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Can eLearning Promote Higher-order Learning Without Tutor Overload?

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ABSTRACT *While numerous claims have been made for the pedagogical benefits of eLearning, these claims are rarely subjected to rigorous empirical evaluation. Moreover, there are indications that eLearning is more expensive to deliver than conventional distance teaching. One component of this extra cost arises from the greater time input required of teachers/tutors in eLearning environments. This article evaluates a number of online pedagogical techniques which offer the potential to enhance student learning of higher-order cognitive skills while limiting demands on tutor time. The online techniques tested were resources/debates and peer-tutoring. Evaluation of the learning of higher-order skills was carried out through analysis of students' contributions to a series of online discussions. This evaluation suggests that, given the appropriate pedagogical design, students can develop effective ways of conducting online discussions which display evidence of engaging in higher-order learning. In addition, the online pedagogical techniques did not appear to make excessive demands on tutor time. However, further work is required before a more definitive statement can be made about the potential of eLearning to enhance higher-order learning with reasonable levels of tutor input. The conclusions of the article will include an outline of the directions of this further work.*

1. Pedagogy and eLearning

A review of the literature on eLearning could create the impression that the application of eLearning will *ipso facto* improve course quality and reduce cost. The pedagogical advantages claimed for eLearning include interactivity, reflectivity and collaborative learning. CMC (Computer Mediated Communication) is potentially an interactive medium but interactivity requires the active participation of the students (and tutors) which in turn is the outcome of appropriate pedagogical design. Because of its asynchronous nature, online learning is considered to promote reflectivity (see Jonassen, 1996, p. 178)—however, it cannot be assumed that reflection has taken place until a student responds, and there is no way of knowing *a priori* when (or even if) the response will occur. One way to improve the probability of a response occurring is to build mandatory response into the pedagogical design. With regard to collaborative learning, Koschmann (1996) argues that Computer Supported Collaborative Learning (CSCL) is a new paradigm in the use of computers for learning. However, a number of questions arise about when collaborative

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learning is appropriate, what distinguishes productive from unproductive collaborative learning and are there subject domains which particularly suit CSCL? From the above, it is evident that the pedagogical advantages of online teaching and learning are not necessarily inherent and, as stated by Romiszowski and Ravitz (1997, p. 752), few claims for such advantages are 'grounded in systematic, rigorous inquiry'. Rather, the pedagogical advantages of online learning are dependent on how it is implemented, in other words, the pedagogical approach.

2. Tutor Time in eLearning Environments and Pedagogical Approaches

It is widely reported that tutors frequently spend more time online (and off-line in preparation) than they would have spent tutoring the same course content in face-to-face situations (see Romiszowski & Ravitz, 1997, p. 749). According to Rumble, 'The biggest and I suggest least costed ingredient in the costs of online learning is the cost of supporting learners online.' (Rumble, 1999, p. 4). In distance education programmes, which rely on part-time adjunct tutors, it would seem that this extra workload is frequently not remunerated (Ash & Bacsich, 2001, p. 32). If this is the case then the long-term sustainability of eLearning courses is brought into question. Any extra payments to compensate tutors for their increased work could undermine the financial viability of eLearning programmes, especially where programmes are funded largely through fee income.

Another approach would be to devise forms of online support which minimise tutor involvement. For example, Goodyear describes an eLearning approach which he termed 'electronic seminars'. In this approach, students posted synopses of set readings to a computer conference and engaged in online discussion of the synopses with their fellow students over a three-week period. The tutor's primary role was in the initial structuring of the activity and thereafter monitoring the online discussion. According to Goodyear, this approach was 'highly cost effective in staff time' (Goodyear, 1995/1996, p. 91)

Of course, many pedagogical approaches can be used in online learning. For example, Kaye (1991, pp. 6–11) describes seven techniques while Paulsen describes eleven 'many-to-many' techniques in which 'all participants have an opportunity to take part in the interaction' (Paulsen, 1995, p. 26). These include debates; simulations or games; role plays; case studies; discussion groups; transcript based assignments; brainstorming; Delphi techniques; nominal group techniques; forums; and projects. We will return shortly to the topic of online pedagogical techniques and, in particular, which ones offer the possibility of requiring reasonable tutor input. However, before doing so, we will look at the other main issue to be addressed in this research which is the teaching and learning of higher-order cognitive skills.

3. Teaching and Learning of Higher-Order Cognitive Skills

While it is generally agreed that higher education should develop higher-order cognitive skills such as critical thinking and deep understanding, there are differences in emphasis as to how best students can actually develop these skills. While

most researchers would seem to emphasise problem solving as the key strategy, Ohlsson has pointed out that some cognitive researchers have insisted that human beings demonstrate their understanding in the generation of symbols. In particular, he claims, there is a connection between abstract knowledge (which he views as the basis of a deep understanding) and discourse. In producing discourse, Ohlsson (1995, p. 51) claims that individuals carry out a series of what he calls epistemic tasks: describing; explaining; predicting; arguing; critiquing/evaluating and defining.

One interesting aspect of Ohlsson's epistemic tasks is that they seem to be very similar to the processes identified by a number of researchers in online and collaborative learning (see Crook, 1994; Salmon, 1998; Dillenbourg, 1999). Salmon's list of characteristics of cognitive thinking articulated through online messages include offering ideas or resources; inviting critique; asking challenging questions; articulating, explaining and supporting positions on issues; exploring and supporting issues by adding explanations and examples; reflecting and re-evaluating personal positions; critiquing, challenging, discussing and expanding ideas of others; negotiating interpretations, definitions and meanings; summarising and modelling previous contributions; proposing actions based on developed ideas (Salmon, 1998, pp. 6–7). We will return to these later in this article.

Dillenbourg postulates a set of learning processes that can be stimulated in collaborative learning situations (although he acknowledges that most can also operate at the level of individual cognition). These processes include: induction (where pairs or groups draw more abstract representations of the problems or ways-of-seeing so as to integrate what is common); sharing cognitive load (where group members share a task so as to avoid redundancy and optimise effort); self-explanations (where an explanation given by one group member can lead to learning gains by both the group members hearing the explanation and the group member giving it); conflict (where diverging viewpoints lead to attempts to reach agreement); internalisation (where on-going discussion leads to the progressive integration of ideas); grounding (where ideas become part of the common ground of understanding); appropriation (where a person re-interprets their own beliefs in the light of what the other group member(s) says or does after hearing them); mutual regulation (where group members justify their actions to each other) (Dillenbourg, 1999, pp. 14–16).

The categories produced by Ohlsson, Salmon and Dillenbourg describe discursive processes that are familiar to anyone involved in teaching and learning, particularly in the social sciences and the humanities. To be more precise, if students engage online in the type of processes described by Ohlsson, Salmon and Dillenbourg, then it is reasonable to infer that they are engaged in higher-order learning. The question therefore arises as to how to encourage online students to engage in these processes or, to put this another way, which pedagogical techniques facilitate students' engagement with these processes. Putting this question along with the issue (discussed above) of tutor time in eLearning environments leads us to the central question of our research project: Are there online pedagogical techniques/methods which minimise demands on tutor time and simultaneously promote the learning of

higher-order cognitive skills? The pedagogical methods which we decided to investigate will be discussed in the next section.

4. Which Online Pedagogical Techniques?

The pedagogical techniques we chose to investigate were influenced by Goodyear's 'electronic seminars' described above. We also found Harasim's description of peer learning groups (Harasim, 1991) to be worth investigating especially as Romiszowski and Ravitz have cited the potential of extending and enhancing peer learning groups as a strategy to overcome the problem of scalability in the use of online learning (Romiszowski & Ravitz, 1997).

From these considerations, two pedagogical techniques were chosen for investigation. The first method, which we termed Online Resources/Debates, gave students some initial experience in locating and evaluating online resources and then set up (deliberately controversial) topics for debate to which students were asked to respond. Even though we use the word debate, it was not envisaged as a debate in the strict sense (as described by Paulsen, 1995, pp. 26–27) where students would be asked to defend or oppose a particular argument. Rather it is closer to a critique discussion group (Paulsen, 1995, p. 33) where students were asked to identify the strengths and weaknesses of an argument and engage in discussion with their fellow students. For the second technique, termed Peer Tutoring, students were assigned an article relevant to a particular topic covered in the module (each student being assigned a different article). They were asked to synopsise the article, place the synopsis online and finish the synopsis with key points or questions, then over the ensuing period answer queries from and engage in discussion with fellow students on the content of the articles.

5. Pedagogical Design

The course selected for testing the online pedagogical techniques was a section of a module in Developmental and Educational Psychology. This is a module in a conventional distance education undergraduate Bachelor of Arts programme supported by Oscail, the National Distance Education Centre in Ireland.

The reason for choosing a module in psychology arises from the nature of the discipline. As Neumann has noted 'hard disciplines … emphasise cognitive goals such as learning facts, principles and concepts. Soft areas place greater importance on … effective thinking skills such as critical thinking' (Neumann, 2001, p. 138) [1]. Braxton agrees with this view and goes on to state that 'Consistent with their stress on effective thinking as the goal of the academic major, faculty in soft fields also tend to favor a more 'discursive' approach to their classroom teaching than do their counterparts in hard fields' (Braxton, 1995, p. 60). It was this favouring of a discursive approach, and the link between this approach and Ohlsson's epistemic tasks that led us to locate this research in the 'soft' discipline of psychology.

The section of the module in Developmental and Educational Psychology, in which the research was located, lasts approximately ten weeks. The whole module

is worth 15 ECTS credits and the section under study accounts for a quarter of these credits. The section covers topics such as the child in the family, bonding and attachment in infancy; children in daycare; children's social development; adolescents in their peer groups; and adult development. The section is assessed by an assignment, which students complete at the end of the section. When students enrol for the Developmental and Educational Psychology module, they receive a specially written distance education course text. In addition, there are two mandatory textbooks. The textbook for the Developmental Psychology part of the module (Santrock, 2001) is published by McGrawHill Companies Inc and is supported by a series of online resources including a Virtual Learning Environment called Page-Out (http://www.pageout.net). Following evaluation, it was decided to use this facility to host the online discussions element of the project.

Of the 83 students registered for the module 25 volunteered to participate in the online version of the course. They were divided into two groups—12 were allocated to the Online Resources/Debate group and 13 were allocated to the Peer-Tutoring group. All students (including those who did not volunteer) were asked to keep a learning log of their study activities in this section of the module. Also, at the end of the study period, all students were asked to write a 500 word reflection on their learning experience of this part of the module. This learning log and reflection formed part of the assignment.

6. Online Course Activities

The students in the Online Resources/Debates group started by choosing a topic from the course content and exploring the web resources available on this topic. (Guidance was given on how to locate web resources starting with web resources identified on McGrawHill's Developmental *Supersite*, http://www.mhhe.com/developmental.) They then reported back to the discussion area on the quality of information in terms of academic merit, practical application and credentials of host organisation. In the second stage, the tutor posted a series of statements for debate and the students (using web-based and other resources) engaged in discussion with their fellow students on the statements.

In the Peer-Tutoring group, each student was allocated one article covering a topic relevant to this section of the module. Students synopsised their article and posted their synopsis online, finishing with key points and questions arising from the article. Students read the synopses posted by the other students; posted questions/comments to the students who made the synopsis and followed up online discussion where appropriate.

Students were asked to make a minimum of four contributions per week. For both groups, the critical work (engaging in the online debates or peer-tutoring) took place over four weeks. In the final weeks students in both groups prepared their assignment.

7. Participation

As can be seen from Table 1 four students in the Online Resources/Debates group

TABLE 1. Participation Rates

	Resources/Debates	Peer Tutoring
Students allocated	12	13
Students participating	8	6
Av. number of contributions/student	6.6	4.8
Assignment returned	11	8
Evaluation questionnaire returned	9	5

and seven students in the Peer-Tutoring group did not participate even to the extent of posting an online introduction to the Discussion Area. Four out of the eleven non-participants could not be contacted by phone for follow-up discussion (three from the Online Resources/Debates Group and one from the Peer-Tutoring Group). Of the remaining seven, one said that she did not participate due to technical problems while the other six gave reasons such as work pressures or family commitments as their reasons for not participating. However, five of these six students contacted had experienced technical problems which may have contributed to their non-participation.

The different participation rate between the Online Resources/Debates Group and the Peer-Tutoring Group (75% as against 46% respectively) may be explained by the fact that students in the Peer-Tutoring Group had to 'pay a high entry price' to participate, i.e., they had to produce a synopsis while the 'entry price' for the Online Resources/Debates Group was lower (reviewing a number of websites). Aside from the participation rate, the level of online contribution of those students who did participate was below expectation. We had asked students to make a minimum of four online contributions per week during the four key weeks. However, as can be seen in Table 1, the actual average number of contributions per student over the four key weeks was 6.6 and 4.8 for the Online Resources/Debates Group and the Peer-Tutoring Group respectively. It is likely that the primary reason was that the online contributions did not form part of the student assessment. This issue will be returned to below.

8. Tutor Time

As mentioned above, the amount of time devoted to online tutoring was an important subject of investigation. Both tutors logged their time on the project, with tasks divided into two categories: development tasks and online tutoring tasks. It should be noted that in addition there was a design phase involving the course designers and subject matter expert which has not been factored into tutor time.

The development phase for the Peer-Tutoring Group tutor took 17.5 hours and the online tutoring took 9 hours. The development phase included setting up the website; registering all the students online; writing and editing both the Instructional

Schedule and the Guide to Using PageOut; sending the starter email to all students and following up with students who had difficulty accessing email. The tasks of the online tutoring phase included setting up the online conferences/threads; making announcements; reading student contributions (including their synopses) and making online contributions. During the main phase of the project (weeks 3 to 6 inclusive) the tutor made 18 contributions. The latter were mainly attempts to clarify student contributions and stimulate discussion.

The development phase for the Online Resources/Debates Group tutor took 11 hours and the online tutoring took 5.5 hours. The development phase included setting up the website; editing the Instructional Schedule and Guide to using PageOut; choosing the articles for the Peer-Tutoring Group and choosing the debate topics for Online Resources/Debates Group. The tasks of the online tutoring phase included setting up the online conferences/threads; posting the topics for debate; making announcements; reading student contributions and making online contributions. During the main phase of the project (weeks 3 to 6 inclusive) the tutor made 9 contributions. The latter were mainly attempts to summarise, move on and sometimes close the online discussion.

This division between developmental and tutoring tasks is important for distance teaching institutions as the developmental tasks can be carried out by the distance teaching institution leaving only the tutoring tasks to be carried out by the tutors. Both the Online Resources/Debates Group and the Peer-Tutoring Group tutors were of the opinion that the time they spent on their tutoring tasks was appropriate (indeed the Peer-Tutoring Group tutor was of the opinion that a more judicious choice of article for synopsis could have reduced the time required).

In comparing the time the two tutors spent on tutoring tasks (14.5 hours—average 7.25 hours) with the time spent by tutors providing support to students on the standard distance taught section of the module, it appears that there was little difference in the time spent by the online tutors and those who tutored the same section of the module face-to-face. Normally students would receive four hours of face-to-face tuition for this section of the module. In addition tutors would also spend time preparing for the tutorials; travelling to tutorials; answering phone calls and emails; and keeping records and writing tutorial reports. So, overall, the tutoring time spent by the tutors working in the eLearning environment compares favourably with the time spent by the tutors in the conventional distance education format. However, one difference (which may have important consequences) is that the time distance education tutors spend outside of tutorials is a somewhat 'hidden' quantity and is usually not directly remunerated, whereas time spent online is highly visible.

9. Evaluation of Higher-Order Cognitive Skills

Students' contributions to the discussion forum were analysed to investigate whether there was evidence of the students engaging in higher-order learning. The problem of which 'unit of analysis' to use for online contributions has been of some concern to content analysts. Some have used the message as the unit of analysis (Ahern *et al.*, 1992), Henri proposed that the unit of analysis would be a 'unit of meaning' (Henri,

1992), Howell-Richardson and Mellar proposed a communication unit of the illocutionary act based on Speech Act theory (Howell-Richardson & Mellar, 1996) and Hara and her colleagues proposed the paragraph within each message, albeit not strictly as written by the student (Hara *et al.*, 2000).

In analysing the contributions, we used both the message and the 'unit of meaning' within messages as our 'unit of analysis'. Salmon's characteristics of cognitive thinking were modified to produce 16 categories—these categories are listed in Table 2 illustrated with examples of students' contributions. Operationally, we defined the 'unit of meaning' as any instance of the categories given in Table 2, in this way there could be more than one instance of the categories within each message. While the categories are, by and large, self-explanatory, attention should be drawn to how certain categories were treated. Making Declarative Statements was coded when an opinion was explicitly stated; if a supporting argument was made for the opinion then Supporting Positions on Issues was coded and if the argument was further elucidated and explained then Articulating and Explaining was coded. In this way, these three categories (along with adding examples) functioned as a measure of a move from surface to in-depth argumentation on the student's behalf. In the first instance, the two coders reviewed each message for the presence of each of the Salmon-derived categories and calculated the number of instances of each of the categories in each message. There was a high level of agreement between the raters for the presence of a category.

Table 3 compares the two pedagogical approaches used in Online Resources/Debates Group and Peer-Tutoring Group in terms of presence of cognitive characteristics. It should be stressed that only the messages made in the core 'task-oriented' conferences were analysed i.e., in the Online Resources/Debates Group only the contributions made by students in response to the four debate topics and in the Peer-Tutoring Group only the contributions made by students in response to the articles which were synopsised.

There are at least two interpretations of the results presented in Table 3. On the one hand, if the assessment imperative is as pervasive as a number of authors believe (e.g., Jones, 1999), then it is heartening to see that students were not only willing to make a substantial number of contributions which demonstrated a reasonably high level of cognitive skill but also to do so without the 'carrot/stick' of being assessed. On the other hand, with some exceptions, those categories which would usually be designated on the lower end of the higher cognitive skills (such as Offering Resources and Making Declarative Statements) were scoring highest. Higher cognitive skills (such as Re-evaluating Personal Positions and Proposing Actions Based on Developed Positions) scored lowest. Whichever view one takes, one indisputable conclusion is that the debate/resources approach was more successful in generating evidence of higher-order cognitive skills than the peer tutoring approach. Some possible reasons will be discussed below.

10. Conclusion

This article has reported on the outcomes of the initial phase of a research

TABLE 2. Categorisation and examples of characteristics of cognitive skill

Characteristic of cognitive skill	Example from online contributions in PICTURE project
Offering resources	'Attachment theorists regard the findings of the Strange Situation to be an indicator of the mother-child relationship and that 'this relationship is a major determinant of later social and emotional adjustment'(Gleitman, p. 538).' Topic 1, Online Resources/Debates
Making declarative statements	'As regards punishing the parents, in America parents are put away because of their kids' behaviour but I think that would be too drastic a step to take. Parents need to be educated about bullying as well as kids.' Topic 2, Online Resources/Debates
Supporting positions on issues	'I would have to say that I like Vygotsky's theory in relation to cognitive development in children. If we compare it with Piaget's, for Piaget the cognitive development is one of internalisation i.e., cognitive processes are created internally and it is only subsequently that this construction has external outcomes which modify the child's relationship with his or her familiars and environment, whereas the Vygotsky theory was based on a concept of outside-in: externalisation.' Topic 3, Online Resources/Debates
Adding examples	'An earlier study in 1990 of 200 eight and nine year olds in the US found that children who had been in 'non-maternal' care for more than 30 hours per week from their first year until they went to school, were rated lowest in conduct by their teachers, and rated less compliant by mothers and teachers alike, and were less well liked by their peers. The other point Belsky makes is that the mother is the best attachment figure for the child. He states that other carers simply don't stay the course. This is not what working mothers outside the home want to hear!' Topic 1, Online Resources/Debates
Articulating and explaining	'An interesting article 'Relational and Overt Forms for Peer Victimization: A Multiformat Approach' by N Crick and M Gigbee. It states that boys and girls are cruel to each other in different ways—but effects are equally harmful. The study states that the majority of past studies on peer victimization have focused on boys and physical aggression. It states that more recent research looks at girls, and relational aggression (i.e., exclusion from one's social group or badmouthing her to her peers). This results in social anxiety, distress, loneliness and more submissive behaviour for the victim … The report states that these insights can be invaluable in studying children's mental health problems.' Topic 2, Online Resources/Debates
Asking questions	'Why do you think, whether or not the infant approaches or withdraws from something novel is an indicator of temperament? Couldn't it be attributed to conditioning or other factors also?' Article 5, Peer-Tutoring

TABLE 2—*continued*

Characteristic of cognitive skill	Example from online contributions in PICTURE project
Inviting critique	No Examples!
Reflecting personal experience	'When I was driving home from Cork yesterday I passed a group of Travellers who are living on the roadside and I began to think about their environment. How many of their children do Junior Cert and Leaving Cert? Do many of the Travellers' children attend university?' Topic 3, Online Resources/Debates
Re-evaluating personal positions	'My personal opinion is that children are actually better off with their mothers, presuming of course that the mother is a stable caring individual. This is coming from someone with three children who has always worked (part-time for the past few years) and whose children have been in a variety of childcare environments … The whole key to whether being at home with mum or in daycare is best is the quality of the childcare give' Topic 1, Online Resources/Debates
Agreeing with ideas of others	'In answer to your second question the three basic types put forward by Chess and Thomas are meant to be a compromise between the typological approach and the dimensional approach. But yes I do agree with you that they are a little trite' Article 5, Peer-Tutoring
Expanding ideas of others	'One interesting fact concerning gender and empathy emerged in this report: females of all ages exhibit higher levels of empathy, particularly affective empathy, than do males (Barnett *et al.*, 1980). It would be interesting to do a survey on bullying in an all male and an all female school and attempt to correlate bullying and empathy figures.' Topic 2, Online Resources/Debates
Critiquing and challenging ideas of others	'I agree with you that lack of responsiveness over such a short time as this may not signify lack of care. I know that if I participated in Notaro and Volling's study and was left filling out a questionnaire in a strange room with my child in it, I would feel uneasy, and most likely behave in a way that would not give a true picture of my normal behaviour to my child … I am curious about what they believed a toyless room to be—children can turn almost anything into a toy!' Article 4, Peer-Tutoring
Negotiating and interpreting	'Now divert for a moment and think of Milgram's experiment on obedience. Let us concentrate on the individual and not the situation here. Some individuals are capable of inflicting pain on another and yet remain unaffected by their actions. The authoritarian personality is one who 'is prejudiced against various minority groups', believes in their 'submission to those above, harshness to those below and a general belief in the importance of power and dominance.' Research tells us that these attributes are expressions of underlying personality patterns formed in childhood. ' Topic 2, Peer-Tutoring

TABLE 2—*continued*

Characteristic of cognitive skill	Example from online contributions in PICTURE project
Defining	'Now let us look at the concept of empathy (which has both a cognitive and an affective dimension), a state as Carl Rogers (1975) states as being able to 'perceive the internal frame of reference of another with accuracy and with the emotional components and means which pertain thereto as if one were the person' Topic 2, Online Resources/Debates
Summarising previous contributions	'I notice that most of you are dismissing the idea of punishing the parents but I suspect that we have all had the experience of dealing with parents who use inappropriate parenting styles, whose children behave inappropriately (and bullying is only one example) and who see no reason to change or be educated in parenting. Under these circumstances, how would you deal with the parents and their children?' Topic 2, Online Resources/Debates
Proposing actions based on developed ideas.	'Jailing the parents of bullies will solve nothing. Perhaps we should take direction from APA here: they take a public relations and communications approach by launching a 'Warning signs for parents forum'. Thousands of parents, teachers and students were given 'warning sign' guides, and communication tips for parents, as well as sample press materials, planning checklists and activity suggestions, along with access to a toll free number for any queries … a more practical approach than a retaliatory one.' Topic 2, Online Resources/Debates

programme on the implementation of eLearning in undergraduate distance education. Three broad conclusions may be drawn at this stage.

Firstly, despite the acknowledged difficulties of analysing student contributions, the method adopted succeeded in giving some convincing evidence of students engaging in the use of higher-order cognitive skills. It seems reasonable to state that this partial success was due to restricting the focus of the research to higher-order cognitive skills, locating the study in a discipline and subject matter where critical thinking and promoting understanding through reflective dialogue have a 'natural' home and using highly specific pedagogical techniques and tasks with tutors who were clear as to their objectives.

Secondly, as other researchers have found, assessment is a key influence on meaningful participation in eLearning environments. Commenting on an online programme which was not assessed, Goodyear noted that 'the espoused values of the tutor team were not backed up by their enacted priorities as manifested in assignment tasks and assignment criteria' (Goodyear, 1995/1996, p. 87). In this programme, the absence of the assessment incentive reduced participation for, at least, some students. One of the non-participating students commented that she saw little benefit in 'putting time into PageOut as it had no relevance to the assignment'.

TABLE 3. Presence of characteristics of cognitive skills in the core online resources/debates and peer-tutoring conferences

Characteristic of cognitive skill	Online resources/debates % of Messages exhibiting characteristic (N = 49)	Peer-tutoring % of Messages exhibiting characteristic (N = 29)
Offering resources	76	62
Making declarative statements	65	41
Supporting positions on issues	49	17
Adding examples	61	7
Articulating and explaining	43	59
Asking questions	36	41
Inviting critique	0	0
Reflecting personal experience	18	17
Re-evaluating personal positions	4	3
Agreeing with ideas of others	14	7
Expanding ideas of others	16	0
Critiquing and challenging ideas of others	14	7
Negotiating and interpreting	8	0
Defining	2	0
Summarising previous contributions	2	0
Proposing actions based on developed ideas.	4	0

In order to 'enact our priorities' the online contributions of students will be assessed in the next presentation of the research programme, which will focus on testing appropriate student assessment methodologies.

Thirdly, as mentioned above the amount of time spent by the tutors in supporting students in the eLearning environment compared favourably with the time spent by tutors in conventional face-to-face tutorials on the same programme. However, this was primarily due to selecting scenarios, which promoted student interaction within a carefully designed pedagogical framework.

The main purpose of this research programme is to establish criteria for successful embedding of eLearning in distance education programmes. The next stage is to extend the range of pedagogical techniques over a longer term. In addition to replicating the Resources/Debates and Peer Tutoring scenarios we will also test the potential of eLearning to facilitate collaborative group projects. Assessment of online contributions will be built into the course design.

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NOTE

[1] The terms hard and soft disciplines come from Biglan's typology of academic disciplines (Biglan, 1973). Biglan's hard/soft dimension of disciplinary differences are based on the 'notion of the extent to which members of a discipline share beliefs about theory, methods, techniques, and pertinent problems for the discipline to pursue. Examples of hard paradigmatic disciplines are chemistry, physics and biology, whereas political science, sociology, psychology, history, English and economics are examples of disciplines exhibiting soft paradigmatic development.' (Braxton 1995, p. 60).

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