

Centre for Excellence in Enquiry-Based Learning

Project Case Study

Improving the EBL Experience for First-Year Nurses

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Abstract

Since 2000, the Anatomy and Physiology (A and P) component of the B.Nursing course has been delivered using a Problem-Based Learning (PBL) format. In order to improve the learning experience and engagement in group discussion, alterations were made to the existing course. This study examines the effectiveness of these changes.

The changes that were made included providing the students with pre-set learning objectives during a lecture held at the beginning of the week. These were studied independently by the students. An Enquiry-Based Learning (EBL) session was held for discussion of student findings. A case, related to the weekly topic, was then discussed. The students set new case-related learning objectives which were studied independently over the weekend and discussed by the group at the next tutorial. The programme was evaluated using student questionnaires and discussion at focus groups.

Benefits of this new format perceived by the students included the ability to discuss queries and correct misunderstandings and the development of transferable skills. Students also stated that they felt more confident and were therefore more willing to contribute to discussion. The main areas of concern were the lack of contribution by some group members. In general, the students enjoyed the EBL approach to learning.

Staff felt that distributing pre-set learning outcomes at the start of the week ensured that all students had the potential to have some level of knowledge when the discussion session began.

This study suggests that student experience of this modified EBL course was rewarding and fulfilling. They developed a number of skills associated with EBL (problem solving, communication, time management, etc.) in addition to gaining knowledge.

Background

This Anatomy and Physiology course was delivered to 112 first-year students undertaking the B.Nursing course. The students had mixed ability and academic backgrounds. Entrance requirements for the B. Nursing course are: BBC A level grades (any combination of subjects) or equivalent. It is desirable that students have a minimum of GCSE in Biology.

Rationale

A PBL format was introduced to deliver the Anatomy and Physiology component of the B.Nursing course at the University of Manchester in 2000. It was hoped that this format would provide the students with a sound knowledge of the subject whilst affording them the opportunity to develop those skills associated with PBL (problem solving, communication, team work etc). However, the students appeared to find it difficult to adapt to this form of learning. Few participated in group discussion and as a result the facilitators tended to assume a more didactic teaching role. Whilst examination results suggest that a satisfactory understanding of Anatomy and Physiology was achieved, students did not develop the anticipated skills associated with PBL.

The inability of students to adapt to the PBL process could be attributed to a number of issues. The time constraints of the course allowed little time for induction to PBL, which is crucial to the success of the process. Some students, particularly those with a limited Biology background, lacked confidence and were reluctant to contribute to group discussion. The vast amount of subject matter that has to be covered (the whole human body in 20 weeks) allowed little time for struggling students to catch up and develop confidence in their ability.

It was therefore decided to develop the course so that the subject matter was delivered in a more directed manner whilst maintaining the benefits of an enquiry-based programme. The anticipated benefits were that the

students would have a more fulfilling learning experience and be more engaged in discussion.

Approach

This project involved the modification of the existing unit. It was implemented in the 2005/06 academic year. Staff that taught on the course in the previous year continued to deliver it, and staff contact time was unaltered.

Old Format

The week started with a one-hour PBL session in which students were given a case to discuss (Appendix 1). From this case they derived the learning outcomes which they investigated through self-study. This study was supplemented by lectures and practicals. A two-hour PBL session was held at the end of the week for discussion of student findings. The problems encountered with this format were:

- Some of the students with a limited biology background were unable to contribute to the initial discussion as the subject matter was totally new to them. As a result they became discouraged and lost interest.
- Some groups were unable to identify relevant and appropriate learning outcomes.
- The subject area that had to be covered was so vast it was not possible to provide cases that triggered all the learning outcomes.
- Both staff and students were concerned that some areas of the curriculum were being missed.

New Format

The week started with a lecture in which the topic was introduced and pre-set learning outcomes were distributed. The learning outcomes were investigated by self-study over the next four days. This study was supplemented by practicals and dissection classes; a two-hour session was held at the end of the week. The first hour was spent discussing the findings. The second hour was devoted to EBL; a case study (Appendix 2)

based on the weekly topic was used to promote group discussion and the students devised a new set of questions aimed to examine the case in more detail. These questions were investigated over the weekend and a final one-hour EBL session was held on the Monday to discuss and consolidate the research. This session was followed by a lecture which introduced a new topic and the cycle began again.

This new format altered the stimulus for learning. Distributing pre-set learning outcomes and moving the first discussion session to follow a period of self-study aimed to ensure that all students would have a knowledge base that would allow them to become involved in the discussion. The case was no longer used to derive all the learning outcomes of the curriculum, but aimed to stimulate further interest and motivate students for self learning. It was hoped that the students would be more engaged in the subject matter and have a more fulfilling learning experience.

Assessment

The unit was assessed by a two-hour examination which consisted of 60 multiple choice questions (MCQs) and 60 extended matching questions (EMQs). Traditionally the assessment consisted only of MCQs. The EMQs were introduced to assess problem solving skills as they were case related.

Evaluation

Methods

The programme was evaluated by student questionnaire and discussion at student and staff focus groups. The timing of these events is shown in table 1.

2005	September	Course started & new format introduced
	October	First student questionnaire
	November	First staff focus group
	December	First student focus group

2006	March	Second student questionnaire Second student focus group Term ends
	April	Second Staff focus group

Table 1 Timing of evaluation events.

Student Questionnaires

The course was undertaken by 112 first-year nursing students, of whom 106 and 72 completed and returned the first and second questionnaires respectively.

The first student questionnaire (Appendix 3) aimed to obtain information on student background, their perceptions of EBL and initial experiences of the process. The first questionnaire was distributed to all students during the first EBL session of week two. They were asked to complete it at the end of the session and return it to the tutor. Anonymity was maintained but the tutor group was noted.

The second student questionnaire (Appendix 4) discussion focussed on the students' experience of EBL, their approach to self study and contribution to group. It was distributed to all students during the last EBL session of week eleven and collected at the end of the session. As before, anonymity was maintained but the tutor group was noted.

Student Focus Groups

Fourteen students, two from each tutorial group, were randomly selected and invited to the focus group meetings. Of these nine students attended, each tutorial group being represented by at least one student.

The first student focus group was held during the last week of term. Volunteers for attendance at the forum were randomly selected. The session was held at the CEEBL centre. The discussion was led by a student intern and the issues highlighted by the first student

questionnaire were examined. The session was audio-recorded and a transcript of the discussion produced.

The same group of students who had previously been involved in the student focus group were asked to attend the second focus session. As before, the session was held at the CEEBL centre and a recording was made of the group discussion.

Staff Focus Group

The staff focus meetings were attended by five of the seven tutors. The remaining two tutors gave feedback on an individual basis.

The first staff focus group was held at the end of the first semester. Tutors involved in the delivery of the course were invited to the session. The session took the form of informal discussion, which was led by the authors. Previously prepared open-ended questions were used to stimulate discussion.

The second staff focus group was held at the end of the second semester. Tutors who were involved in the delivery of the course were again invited to the session. The session took the same format as the previous staff focus group.

Results

Student Questionnaires

Background

As most of the students (106/112) completed the first questionnaire, the background of the whole student group is well reflected. The majority of students were under the age of 21 (n=91); 15 students were considered to be mature students (over 21). The students all had A levels or equivalent; however their Human Biology qualifications ranged from GCSE to A level as shown in figure 1. In addition, thirty-four of the students had previous or current nursing experience (care assistant).

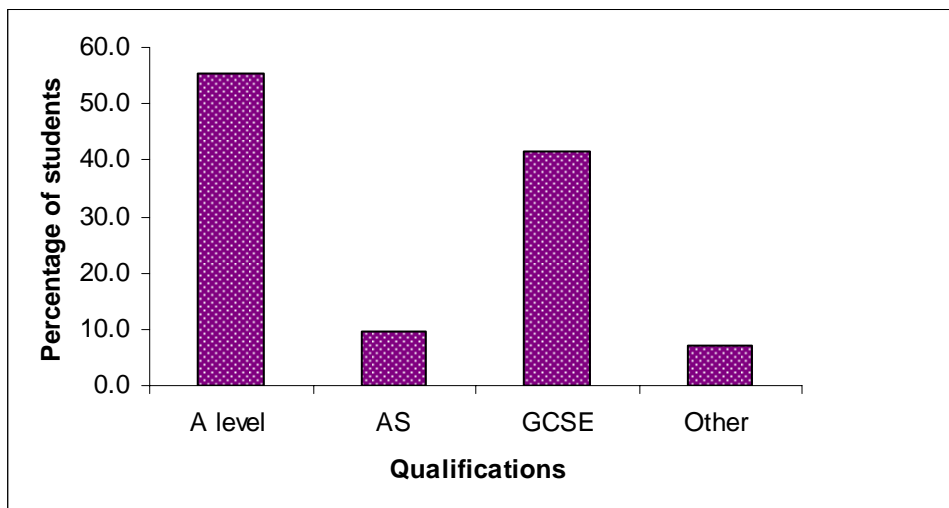


Figure 1 Maximum level of biology background of students (other refers to social care courses or equivalent).

Perceptions of EBL

Sixty-four percent of students had used self-directed learning and 77% had used group discussion previously. However, students were unable to explain the term EBL, suggesting that they had limited understanding of, and exposure to, this process.

Benefits

When asked the question 'what do you see as the benefits of EBL?' at the beginning of the course the students' responses included the following:

- Sharing of information and ideas to promote discussion and enhance learning;
- Allows the clarification of queries and enhances understanding;
- Increased motivation through self-study;
- Improves transferable skills (time management, communication, team working);
- Allows the application of theory to practice.

On completion of the course the students stated that these perceived benefits had been achieved.

Limitations

When asked the question 'what do you see as the limitations of EBL?' at the beginning of the course, the main concerns were:

- Lack of contribution by some students;
- Some students may rely on others to do the work and therefore not research themselves;
- If the work isn't done there will be less knowledge to share;
- Concern that they might know less than group members (because of mixed ability groups);
- Didn't feel confident to contribute;
- Worries about depth of study (omissions and learning the wrong information);
- Worries about where to find information.

On completion of the course the students still had concerns about the contribution levels of some group members. The mixed academic background was also an issue. Those with a Biology background felt they were held back by the weaker students. In contrast, those without a Biology background felt intimidated by those with a more advanced knowledge. Dominant group members also appeared to be a problem in some groups. In addition, students complained that they had to devote a considerable amount of time to the self-study and they were concerned whether they were studying at the correct depth.

Confidence about Contribution

At the beginning of the EBL course 86% said they felt confident about group work and their ability to contribute. In contrast, at the end of the course 96% of students felt they were confident to contribute. All students stated that their confidence improved as the course progressed, and as a consequence of this their level of contribution improved (as shown in figure 2).

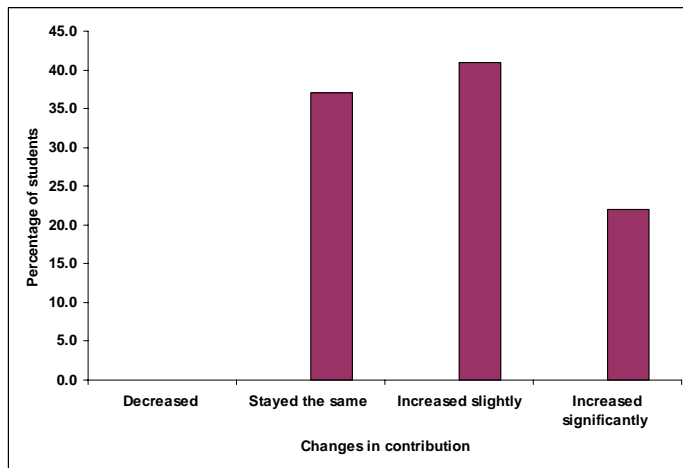


Figure 2 Changes in levels of contribution as the course progresses.

Approach to EBL

Students felt that, as the course progressed, they became more motivated and interested in Anatomy and Physiology. Students stated that they became more organised and used their time more efficiently. They commented that they adapted to self-directed learning and some had increased their work ethic. Students also stated that they have become more aware of, and have utilised, more resources.

Benefits of EBL Experience in Nursing Career

When asked how their EBL experience might benefit their future career in nursing, most students recognised that they had enhanced a number of transferable skills (communication, time management, presentation, teamwork). Improved confidence was also important to many students. In addition, many students thought that they had started to develop problem solving skills and were beginning to link theory to practice through the cases. The changes that some had made in their work ethic would prepare them for lifelong learning.

Improvements to the EBL Experience

When asked what changes could be made to improve their EBL experience, 26% of students stated that no changes were necessary. However, there were two areas highlighted that could be modified: firstly,

the students would like more time spent on group bonding because they became more confident as they got to know their peers; and secondly, most students stated that they would like to be in groups where the students had a similar level of Biology as themselves.

Rating of Course Components

When asked to rate the benefits of the various aspects of the course (lecture, self-study, case and discussion) it appeared that the students found all aspects to be beneficial. At the beginning of the course (figure 3a) the majority of students found self-study and the case the most beneficial. At the end of the course more students rated self-study as essential, suggesting that they now recognised its importance.

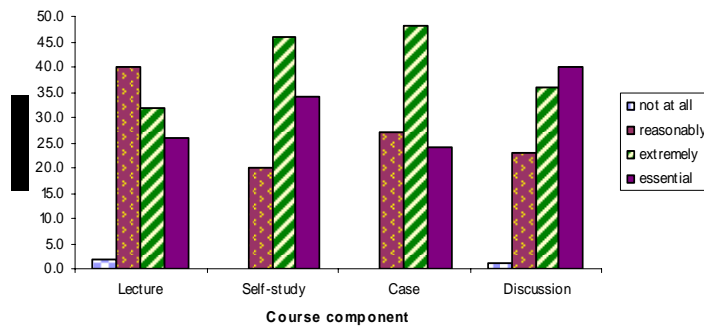


Figure 3a

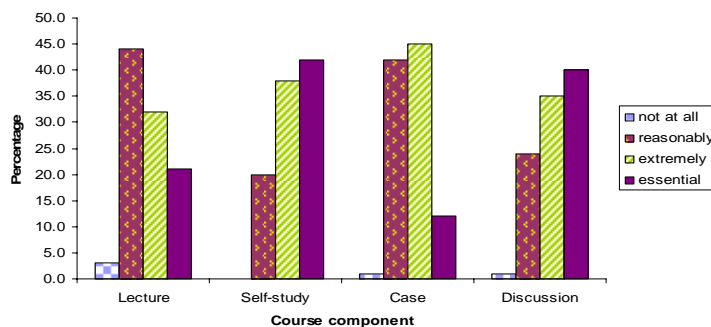


Figure 3b

Figure 3 Student opinion on the importance of different aspects of the course at the beginning (3a) and on completion (3b).

Student Focus Group 1

The discussion at both the first and second meetings revolved around the same issues: student contribution and mixed ability groups.

Student Contribution

In most groups there seemed to be some group members who were reluctant to contribute. The students recognised that some found it difficult to contribute. One student stated:

I think it depends on if they have done the work but for some even if they have done the work they may find it hard to talk in a big group.

It was also suggested that the confidence factor improved as the students became more familiar with each other:

Once you get to know people I guess you feel more confident.

Some positive attributes of group discussion were also highlighted:

If we are stuck we can just bring it up in conversation.

We can explain this to each other and sometimes this is useful.

You can say something but it doesn't have to be right, no-one will judge you, they are just going to help you get it right.

In general, it was agreed that contribution had improved as the course progressed. This supports the findings of the questionnaires.

Mixed Ability Groups

The subject of mixed ability groups was also a main talking point. The quotations below reflect the opinion of those who attend the focus meeting.

Well if you haven't done A level Biology and there are people that have they can give you info and it makes it easier.

Even though I have done A level some of the info has been lost in my head therefore it is quite nice that you can explain it to someone who hasn't done it; it keeps me on track and makes me explain it simply.

These students appeared to like mixed ability groups and recognise their positive aspects. However, this does not support the comments written on the student questionnaires. The questionnaires suggested that most students did not like mixed ability groups; those students with limited Biology felt intimidated by their lack of knowledge compared to other group members, whilst those with A level Biology felt that they were held back and progress was too slow. The different responses between the focus groups and questionnaires may reflect the type of student that attended the focus group. The students who attended the focus meeting all had A level Biology (despite being randomly selected). Only nine of the invitees actually attended the sessions. It could be that those who did attend were those who take responsibility for their own learning and see the benefit of sharing their information with other students.

General Aspects

Evaluation from this focus meeting showed that most students were enthusiastic about EBL and that they enjoyed the EBL experience. They were able to recognise the benefits of the process. The following are a sample of the comments from the student focus groups:

I enjoy PBL more than lectures because you are actually talking about it and reinforcing it in your mind. When I go home I can explain it to my housemates...

With EBL I feel I'm actually learning.

People who have researched in more detail have got different things to read out, therefore you actually learn more.

I am motivated to work especially when I'm in a small group and you have the social pressure to do it.

I really don't mind going to the EBL sessions, I actually enjoy it!

It is more how nurses work –because you don't always know everything. You have to research problems and you have to talk to your patients and colleagues.

A and P is one of the better modules that we have had mainly because of the EBLs.

Staff Focus Group

In general, the staff was happy with the changes made to the delivery of this course. As the students were given set learning outcomes, the staff was reassured that the students had the potential to cover all topics required for the curriculum. This allowed the case to be used to promote further learning and to stretch the students. They also felt that students were using their time more efficiently and in most cases studying at the weekend.

Despite 86% of students stating on the initial questionnaire that they were confident to contribute to discussion, this did not appear to be the case. The staff observed that few students contributed at the beginning of the course. However, contribution increased considerably as the term progressed. They suggested that this might be due to the fact that, as the students got to know each other better, they became more willing to speak out. Alternatively, it could be due to the fact that they had studied the subject for four days and therefore were confident in their knowledge.

The staff commented that the two-hour session was too long when using the old system. The students lost interest and their attention wandered. As a result, the sessions would often be cut short, which wasted valuable contact time. Using the new format seemed to improve student attention. The introduction of the case in the second hour provided a natural break and renewed student interest.

Conclusions

This project modified the Anatomy and Physiology course that forms a compulsory component of the B.Nursing. It attempted to enhance the students' experience of EBL by stimulating lively discussion and student thinking whilst ensuring that an immense subject area was covered. Evaluation of the programme suggests that the students have participated in group discussion and have found EBL to be an engaging and interesting form of learning. They have been encouraged to explore new areas using a variety of resources and have developed skills to prepare them for lifelong learning.

Further Development

A number of areas for future consideration have been highlighted by this evaluation. Mixed ability background appears to have differing impact on student contribution to discussion. Whilst the more advanced students appeared to benefit from mixed groups, the weaker students were inhibited by them. Having a Biology background appeared to give students confidence and explaining their findings reinforced their knowledge. In contrast, the weaker students were conscious of their lack of knowledge and tended not to contribute for fear of looking foolish. In order to address this in the next academic year we will allocate the groups according to maximum level of Biology qualifications.

All students felt that their contribution increased as the course progressed. This may be reflective of changes to the timing of events. Moving the first discussion session to the end of the week allowed the students to gain a solid understanding of the subject matter, which made

them more confident to discuss their findings. However, the responses on the questionnaires suggested that confidence increased as the students got to know each other. This highlights the need for a good induction programme and emphasises the importance of group bonding exercises. This will be taken into account when planning the timetable for next year.

Appendix 1

Example of Old-Style Case for the Topic of Endocrinology

The Cabbage Farmer

Mr Sloan, a 36-year-old Bedfordshire farmer, specialised in growing cabbages, brussel sprouts and related vegetables. He came to see his GP at the insistence of his wife and foreman, after falling twice for no obvious reason, while at work. When he came into the surgery, the locum GP noticed that Mr Sloan was a little unsteady and that his movements were slow. His speech was also rather slow and his manner dull and monotonous. He was a pallid, broad faced, bulky man with very dry skin and thin hair, dressed in very warm clothes despite it being early spring.

Mr Sloan said that he felt he had slowed down a lot at work over the past 1-2 years, yet he was always tired at the end of the day and his muscles ached more than they used to. He had put on weight and his shirt collars became too tight. This did not concern him; several of his mother's family from the Peak District had had thick necks. He admitted to feeling cold all the time and to frequent episodes of constipation. The latter was put down to his appetite for sprouts by his wife; it appeared that he ate a double portion once and often twice a day and considered that they were very good for him. Mr Sloan also felt that his memory was deteriorating.

The GP gave him a general examination and found that his reflexes were rather slow as well. A blood sample showed reduced free thyroxin and elevated TSH levels. The GP suggested that he cut down on eating brussel sprouts and related vegetables and gave him a prescription for thyroid hormone replacement tablets from the chemist.

Appendix 2

Example of New-Style Case for the Topic of Endocrinology

Fat Neck, Thin Body

Student Nurse Smith, undertaking a placement on the Endocrinology Unit, was preparing a young patient for theatre. Her patient, 23-year-old- Roxy Lake, was a pretty girl, but her eyes protruded as if 'stuck out on stalks'. Nurse Smith noticed that Roxy was rather excitable and edgy but put this down to preoperative nerves. When helping her into her theatre gown she observed how thin Roxy was and asked her the secret of her diet. She was envious when Roxy said that she never watched what she ate as she didn't put on weight, although she had been advised against eating fish when her condition was diagnosed.

Nurse Smith took Roxy's preoperative blood pressure and pulse rate. They were both elevated so she checked Roxy's records and saw that they were also elevated on admission.

Roxy presented with an enlarged neck (thyroid goitre) and was going to theatre for a partial thyroidectomy. She had been diagnosed as having an over-active thyroid gland. This puzzled Nurse Smith, as she had recently nursed another patient with a thyroid goitre, yet that patient had been treated for an under-active thyroid gland. Had someone made a mistake?

Nurse Smith was told that she would be looking after Roxy post-operatively and that she would have to report immediately any signs of muscle spasm. She wondered why this was important.

Appendix 3

Questionnaire 1

Anatomy and Physiology for Nurses

This year the Anatomy and Physiology course (NU130) has been modified to improve your experience of group work and Enquiry-Based Learning (EBL). In order to monitor the progress of the course we require your feedback and comments. Throughout the year there will be a series of questionnaires, which will allow you to express your opinion. In addition, we will hold a number of student focus sessions that you may be invited to attend. Many thanks, we are grateful for your cooperation,

Dr Liz Sheader and Dr Niggy Gouldsbrough

Enquiry Based Learning Questionnaire (1)

Group Number (or tutor name)

Are you a mature student (over 21)?
yes/no

Have you any previous nursing experience (care assistant etc)?
yes/no

If yes please give details

To what level have you previously studied Human Biology?
GCSE A level other (please state)

What do you understand by the term Enquiry Based Learning (EBL)?

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.....
.....

Have you previously utilised self directed learning as a study method?
yes/no

Have you previously utilised group discussion as a study method?
yes/no

What do you perceive as the benefits of EBL?

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.....
.....

What do you perceive as the limitations of EBL?

.....

.....
.....

Do you feel that you are adequately prepared for the discussions during the tutorials

yes/no

If your answer is NO explain why you are not prepared?

.....
.....
.....

Do you confident about contributing to the discussions held during the tutorials

yes/no

If your answer is NO explain why you are not confident?

.....
.....
.....

How beneficial do you rate following aspects of the course in relation to your learning?

Not at all	reasonably	extremely	essential
Lectures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Self study	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Case	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discussion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How do you feel that your experience of EBL could be improved?

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.....
.....
.....

Many thanks for taking the time to complete this questionnaire.
Your comments will be utilised for future developments to the course, from which you will benefit.

Appendix 4

Questionnaire 2

Anatomy and Physiology for Nurses

We are now coming to the end of the Anatomy and Physiology course (NU130). We hope you have enjoyed it and that it has been a valuable learning experience. We would appreciate it if you would take some time to complete this questionnaire regarding your experience of the course.

Many thanks, we are grateful for your cooperation,
Dr Liz Sheader and Dr Niggy Gouldsbrough

Enquiry Based Learning Questionnaire (2)

Group Number (or tutor name)

Are you a mature student (over 21)?
yes/no

To what level have you previously studied Human Biology?
GCSE A level other (please state)

Now that you have experienced Enquiry Based Learning (EBL):

What do you feel are the benefits of this form of learning?

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.....

What do you feel are the limitations of this form of learning?

.....
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.....

What skills have you developed through the enquiry based learning?

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.....

How did your approach to self study change during the course?

.....
.....

How has your level of contribution to the group discussion altered since the beginning of the course? (please circle)

increased significantly increased slightly stayed the same decreased

What are the reasons for the changes in your level of contribution?

.....
.....

Do you now feel confident about contributing to the discussions held during the tutorials

yes/no

If your answer is NO explain why you are not confident?

.....
.....

How beneficial do you rate following aspects of the course in relation to your learning?

Not at all	reasonably	extremely	essential
Lectures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Self study	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Case	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discussion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How do you feel that the experience of EBL will benefit your future career in nursing?

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.....
.....

How do you feel that your experience of EBL could be improved?

.....
.....
.....

Many thanks for taking the time to complete this questionnaire. Your comments will be utilised for future developments to the course.