Evaluation of different methods of on-line collaboration/group work forming the coursework assessment in a blended learning module.

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Abstract: Advantages associated with collaborative learning have been well documented. The paper describes a qualitative study undertaken to evaluate three different methods of online collaboration/group work which together form the coursework assessment of a blended learning module.

The aim of the study was to discern whether the different methods of online collaboration/group work tasks could be used to encourage independent and effective student learning as perceived by the student group. Specific objectives for the study were to identify direct-entry and mature students' perceptions of independent and effective learning associated with the delivery of the different methods, and to identify strengths and weaknesses in the structure of each.

Evaluation of the study was undertaken by questionnaire following the completion of each piece of coursework, asking students to identify their usage of the managed learning environment (MLE) and express opinions regarding the effectiveness, strengths and weaknesses associated with each method.

Students preferred individual coursework to group work, and coursework in which they chose with whom to work over coursework in which they were assigned to groups by the tutor.

Working in a healthcare environment, staff are expected to work in multi-professional teams where they do not necessarily know all members, and are expected to achieve tasks and goals effectively. The challenge for the teaching team is to foster a greater value on group work and team work amongst students, and create a framework within which it can be accomplished.

Key Words: Blended learning; Collaborative on-line learning; Course design

1. Collaborative Learning

Advantages associated with collaborative learning have been well documented. It is now increasingly accepted that the most important outcomes of education and training are about developing people, and not just what people know or understand (Race, 2001, p141). There has been considerable pedagogic research into collaborative learning and it has been shown to contribute to the graduate skills of "teamwork, communication, lifelong learning and problem-solving" (Gupta, 2004, p.63). With advances in our understanding of learning, educators now place greater emphasis on collaborative learning and the development of participatory learning communities to promote the social construction of knowledge (Fung, 2004). Social constructivism—one of the two main approaches within the constructivist view of learning—focuses on the sociocultural context in which knowledge is built (Richardson, 1997). Paulus (2005) further refined the definition to emphasize the negotiation of meaning and construction of shared understandings through dialogue. This supports the work of Bandura (1971) who stated that interaction and dialogue are key components of learning according to social learning theory.
There is, however, limited research in using this approach in a blended learning environment (Baskin et al, 2005).

The aim of the project was to discern whether different methods of collaboration/group work, supported by a managed learning environment (MLE), could be used to encourage independent and effective learning, as perceived by the student group, during the delivery of an undergraduate, level 3 module.

Specific objectives for the project were to: identify student perceptions of effective learning associated with the delivery of different types of collaboration/group work tasks; identify strengths and weaknesses in the structure of the different types of collaboration/group work tasks; and identify potential barriers associated with the collaboration/group work tasks.

2. Structure of the module and collaboration/group work tasks

The project was undertaken in a module called "Comparative Imaging". This is an undergraduate, level 3 module forming part of a BSc (Hons) Diagnostic Radiography and Imaging programme. The Comparative Imaging module is based within a blended learning model, combining face-to-face lectures and seminar sessions with elements of self-directed learning and interaction within a managed learning environment (MLE). At the beginning of the module, students choose to study the module from the viewpoint of one of four imaging modalitites: CT scanning; MRI scanning; Nuclear Medicine (Radionuclide Imaging); or Ultrasound scanning.

Assessment of learning within the module consists of a two hour unseen examination and 3,000 word equivalent coursework, each of which are weighted at 50%. The coursework assessment within the module consisted of three collaboration/group work assignments. See table 1 below, which outlines the structure of each.

Coursework 1	Work individually on group task, uploading their individual material to the group site, which may be shared by all, and providing individual write up
Coursework 2	Work with a group of their own choosing. Individual tasks not structured. Group write up.
Coursework 3	Work in a group **not** of their own choosing. Individual tasks structured (jigsaw method). Group write up.

Table 1. Structure of the three collaboration/groupwork tasks.

2.1 Coursework 1

Following the delivery of a lecture to all students about the anatomy and physiology of head and neck organs and structures, students were directed to explore the area from the viewpoint of their chosen modality and to upload a link to a relevant electronic article to their chosen modality group site, which could be accessed from the Comparative Imaging home page. The links were to be uploaded by a deadline date, and were to be accompanied by a 200 word article summary. Each group site contained information on how to complete the task and how to upload the links. The features within the group sites were "discussions" and "files", which was where the links had to be placed. The group sites had open access for all students to access the uploaded materials from all the modalities.

Students had to submit an individually written report on an application of their chosen modality based upon three of the uploaded articles from different modality groups.

2.2 Coursework 2

Students were asked to form groups of 5-6 members, of their own choosing, and to notify the module leader by a fixed date. Individual group sites were then created for each group. During the students next clinical placement, they were rostered into their chosen modality area and asked to consider the following themes. See table 2, below.

| As part of their specialist placement students will be asked to consider the following themes: |
| 1) Theory relating to practice
    a. How closely does the taught theory match the clinical reality?
    b. How did the taught theory help with the placement?
    c. How did the reality differ from the taught theory/what individual variations in practice did you observe? |

2) Communication within the specialist modality area		
a. Patient - staff communication		
b. Staff - staff communication		
c. Interprofessional communication		
3) Patient care - How close is the relationship between practitioner and patient?		
a. What types of patient preparation is required?		
b. What care is required during the procedures/investigations?		
c. What aftercare do patients receive?		

Table 2. Themes for consideration during specialist clinical placement.

Students were asked to assign tasks amongst themselves and to submit a written group report based upon one of the above themes and making comparisons between the specialist modality and general radiography areas.

2.3 Coursework 3

Students were placed in groups of 6-8 and group sites were created for each group. Students were given the task of critically evaluating a specialist website from a given list. Individual tasks were assigned and each group was required to submit a group written report.

3. Assessing group work participation

In addition to the group written reports for coursework 2 and coursework 3, students were required to submit a "self and peer participation evaluation form" (see example in figure 1, below) in order to recognise the participation and contribution of the individual group members, and to formulate individual coursework marks.

Self and Peer Participation Evaluation Form for Groupwork.

Name: Student 5
Group No: 20

On the form below, please write the names of your other group members and allocate marks on a scale of 0 – 4 to yourself and each group member for each specific criteria.

Task	Student 1	Student 2	Student 3	Student 4	**Self** Student 5
Ability to work with other group members	3	4	4	2	4
Ability to generate ideas, initiative	2	4	4	1	4
Punctuality and reliability within the group	3	4	4	1	4
Taking and doing a fair share of the work	3	4	4	1	4
Quality of work done	3	4	4	1	4
Total Mark	14	20	20	6	20
Average Mark	2.8	4	4	1.2	4

Figure 1. Self and peer participation evaluation form for coursework 2 and coursework 3

Individual weighting factors were calculated and applied to the group mark to generate individual marks. This method of generating individual marks is based on the "Sparks" system (Freeman and McKenzie, 2002). A worked example is illustrated in figure 2, below.

Self and Peer Assessment factors for Group 20

	Scores for Student 1	Scores for Student 2	Scores for Student 3	Scores for Student 4	Scores for Student 5
Student 1	4	4	4	3.4	3.4
Student 2	4	4	4	1	4
Student 3	4	4	4	4	4
Student 4	3.8	3.6	3.8	3.4	3.8
Student 5	2.8	4	4	1.2	4
Total average	**3.72**	**3.92**	**3.96**	**2.60**	**3.84**

Average of all totals   **3.61**

Self and Peer Assessment Factor (SPA) = $\sqrt{}$(Total average for individual/Average of all totals)

SPA Student 1	3.72/3.61		SPA Student 2	3.92/3.61
	1.03			1.09
Moderation (sq root)	1.02		Moderation (sq root)	1.04
SPA Factor	**1.02**		SPA Factor	**1.04**
SPA Student 3	3.96/3.61		SPA Student 4	2.6/3.61
	1.10			0.72
Moderation (sq root)	1.05		Moderation (sq root)	0.85
SPA Factor	**1.05**		SPA Factor	**0.85**
SPA Student 5	3.84/3.61			
	1.06			
Moderation (sq root)	1.03			
SPA Factor	**1.03**			

Figure 2. A worked example of the self and peer assessment method.

For a group mark of 50%, the individual marks would be as follows:
Student 1 (50 x 1.02) 51%; Student 2 (50 x 1.04) 52%; Student 3 (50 x 1.05) 53%; Student 4 (50 x 0.85) 43%; Student 5 (50 x 1.03) 52%.

4. Evaluation

The student group consisted of 84 students. The student group is ethnically diverse and also has a wide age range, with approximately 50% of the group being mature students.

Following each assignment, students were given a questionnaire asking them to identify whether or not their group accessed the managed learning environment (MLE) in order to complete the coursework (this question was not applicable for coursework 1, as students worked individually, and could not complete the task without accessing the MLE), and how many times they individually accessed it in order to complete the task. They were also given two statements and were asked to identify on a likert scale of 1 to 5 how strongly they agreed or disagreed with them. The statements were:

    i)   In my opinion, the process of doing "coursework (1, 2 and 3)" encouraged me to learn independently.

    ii)   In my opinion, the process of doing "coursework 1, 2 and 3)" contributed effectively to my learning.

Students were also asked open questions about the strengths/good points and weaknesses/difficulties with each piece of coursework.

The third and final questionnaire also asked the students to rank the coursework tasks in order of preference.

Comparisons were made between direct entry and mature student responses.

5. Results and Discussion

5.1 Response rates
Response rates for the return of questionnaires were generally very good. Table 3, below, outlines the response rates for each piece of coursework.

	Response rate (%)	Direct entry student responses (%)	Mature student responses (%)
Coursework 1	71%	50%	50%
Coursework 2	57%	48%	52%
Coursework 3	71%	48%	52%

Table 3. Response rates for the return of questionnaires for each piece of coursework.

The percentage responses from direct entry and mature students remained consistent for each questionnaire.

5.2 "Did your group work together using the MLE in order to complete the coursework"?
This question did not apply to Coursework 1, as students worked individually and could not complete the coursework task without accessing the MLE.
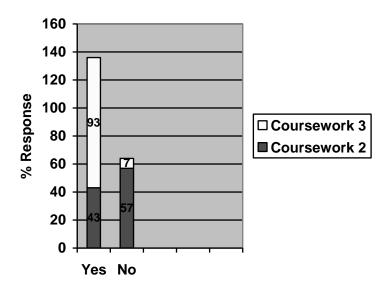The responses to this question for coursework 2 and coursework 3 are outlined in figures 3 and 4, below.

Figure 3. Direct entry student responses to the question "Did your group work together using the MLE in order to complete the coursework"?
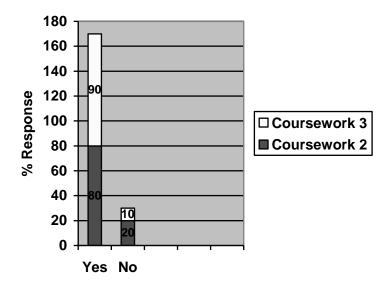

Figure 4. Mature student responses to the question "Did your group work together using the MLE in order to complete the coursework"?

The mature students demonstrated a more consistent approach in the use of the MLE (80% for coursework 2, and 90% for coursework 3 indicating that their groups used the MLE) than did the direct entry students (43% for coursework 2, and 93% for coursework 3). Indeed, for coursework 2, a greater percentage of direct entry students (57%) indicated that their group did not use the MLE in order to complete coursework 2 than did use it (43%).

A Possible reason for this might be the geographical spread of the student population. The student population does come from a very large geographic area spanning several counties. For coursework 2, students were able to choose who they worked with. It is possible, with many direct entry students living on campus that they may have chosen their groups from those with whom they share a house,

or who live in the same halls of residence. It would therefore be more possible for the direct entry students to complete the coursework 2 assignment through face-to-face meetings rather than through use of the MLE. The mature entry students are more geographically separated by distance, and so therefore might feel a greater need to complete the coursework through the group sites on the MLE. This could also lead on to the suggestion that if there is not a specific need to use the MLE in order to complete assignments, then students may be less likely to engage with it.

This same theory of geographical location might also account for the dramatic turnaround in direct entry students' use of the MLE for coursework 3 (93% now indicating that their groups used the MLE in order to complete the assignment. For coursework 3 students were placed into groups and, due to the geographical spread of group members, it may have been easier to communicate via their group sites on the MLE.

Another possibility might be that for coursework 2, friends of similar ability may have grouped together, and some groups may have been reluctant to use the MLE. When placed in groups for coursework 3, more reluctant users may have felt more obliged to participate in the use of the MLE, spurred on by the abilities of the other group members.

5.3 How many times did you access the MLE in order to complete the coursework?

Figures 5 and 6, below, outline the direct entry and mature student responses for each piece of coursework.
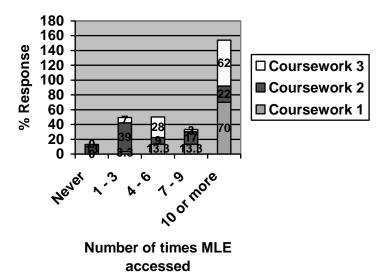

Figure 5. Direct entry student responses to the question "How many times did you access the MLE in order to complete the coursework"?
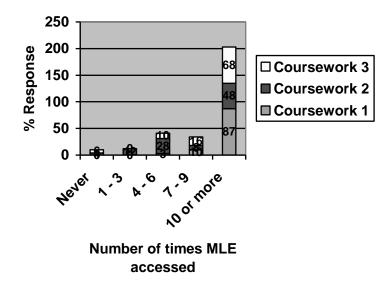
Figure 6. Mature student responses to the question "How many times did you access the MLE in order to complete the coursework"?

Generally speaking, the mature students accessed the MLE a greater number of times in order to complete each of the coursework assignments than did the direct entry students. This may be due to geographical location of the students as previously mentioned. It might also be due to mature entry students accessing the coursework question discussion forum more frequently than direct entry students in order to seek clarification of purpose. For both direct entry and mature students, coursework 2 resulted in less use of the MLE.

5.4 "In my opinion, the process of doing the coursework encouraged me to learn independently".

Figures 7 and 8, below, outline the direct entry and mature student responses for each piece of coursework.
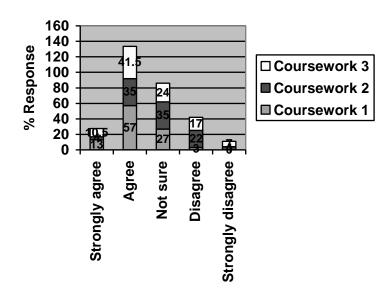
Figure 7. Direct entry student responses to the question "In my opinion, the process of doing the coursework encouraged me to learn independently".
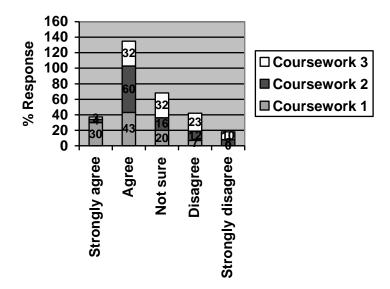

Figure 8. Mature student responses to the question "In my opinion, the process of doing the coursework encouraged me to learn independently".

Overall, for both groups, there is more agreement with the statement than disagreement. Coursework 1 produced the highest the highest level of agreement (70% of direct entry students either agreed or strongly agreed with the statement, and 73% of mature students either agreed or strongly agreed with it). Coursework 1 involved students working individually and submitting an individual assignment. The assignment could not have been completed, however, without reference to other student's uploaded articles. Some of the strengths of this piece of coursework, as identified by the students comments are reproduced below:

•   "Interesting and useful task. Beneficial to learning";
•   "Being able to learn and gather information independently";
•   "Learning to upload and pick important bits from all articles".

Coursework 1 was a challenging task for the students. They were not given an essay title, but were given an outline of what was to be done and what was expected of them. They had the responsibility of creating links within the uploaded articles in order to complete the written assignment. For many students, this created initial confusion and uncertainty. From the tutor's reflective journal which was kept throughout the period of running the module, the following extract illustrates the situation as it was within the first couple of weeks:

"I think the structure of the module has confused the students a bit. I think they were initially a bit stunned by what was involved. The first couple of weeks for me have been frantic, trying to keep up with the number of worried e-mails. Towards the end of week 2, suddenly all the worried e-mails ceased. Students started to get organised and began to upload articles".

This view is supported by the students' comments, some of which are reproduced below:

•   "There was a bit of confusion to what actually had to be done. The whole class was up in arms for about 2 weeks with confusion";
•   "Really understanding what to do to begin with. Found it difficult to get started, motivation".

Coursework 2 produced the greatest difference of opinion between the direct entry and mature student groups. Here 64% of mature students either agreed or strongly agreed with the statement as compared to 39% of direct entry students either agreeing or strongly agreeing with it. The reasons for these results are not clear. It might be due to uncertainties or differences in perception of what constitutes independent learning. Alternatively, the results might be a reflection of individual preferences of different learning tasks.

The situation was reversed for coursework 3, where 52% of direct entry students either agreed or strongly agreed with the statement, and 35% of mature students either agreed or strongly agreed with it.

5.5 "In my opinion, the process of doing the coursework contributed effectively to my learning".

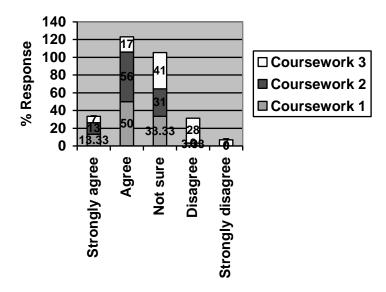Figures 9 and 10, below, outline the direct entry and mature student responses for each piece of coursework.

Figure 9. Direct entry student responses to the question "In my opinion, the process of doing the coursework contributed effectively to my learning".
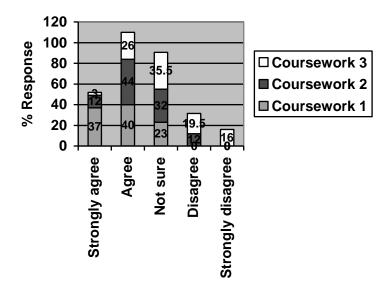
Figure 10. Mature student responses to the question "In my opinion, the process of doing the coursework contributed effectively to my learning".

For coursework 1, there is strong agreement between the direct entry and mature students regarding the effective contribution to their learning (63.3% of direct entry students either agreed or strongly agreed with the statement, and 77% of mature students either agreed or strongly agreed with it).

For coursework 2, a higher percentage of direct entry students were in agreement with the statement than mature students (69% of direct entry students either agreed or strongly agreed with the statement, and 56% of mature students either agreed or strongly agreed with it).

A slightly higher percentage of direct entry students considered coursework 2 to contribute more effectively to their learning than coursework 1. A possible reason for this might be due to the nature of coursework 2, which was rooted in clinical practice, and therefore seen as more valuable by some students.

For coursework 3, The highest response from both the direct entry and mature student groups was the "not sure" category. Coursework 3 produced the least agreement with the statement (24% of direct entry students either agreed or strongly agreed with the statement, and 29% of mature students either agreed or strongly agreed with it). It might be possible that the reason for this was the result of being placed in groups not of the students own choosing. This view is supported by students' comments, many of whom reported difficulties in working with group members. No conflict was, however, reported to the tutor. Some sample comments are reproduced below:

- "Some members didn't show much interest and produced rather average work";
- "I found being put in a group of people I didn't choose delayed the time in completing the project";
- "Personality conflict- working with some others who did not place much importance on the task".

The students view is not all negative, however. Some students mentioned working with others that they did not know, and being allocated tasks by the tutor as strengths of coursework 3.

5.6 Students preferred method of assessment

On the final questionnaire, students were asked to rank the three coursework methods in order of preference.

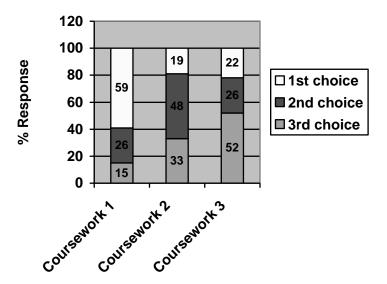Figures 11 and 12, below, illustrate the respective choices of the direct entry and mature students.

Figure 11. Direct entry student responses to ranking the methods of assessment in order of preference.
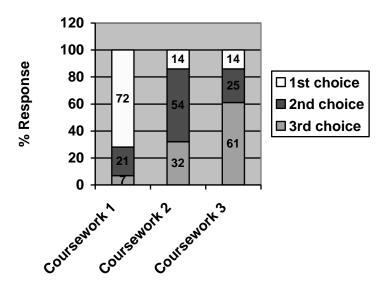

Figure 12. Mature student responses to ranking the methods of assessment in order of preference.

Although each type of coursework produced 1st, 2nd and 3rd choices, the overall ranking of preference for both the direct entry students and mature students was the same. Coursework 1 was ranked most highly followed by coursework 2 and coursework 3. Reasons for this result might be that students preferred the independence of studying and submitting work individually over both forms of group

work. Also, when students worked in groups they may have preferred choosing and working with friends above being placed into groups by the tutor. Also, the nature of the coursework tasks should be taken into account.

The third piece of coursework, although not rated highly in terms of independent learning and effective learning by the students, did result in greater use of the MLE than coursework 2. The task process of coursework 3 is a similar situation that will be encountered by the students when qualified and working in clinical imaging departments. They will be expected to work in multi-professional teams where they do not necessarily know all members and would be expected to achieve tasks and goals effectively. The challenge for the teaching team is therefore to foster a greater value on group work and team work amongst students, and create a framework within which it can be accomplished.

6. Summary and Conclusions

The managed learning environment was able to support the different methods of group work, providing a range of group working features, which were used by the student groups.

When placed in groups not of their own choosing, the use of the MLE increased, when compared with students working in chosen friendship groups. This may have been due to the geographical location of the students. The student population is spread over a wide geographical area. It may have been due to the fact that students may have felt less able, or inclined, to use the MLE when working with their friends – opting instead for face-to-face communication. When working with students not from their friendship groups, they may have felt greater pressure to participate in the use of the MLE.

For this project, group working skills, and roles were not taught or discussed with the students in advance. Similarly, attempting to place students in groups based upon Belbin roles or Myers Briggs types was not attempted. It is unclear whether this would have had any impact on the process.

The students preferred method of assessment was the individually submitted assignment. There is a challenge here for staff to foster a greater value on group work and team work amongst students.

7. Acknowledgements

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