Students and their digs: Enquiry based learning in level-one Archaeology

Erin-Lee Halstad McGuire
Department of Archaeology
University of Glasgow
e.mcguire.1@research.gla.ac.uk
Tel. 0141 330 2350

Abstract

This paper examines a case study of the use of enquiry based learning (EBL) in a level one archaeology course at the University of Glasgow. Small group work and EBL have been demonstrated to encourage deeper approaches to learning among many students. Unfortunately, numerous courses in higher education still use tutorials as support for lectures rather than as tools in their own right. This case study looks at the development of a new tutorial design using EBL and role-play. The success of the new design is discussed through the examination of one part of the new tutorial series; student feedback and tutor reflection are an important part of the assessment. Coming from the perspective of a graduate teaching assistant, this paper considers the ways in which EBL approaches support student learning and suggests possibilities for further development for this course.

Keywords: archaeology, case study, enquiry based learning, role-play, small group work

Introduction

Paul Ramsden (1992) has criticised the tendency to treat small group teaching (e.g. tutorials, seminars etc) as “a supplement to lecturing” (p. 157). Researchers have noted that small group teaching can have a significant positive impact on student learning, but...
only if managed effectively (e.g. Brown and Atkins, 1988). Although these observations are now more than 15 years old, unfortunately many courses still use traditional approaches to small group teaching opportunities. This paper examines the means by which the traditional tutorial style from one archaeology course at the University of Glasgow was revised by the course convenor and the Graduate Teaching Assistants (GTAs) in 2006-07. The revised tutorials represent work in progress, which continues this year.

The purpose of this paper is to explore my experiences as a tutor in the implementation and evaluation of the second of three tutorials for the level one course, Introduction to Archaeological Practice. Aspects of the tutorial considered here include tutorial design (in order to support student learning), and implementation and evaluation (of the design). Although all three tutorials form a coherent set, I have chosen to focus on a single tutorial to allow for a more in-depth discussion of the changes made and the student responses to them. Tutorial two was selected because it took a more substantive EBL approach than the other two.

While this paper focuses on my own experiences and reflections on the tutorial, it is important to note that credit for its design must be shared by the course convenor, Dr Allan Hall, the other two GTAs, Kirsten Bedigan and Sarah Thomas. The revision of the tutorials used for Introduction to Archaeological Practice could only have come about through Dr Hall’s support willingness to look to new options for the course.

Background

The course, Introduction to Archaeological Practice, is supported by three tutorials led by GTAs. Prior to this year (2007/08), the tutorials were spread across a two month period, leading to large gaps between each class. This resulted in confusion for the students in terms of remembering when their tutorials were scheduled and what material was covered in the previous meeting. Appendix 1 contains a copy of GTA handout for tutorial 2 that was used in 2005/06 (the new version of this tutorial is the subject of this paper’s analysis). During the 2005/06 academic year, the GTAs (author and colleagues) noticed the students who attended the tutorials were not engaging with the material and felt that a new tutorial structure was needed. Together with the course
convenor, we designed an archaeological role-playing game to replace the existing three tutorials. A key element to the game was that the students would be placed in the role of archaeologists, thereby helping them to develop a sense of identity within the field of archaeology, and making the tutorials more meaningful to them. When coursework seems relevant to practices outside academia, students are more likely to be motivated and to take a deep approach to their learning (Seifert, 2004).

The new tutorial design was primarily based around a site analysis game (henceforth ‘the game’), which we developed collaboratively. The students would work in teams throughout the three tutorials, with each team discovering their own fictitious archaeological site (tutorial 1), for which they would then develop survey and excavation plans (tutorial 2) and subsequently decide how to process the evidence and interpret the archaeology (tutorial 3). These new tutorials use an EBL approach by asking the students to draw on their own knowledge, and their recollection of their lectures to solve problems (Clouston, 2005). There are no right or wrong answers; they are not given definitive solutions to these problems. Instead, they develop plans as a team then present their proposals to the rest of the tutorial group. The tutorials are thereby learner-centred; that is, the students are “active participants in the learning process” (Clouston, 2005 p.50). This supports and encourages them in taking a deep approach to their learning because they are urged to make connections between what they know already and what they learn in the course (Kahn and O’Rourke, 2005).

This approach also takes into account diversity among the students on the course. The students have different motivations, have different levels of archaeological knowledge and can even come from different degree programmes. An EBL approach is interactive; this can make students feel more integrated into the class environment (Clouston, 2005). Furthermore, from a personal perspective I have found it easier to address language barriers in this format as non-native English speakers taking the course seem more willing to ask their peers or the GTA for help in small groups than in a lecture or other large group environments.
Tutorial Design

Following our initial meeting, the course convenor designed plans for each one-hour tutorial, described in more detail below.

- Tutorial 1 – each team discovering their own fictitious archaeological site.
- Tutorial 2 – each team then develops survey and excavation plans (this tutorial is the focus of this paper).
- Tutorial 3 – each team subsequently decides how to process the evidence and interpret the archaeology.

The fictitious archaeological sites were created by the GTAs and the course convenor; sets of materials (images, overheads of the sites, survey results, plans and artefacts) were compiled for each site. For the tutorials, the students are given the role of being archaeologists, working as team leaders for an archaeological research unit, while the GTA acts as the unit’s manager. This is an example of simulation role play as defined by DeNeve and Heppner (1997), because it attempts to model a real life situation. The students work in self-selected teams on their own projects, reporting back to the unit (i.e. the tutorial group), and guided by the manager (GTA) as needed. When reporting to the unit, the students give a brief oral presentation supported by photographs and plans from the materials package and the posters produced in the tutorial by the students themselves.

**Tutorial 1**

The structure for tutorial one was divided in two parts. The first half of the tutorial was spent on other aspects of the course, such as essay preparation. In the second half of the tutorial the GTAs introduced the game, allowing the students to form self-selected teams of three to four. This was followed by small group discussions, (in the teams, with the GTA available to answer questions), about how archaeological sites are discovered. The teams then shared their responses with the entire tutorial group and were assigned the imaginary archaeological sites based on these responses. For example, the first team to suggest aerial photography as a means of discovery for archaeological sites was then given a site discovered by aerial photography for their project.
**Tutorials 2 and 3**

The plans for tutorials two (Appendix 2) and three were broken down into six segments, mixing tutor-led discussions with small group work, and oral presentations:

1. Tutor-led discussion (e.g. survey techniques used in archaeology)
2. Team group work on sites (e.g. survey techniques suitable for team sites)
3. Team presentation to rest of tutorial group (e.g. survey plans for team sites)
4. Tutor-led discussion (e.g. excavation techniques used in archaeology)
5. Team group work on sites (e.g. excavation techniques suitable for team sites)
6. Team presentation to rest of tutorial group (e.g. excavation plans for team sites)

The purpose of the tutor-led discussions was to remind students of their options in terms of archaeological techniques, while the small group work was meant to allow the students to determine which techniques would be most suitable for their particular sites. The oral presentations allowed each team to share their ideas with the rest of the tutorial group, thereby providing the opportunity for the other teams to offer feedback, reinforcing the idea that the archaeological techniques applied to sites vary considerably depending on the nature of the site and the archaeology involved.

The EBL aspect of the tutorials revolves around the survey and excavation plans. Throughout the tutorial, the students were to design a survey plan, working from the materials provided. For example, one site package included a segment of a seventeenth-century map, a photograph of some burial mounds and a short note about the history of the place name. The site packages, previously assembled by the course convenor and the GTAs in advance, all consisted of fictionalised materials. Once the students had developed survey plans, they were then given further information from the packages based on their choices thus far. For example, when some students chose to do a radar scan of the burial mound, they were given a print out of what that radar scan might look like. Using both sets of materials, they were asked to propose an excavation plan for their sites. At the end of the tutorial, the teams reported their plans back to the class, making preliminary observations about their sites. One weakness in this design is that not all choices that could be made by the students were accounted for, and
sometimes they needed to be guided towards different choices based on the materials we had prepared.

Although the topics covered in each segment closely mirror those of the previous tutorials, I believe that they support student learning better than the original design. The students are no longer asked to respond to recall-based questions posed by the tutor, but are instead faced with a problem which requires them to develop a plan. It seeks the same basic information, but allows more opportunity for experimentation and discussion. The new design is intended to support student learning through the use of role-play, small group work and a diverse range of tasks. All of these things have been argued to be beneficial to student learning:

- Role-play (i.e. as practising archaeologists) demonstrates many of the characteristics of authentic activities (Reeves, Herrington & Oliver, 2002);
- Role-play and EBL provide challenge, interest, and meaning, thereby motivating students (DeNeve and Heppner, 1997);
- The range of activities (e.g. small group work, oral presentations, group discussion, poster design etc…) supports different learning approaches (Brown, Fry & Marshall, 1999);
- Small group learning promotes confidence, communication and independent thinking in a low risk environment (Anderson, 1997; MacKenzie and Ruxton, 2006).

The new tutorial designs provide greater opportunity for group discussions and less need for the GTA to seek purely recall-based answers from the students. The course convenor has also provided a formula for the tutorials, including approximate timings and a clear structure so that new tutors can have a starting point for their work. This will hopefully enable GTAs in subsequent years to follow, and develop further, the tutorial designs that have been created.

**Implementation**

Although I was supplied with a formula for the tutorials, I made some changes in the design to help with implementation (see Appendix 3). At present, there are no intended
learning outcomes (ILOs) for the tutorials. In order to guide my lessons plans and to support student learning I therefore defined my own ILOs. Because tutorial two focuses on survey and excavation techniques, the following ILOs were written:

By the end of this tutorial students will be able to…

1. Recognise that survey techniques are variable in terms of where and when they can be used, and what results they yield;
2. Assess the needs of their sites and identify the most appropriate survey and excavation approaches;
3. Explain and support survey and excavation plans to peers.

I made a minor change to the order of activities. Because each team sat at their own tables, it was easier to combine the large group discussions at the end of the tutorial. This also permitted more flexibility in the timing for the team tasks, so that if a group finished early, the students could be given further materials from their site packages and move on to the next task.

Another change that I made to the tutorial design was the inclusion of a poster (figure 1). The students were asked to record their survey and excavation plans on a poster, which they would use in the group meeting at the end of the tutorial. There were several reasons for the addition of the posters. They:

- Provide another form of participation for the students, sometimes enabling those less comfortable with public-speaking to contribute to their teams;
- Reinforce some of the basic elements of archaeological practice through repetition (first the students need to decide which techniques to use, then they write them down on the poster, and finally, they use the poster to help them describe their plans to their peers);
- Display and record student ideas for presentation to their classmates, these can serve as a reminder for subsequent tutorials.

The posters are particularly useful in terms of allowing me to supply the students with relevant data for their sites in tutorial three, based on their survey and excavation plans.
They were also used in the third tutorial as a means of reminding the students of their previous work and helping those who missed tutorial two to catch up with their team mates.

**Transcription:**

a) Field walking (25m)  
sting remains - finds  
b) resistivity (end Spring)  
GPRadar (for the prior phases)  
c) test pits according to the  
results/randomly  
→ enlarge → by hand?  
→ use the core (stratigraphy dating the site)  
probably on highest area (suggests older)

**Transcription:**

Resistivity  
Field walking  
Focussing on the inside of the fort  
Strip trenches  
Grid  
JCB  
Test pits  
Open

**Figure 1** Survey excavation plan posters – Teams 2 and 3, Tutorial Group 6
Evaluating the tutorial – feedback, evaluation and reflection

Through each of the tutorials I decided to use minute papers for classroom evaluation (Angelo and Cross, 1993). Class room assessment techniques are important because they allow tutors to quickly evaluate specific issues for the students and/or the tutorials. In the last few minutes of class, students are asked to respond to two or three questions about the tutorial on scraps of paper which are then submitted to the tutor (Angelo and Cross, 1993). In tutorial two, the questions for the minute papers were as follows (Appendix 4):

1. What did you learn today?
2. What was unclear?
3. Did the room change affect your learning? How?

There were 39 minute papers submitted, however in four instances, only some of the questions were answered. The first question was meant to evaluate the learning outcomes and identify those aspects of the tutorials that the students were focussing on as opposed to what they were meant to be focussing on. The second question was to highlight any areas that needed to be addressed in the following tutorial. The final question was related to the change in location for the tutorials in response to student and GTA feedback after tutorial one. This evaluation method was chosen because it is quick and gives an indication of what the students have learned. It allows me to compare what the students have learned against the ILOs for the tutorial and identify any areas that need to be revisited before the next tutorial. The following sections consider questions one and two only, because they relate directly to the ILOs.

**What did you learn today?**

From the answers to the first question it seemed that students picked up on a range of key ideas. Going beyond basic identification of archaeological techniques, many students felt they had learned about when and why these techniques were useful, which means that they had achieved ILO 1 and possibly 2. Furthermore, several students felt that they had learned some of the practicalities of archaeology:
“Learned a bit about organising an excavation through logical … decision making”
“Lots about the practicalities of excavations …”
“I learnt that it is not always easy to know how to approach a site.”

These student comments are important because they indicate that students are going beyond basic fact-recall. In fact, many of the students in these tutorials seem to have moved into the comprehension and application levels of Bloom’s hierarchy of the cognitive domain (Bloom, Engelhart, Furst, Walker & Krathwohl, 1956). They examined the information they had for their sites and made decisions on which techniques they should use. In doing so, they have considered the strengths and weaknesses of the techniques as well as the potential limitations of their sites. Hence, they are actively solving problems and applying their knowledge to the materials they have been given.

What was unclear?

The second question highlights those areas that need further work. Out of 37 responses, 26 indicated that nothing was unclear. The remaining 11 can be divided into three categories:

- Geophysical survey techniques (4);
- Practicalities of excavation (4);
- Archaeology in general (3).

Geophysical techniques are complex and have been explained several times in class and tutorials. It may be that some students would benefit more from practical experience with the techniques. It may be possible to introduce further examples of the results of the different techniques in order to help explain them. At the same time, there is a risk of dwelling on one topic to the exclusion of others, which is not beneficial to the rest of the class. It is also difficult to know how to respond to the students who wrote that archaeology was unclear to them. This may be an indication that that my question was poorly phrased and further evaluation is required in order to identify student needs in this area.

The most intriguing responses from my perspective are those about the practicalities of excavations, such as costs and time frames. They suggest that some students are
thinking beyond the materials and topics they have been given, thereby entering into the valuing level of Bloom’s Affective domain (Bloom, Krathwohl & Masia, 1984). These questions raise interesting issues which could be addressed in the future. It might be useful to add further details to the materials packages, for example. These could include costs for particular survey and excavation techniques and a budget for each team. This would enhance the realism of the game while adding a new dimension for consideration.

**Personal reflections**

From my own reflections on the tutorials, I noticed a problem with regards to equity. In particular, because these tutorials are new, each one is something of an experiment. I had four tutorial groups and so ran each individual tutorial four times over the course of a week. My first group had the roughest version of the tutorial, whereas by the time I reached the final group it had been refined. I am not yet sure how best to address this, but hope that improvement will come with further experience. Finally, it would be useful to know if the apparent improvement to student learning seen in the tutorials was reflected in the examinations. Unfortunately, as a GTA, I have been unable to access these results. Furthermore, because my students represent only one-third of the entire class, and each GTA implemented the tutorials in different ways, it would be difficult to assess the meaning of any changes to the overall marks seen in the course.

**Conclusion**

Most students appear to have found the tutorials to be stimulating and useful. In addition to verbal feedback, positive responses to the tutorial design are embedded in the minute papers:

“Archaeology can be like playing an RPG. This is a good thing!” [RPG – role playing game]

“Very good tutorial, working in groups really makes you think.”

“Yes, it’s working very well.”

Overall, the new tutorial style (the game) has many advantages over the traditional tutorial. Because the new tutorials involve authentic activities and are driven by student
enquiry, they seem to encourage deeper approaches to learning (Clouston, 2005; Reeves, Herrington & Oliver, 2002). The students are getting involved in their tasks, taking ownership of their sites and their learning, and working together. Based on the tutorial evaluations, I plan to expand the site materials packages to better respond to the variation in student approaches to the sites. For the 2007/08 year, the course convenor has rearranged the course schedule so that the tutorials are now closer together. This will help reduce confusion in the course timetable and increase coherency in the tutorials, hopefully further improving attendance and helping the students to remember their earlier work. This year also sees two new GTAs teaching on the course; working with new tutors will enable us to understand how effective the course materials are. It should also give some impression of the sustainability of the tutorial design.

Other aspects of the tutorials that I believe need to be addressed in the future, but are outwith my control include; length and frequency of tutorials (authentic activities, as defined by Reeves, Herrington & Oliver (2002, p.564), should be sustained over a longer period of time), assessment (the tutorials are currently only assessed indirectly through the exam), and the addition of unsupervised group work, all of which would provide more opportunities for the students to develop their ideas and knowledge. It is difficult to use a predominantly student-led approach as might be expected in EBL (see Clouston 2005, for example), because the GTAs need to ensure the students’ tasks are accomplished during the limited time dedicated to tutorials. The course is due to be reviewed soon, which means that there is the potential for further change. The interim result seems to be that the students are benefiting from the tutorials and that the project is worth continuing.

References


Appendix 1 – Original GTA handout for Tutorial 2 (2005-2006)

GTA Notes Tutorial 2 on the Recovery of Archaeological Remains

NB sites covered in lectures: Staosnaig Mesolithic site – flint scatter and structural remains; shell middens (see Powerpoint), Elginhaugh roman fort – area excavation, cropmark site, fort and annex.

1. An archaeological site has been discovered and you wish to investigate it further. What needs to be done before archaeologists even arrive on site?
   - Aims, authorisation, planning (desk top assessment), funding, logistics, etc…

2. Upon arrival on a site what needs to be done before the main area(s) of excavation is/are established? Why might it be necessary to undertake such tasks?
   - Field walking, test-pits, trial trenching, auguring, geophysics, phosphate survey. Purpose is to get an immediate impression of the site – both horizontal and vertical – to pinpoint the key areas for further investigation. Recover finds from topsoil – sampling if machine stripping etc.

3. Why is it necessary to establish some sort of grid system across the site? How might such a grid be physically established?
   - Grid is necessary to record spatial relationships of finds and features. Grid squares in metres usually with co-ordinates recorded relative to site datum. Can explain in relation to OS maps and use of co-ordinates, ditto elevations.

4. How are archaeological excavations recorded? Why are several different methods involved?
   - Field notes (notebooks, standardised forms/sheets, electronic), general diary, drawings (plans, sections), photography (artefacts, features, surfaces, sections), and items for sampling.
   - Different methods record different things (plans – soil relationships), reason for duplication – e.g. photographs versus drawings.

5. There are many different types of sites that require different types of excavation strategies. List some different types of sites and consider what different strategies would be needed?
   - Lithics scatters, burials, waterlogged sites, area excavations etc. Upstanding versus cropmarks, urban stratigraphy.

6. How in general terms might the different site types in 5 differ in their requirements (e.g. trench sizes, artefact categories, specialists needed, material expected)?
   - Sizes of sites, complexity, types of research questions, research v. commercial archaeology, types of finds structures expected, location (remote, urban, rural), requirement for machinery /or extensive logistics (conservation, flotation or sieving etc.) Multiple phases of activity.
Appendix 2 – New GTA handout for Tutorial 2 (2006-2007)

New Theme: Investigating Archaeological Sites (50 mins total)

Take the register
For each team give out the ‘Discovery Document’ for each of 5 sites.

1. Tutor led discussion: What are the first stages in investigating an archaeological site? (5 mins)
   • Possible answers: Topo Survey (Earthwork plan; Contour survey); Geophysical Survey (resistivity; magnetometry; GPR?)

2. Each team to consider 1st questions (10 mins):
   • What type of detailed survey would you recommend for your site project?
   • How would the survey help you choose a place to excavate?

3. Each team shares results with group (5 mins).

4. Tutor led discussion: What is involved in excavation? What types of excavation are used? (5 mins)
   • Possible answers: trial pits; exploratory trench (JCB); exploratory trench (h cut); area excavation (size of area?); other?

5. Each team to consider 2nd question (5 mins):
   • What type of excavation would you recommend for your site?

6. Each team to present their case to group. Tutor to record (15 mins).

The information from last year from Tutorial 2 may be useful.
Appendix 3 – Author’s tutorial plan, based on new GTA handout

New Theme: Investigating Archaeological Sites (50 mins total)

By the end of this tutorial students will be able to...

- Recognise that survey techniques are variable in terms of where when they can be used, and what results they yield;
- Assess the needs of their sites and identify the most appropriate survey and excavation approaches;
- Explain and support survey and excavation plans to peers.

Arrange room into individual team tables

Hand out name cards, site info ('Discovery document'), markers, poster paper

Explain tasks for session

1. General brainstorming (tutor-led) (5 mins)
   - What are archaeological survey techniques and what are their uses?

2. In teams, create a survey plan for site; make poster (student-led, tutor available to answer questions) (10 mins)

3. General brainstorming (tutor-led) (5 mins)
   - What are archaeological excavation techniques and what are their uses?

4. In teams, create an excavation plan for site; finish poster (student-led, tutor available to answer questions) (10 mins)

5. Move desks to boardroom layout; each team reports to the group (aka Archaeological Research Unit on their survey plan and results, excavation plan, current interpretation of the site) (3-5 mins each)

Notes on implementation:

- Feedback from previous tutorial needs to be addressed at the beginning
- Time for evaluation at the end needs to be included
- Times set out are too rigid – feed info on survey results to groups as they come up with their plans
- Include names tutorial # on posters for use in tutorial 3
Appendix 4 – A sample of student minute papers from the new tutorial two design

<table>
<thead>
<tr>
<th>1) learnt methods of dealing</th>
<th>I learnt that it is not always easy to know how to approach a site.</th>
</tr>
</thead>
<tbody>
<tr>
<td>how to survey. That they very pretty</td>
<td></td>
</tr>
<tr>
<td>2) No real problems tutorial rocked.</td>
<td>Nothing particularly unclear. I think the tutorial works a lot better in this room!</td>
</tr>
<tr>
<td></td>
<td>Very good tutorial, working like this is great, really makes you think.</td>
</tr>
</tbody>
</table>
| 3) Location rocks! I hate 321! not stuffy or dark or breasted | |}

<table>
<thead>
<tr>
<th>1. The best ways and areas to excavate at a sight. Most effective geophysical methods for soil type etc.</th>
<th>Yes, it's working very well.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. No.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1) Archaeology can be like playing a RPG <em>all</em> good things</th>
<th>a) Organising the things we've learnt so far</th>
</tr>
</thead>
<tbody>
<tr>
<td>2) No.</td>
<td>b) Practical - economical &quot;good&quot; excavation method</td>
</tr>
<tr>
<td>3) I would have been late for my lectures. except for reading. we liked lesson.</td>
<td>c) Not particularly</td>
</tr>
</tbody>
</table>
1) Learned a bit about organizing an excavation through logical (hopefully) decision making.
2) The effectiveness, ineffectiveness of such decisions
3) Yes, was much better, more room to be productive, better lighting.

1) That GPS is the best for mapping land mass
2) How GPS works
3) Group work with both P.E.

Food Back
1) Lots about the practicalities of excavations - good to work in groups, sharing ideas.
2) No, not really
3) Yes, there was space to breathe

1) Learned about different survey and excavation techniques, and in what context they are best used.
2) Not too clear on archaeology as a whole, but working hard to learn more.
3) Yes, it was easier to learn in a larger environment.

1) Different types of techniques, fun barriers being worked upon.
2) Time scales, causes.