332	1724	1733	1405
WANT	2768	1208	666	517	866	872
NEED	2487	704	1992	1551	993	824
FEEL	1926	1107	2533	1034	1282	2181
TRY	1890	957	1199	517	1661	654
LIKE	731	2216	2933	2931	1011	920
FIND	695	1914	2133	2068	577	2981
SEEM	609	100	1467	1378	1806	387
MEAN	573	553	1467	517	254	194

TEND	560	251	0	0	108	169
SUPPOSE	548	352	533	344	577	72
EXPECT	414	201	399	0	180	96
HELP	390	503	2267	517	599	2011
WONDER	207	50	133	344	288	0
HOPE	109	100	399	0	307	266
BELIEVE	97	403	266	1207	451	387
ENJOY	97	352	0	172	361	387
PREFER	73	150	133	689	270	72
WISH	48	50	399	0	234	121
TRUST	24	201	0	0	36	0
LOVE	12	957	133	0	397	72
REFLECT	0	0	0	0	180	1236
Totals	**27,500**	**28,161**	**33,317**	**24,993**	**18,397**	**17,609**

Overall, Table 5 illustrates many verbs suggestive of cognitive processing and degrees of knowledge (*think* and *know*, *reflect*, *wonder, expect*), some of which signal hedging (*I think*) and vague language (*you know*) (Channell 1994). Some modes involve engagement with other parties, thereby increasing the need to attend to face wants and needs (see also *mean*, which is common in the structure *I mean* in these corpora). Also present are more emotive verbs like *feel*, *want*, *love, wish, enjoy*, *prefer, hope,* pointing towards more affective engagement and displays of attitude. Evaluation is suggested by items such as *like, need, try, prefer,* and *help*.

5.2. Adverbs as indicators of reflection

Table 6 presents a number of adverbs extracted from the data and which signal the reflective nature of the discourses. A number of adverbs such as *very, kind of, sort of, quite, pretty,* and *really* are strongly suggestive of evaluating a particular context, theory or learning experience, and evaluation is a strong component of the critical phase of reflection. Others like *actually, definitely, especially, probably, perhaps, certainly,* and *simply* indicate speaker attitude and stance, and again the expression of personal opinion is highly valued in reflection. A number of items also have the potential to be used as vague language markers and hedges, and in line with our discussions in the previous section, are more frequently found in the spoken data, for example, *kind of, bit, like,* and *sort of.*

Examining the data contrastively, some trends emerge. The first and most obvious from the discrepancies in the overall totals is the higher usage of these types of adverbs in face-to-face modes. Seven items in particular account for this: *kind of, bit, like, maybe, sort of, probably* (again, all carrying hedging functions), *actually* (to indicate counter opinions or change of opinion) and *necessarily* (frequent in the expression *it isn't necessarily the case*). On the other hand *pretty, extremely, particularly,* and *highly* are more prominent in the written and discussion forum modes.

Table 6. Adverbs across the corpora (words per million)

	Interactive				**Non-interactive**	
	Face-to-Face		**Online**			
	POTTI	***Group Discussion***	***Chat***	***Discussion Forum***	***Blogs***	***Essays***

VERY	4194	2418	2666	4137	1408	3441
BIT	2499	1259	266	344	1011	266
ACTUALLY	2438	1008	1199	172	596	363
MAYBE	2024	1360	799	344	451	242
REALLY	1902	2922	1333	1034	1679	1769
KIND OF	1694	5543	0	0	54	0
LIKE	1463	3981	399	172	0	0
SORT OF	1231	806	133	0	18	24
PROBABLY	1085	1259	266	344	487	121
QUITE	1060	755	933	689	1210	1284
EXACTLY	914	352	799	172	198	121
DEFINITELY	475	504	133	172	433	266
PERHAPS	438	0	133	344	325	169
OBVIOUSLY	353	50	133	0	54	121
CERTAINLY	268	100	0	344	216	242
SIMPLY	231	0	266	689	162	169
SLIGHTLY	231	0	0	0	36	121
COMPLETELY	219	251	133	172	126	218
IN FACT	219	50	0	0	216	121
NECESSARILY	219	50	0	0	36	96
PARTICULARLY	207	0	0	344	90	290
ESPECIALLY	97	453	0	689	198	508
PRETTY	97	100	0	689	487	24
EASILY	73	0	0	0	126	169
EXTREMELY	0	0	0	0	90	315
HIGHLY	0	0	133	344	126	72
Totals	**23,631**	**23,221**	**9,724**	**11,195**	**9,833**	**10,532**

5.3. Adjectives as indicators of reflection

Adjectives are usually indicative of stance and evaluation and there is good reason to believe that this is the case in the academic corpora under review here. The totals found in Table 7 indicate that online modes seem to be especially conducive to using adjectives to comment on what is being said or indeed to evaluate something that might have happened. A number of specific items contribute largely to the relatively higher totals of the online modes: *good, better, important, interesting, positive, useful, easier* and *true*. Many of these items suggest positive evaluation, which is perhaps indicative of the formation of a community of learners who boost each other in supportive ways. A number of the adjective items can also function as engaged listenership and response tokens (for example, *sure, right, fine*) but these instances were not included in the counts presented here. The words *best* and *useful* are found relatively more often in the Essays corpus, and may indicate a more considered account of a number of relevant events or materials.

Table 7. Adjectives across the corpora (words per million)

	Interactive				**Non-interactive**	
	Face-to-Face		**Online**			
	POTTI	***Group Discussion***	***Chat***	***Discussion Forum***	***Blogs***	***Essays***
GOOD	1804	1562	4133	3965	2311	872
SURE	1304	201	933	1034	559	145
DIFFICULT	743	806	1066	533	361	848

BETTER	756	596	1599	0	722	387
RIGHT	719	654	266	172	361	96
FINE	646	403	133	0	54	0
IMPORTANT	585	251	1599	1422	451	727
NICE	499	150	266	0	451	96
INTERESTING	438	1008	799	2667	1011	1114
HAPPY	390	100	0	0	1307	72
EASY	378	352	133	17	216	630
WRONG	268	604	0	533	198	121
NERVOUS	231	251	133	0	54	48
HARD	207	957	666	172	288	145
POSITIVE	207	150	799	355	126	266
BEST	195	251	133	533	361	1090
CHALLENGING	195	352	0	0	18	96
RELAXED	195	100	0	172	36	72
BAD	170	403	133	172	433	48
USEFUL	170	352	799	1034	144	1551
NEGATIVE	170	50	266	172	234	242
EASIER	158	201	533	172	144	266
GREAT	146	201	666	711	866	678
TRUE	121	100	799	533	162	193
EFFECTIVE	97	0	133	172	18	436
BENEFICIAL	85	0	266	0	72	533
Totals	**10,877**	**9,920**	**16,253**	**14,541**	**10,958**	**10,772**

5.4. Nouns as indicators of reflection

While it is perhaps more difficult to equate reflection with the use of specific nouns, the data in Table 8 does display some trends, which, if combined with the results for the previous three sections, give a more holistic picture of the type of generic fingerprint created in these corpora.

Table 8. Nouns across the corpora (words per million)

	Interactive				**Non-interactive**	
	Face-to-Face		**Online**			
	POTTI	***Group Discussion***	***Chat***	***Discussion Forum***	***Blogs***	***Essays***
PROBLEM	999	1058	1467	1207	307	557
FACT	402	150	266	861	505	654
DIFFICULTY	195	100	133	0	108	290
PRESSURE	134	302	0	172	90	72
EFFORT	182	0	133	0	90	266
MISTAKE	121	150	266	172	216	315
POSSIBILITY	121	150	133	355	90	193
NEED	121	100	0	533	198	169
FUN	12	352	533	0	451	48
TROUBLE	60	0	0	172	0	24
ENJOYMENT	48	0	0	0	90	24
FEAR	0	201	133	172	18	96
NERVE	48	0	0	0	54	0
CHALLENGE	36	0	0	0	72	48
DANGER	36	0	0	0	90	24
ADVANTAGE	24	0	133	0	18	751

BENEFIT	0	100	0	355	144	605
REFLECTION	24	0	0	0	54	508
DISADVANTAGE	0	0	0	0	36	387
POWER	0	0	133	0	252	24
DOUBT	24	50	133	172	162	121
IMPORTANCE	0	0	0	0	36	266
Totals	**2,587**	**2, 713**	**3,463**	**4,171**	**3,081**	**5,442**

As expected, the Essays corpus contains a relatively higher occurrence of these items and this is characteristic of more formal academic writing, which also tends to be lexically denser. It contains higher numbers of some general nouns, or what have been termed by some as discourse organising words (*difficulty, effort, advantage, benefit, reflection, disadvantage, importance*). The notion of lexical density is also strongly suggested by the fact that the written modes (Essays, Blogs, Discussion Fora and Chat), have higher frequencies of nouns overall, while the spoken modes have somewhat lower frequencies. This is unsurprising as written modes of discourse carry more lexically dense information as writers have time to think, and indeed reflect upon their writing, while speech is more spontaneous and fluid. One interesting trend in the data is the use of words like *possibility*, *trouble*, and *doubt* being higher in the discussion forum data. Perhaps this mode induces more emotional and personal disclosure as it is more self-reflective and not open to sharing or for public consumption.

Furthermore, the nouns appear to be more negative than positive overall. Words such as *problem, difficulty*, *pressure, mistake, trouble, fear, nerve, challenge, danger, disadvantage* and *doubt* account for 10,800 words in total, while the more positive nouns such as *fun, enjoyment, advantage* and *benefit* account for 3,688 words. On closer examination, it emerges that POTTI contains the least amount of positive nouns, while the Essays corpus displays the most. This may be due to the contexts from which the data emanate, and while the essays come from students who are focussing on both advantages and disadvantages of certain tools to further their learning, POTTI stems from student teachers who are reflecting on their teaching, and their tutors providing collaborative feedback. As these are novice teachers, and the context is one of critical reflection, they may be focussing more on their negative teaching practice experiences and areas in need of improvement the next time round. Finally, the noun *reflection* only occurs within the POTTI, Blogs and Essays corpora, possibly due to the fact that the notion of reflection was both implicitly and explicitly presented to students within these settings. This is not to suggest that the participants in the other corpora are not reflecting, but that this activity is merely happening without them actively talking about it or naming it.

6. Closing Comments

This paper, through semi-automatic quantitative extraction methods, has identified the level of participation and interactivity in a number of academic corpora derived from contexts where students are performing reflective tasks, as designed by their lecturers. The relative frequencies of specific items which have the potential to indicate the presence of reflection, evaluation and stance were extracted according to the word classes of verb, adverb, adjective and noun, and some interesting comparisons were drawn and hypotheses formulated. These hypotheses need to be further investigated in more detailed qualitative analyses to get a fuller understanding of the quality of the reflection in which students are engaged. Nonetheless, there is some evidence that

fingerprints of reflective genres are present. If we total the results per genre from each of the sections above we get the following number of items which strongly suggest that reflection is taking place (per million words):

- POTTI (64,595)
- Group Discussion (64,015)
- Chat (62,757)
- Discussion Forum (54,900)
- Blogs (42,319)
- Essays (44,355)

These results must be interpreted in conjunction with participation levels and in light of the fact that some environments are scaffolded, some are cooperative and some are pure individual reflection. We would like to return to the questions we posed at the beginning of this paper: What are the real and tangible elements of reflection? What does it mean to reflect effectively? How can reflection be evaluated in terms of process and resulting application? We have begun to answer the first question by examining the data in a quantitative way and we have found evidence of varying levels of participation and of reflection, but the quality of the reflection needs further investigation to begin to address the second question. To address the final question, we needed a different methodology and timeframe and we are currently working towards collecting and analysing data which will bring us in that direction.

Our analyses in this study confirm that the different modes contain evidence of reflection, albeit to varying degrees, and further qualitative exploitation of the corpora will unveil more comprehensive findings. What we don't know from our analyses is whether the language which would seem to evidence reflection is an indicator of good, critical reflection, or if it simply indicates that the students have become part of a discourse community and have linguistically mastered this genre. In other words, are they actually doing good reflection, or do they just know how to talk the talk of reflection. This is a very difficult question to answer but it is an important one in light of the fact that many of these reflective instruments are formally assessed and carry credit. We are not, at this stage, in a position to offer any counter evidence to Akbari's (2007) objection that reflective practices lack critical dimensions and focus on retrospection. A related question, which is perhaps as important and still needs to be answered, is what criteria educators should be using to measure critical reflection in assignments they set. What we do know from our analyses is that students are engaging in these tasks, they are sharing, they are venting, and they are supporting. All of this is happening in different ways; collaboratively and individually, and through written, spoken and online modes. It seems that the different fora seem to promote different levels of interaction, from the more formal unshared written essay or blog, to the occasional moan to friends and peers in online chat. This suggests that using a variety of tasks and modes will result in a more rounded reflective experience for the participants, and will allow them to play to their strengths, whether that occurs privately, or in the company of their peers, mentors, or lecturers.

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