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Enquiry-based learning and formative assessment environments: student perspectives

Kay Sambell
Northumbria University
kay.sambell@northumbria.ac.uk

Abstract

This paper outlines case study research into first-year students' experiences of enquiry-based learning (EBL) on a year-long introductory theory module. Students were supported to carry out a series of authentic small-scale enquiries involving:

- working in research teams;
- gathering, disseminating and analysing data from the field;
- sharing their interim findings as 'work-in-progress' reports; and
- becoming involved in peer communities via a student conference.

Semi-structured interviews investigated students' experiences of EBL and its relationship to formative assessment environments. The paper reports the findings under key themes, with illustrative quotations. It illuminates the relationship between EBL and the students' shifting ideas about studentship in the early stages of their university careers. Conceptual links between EBL as 'research-based teaching' and the literature on 'assessment for learning' are highlighted, together with implications for practice development.

Keywords

Assessment for learning; research-based teaching; enquiry-based learning; EBL; first-year experience; formative assessment.

Introduction

This paper outlines case study research into first-year students' experiences of enquiry-based learning (EBL) on a year-long introductory theory module in the interdisciplinary area of Childhood Studies. EBL was introduced to encourage inexperienced undergraduates to develop a sense of active studentship, in which they (re)frame their own learning as a matter of active enquiry and meaning-making, rather than seeing themselves as passive recipients of their lecturers' knowledge.

The study took place in the context of increasing student diversity in mass higher education. Widening participation in higher education presents many pedagogic challenges, especially in the first-year experience of study. Many first years mistakenly see learning as passively receiving and regurgitating the information a lecturer gives them. The project aimed to help students explicitly recast themselves as active and creative participants in the construction of knowledge. Previous research has suggested that lecturers can no longer expect students to 'hit the ground running' (Collins and Lim, 2002). Students need more guidance, more practice at tackling assessment-related activity and more feedback on their learning than

is traditionally the case in many university courses. Nowadays, however, undergraduates are expected to adapt to a model of learning and 'mass independent study' that differs markedly from the nature of support and the levels of direction offered in pre-higher education contexts (Sambell and Hubbard, 2004). Gibbs and Simpson (2004), for instance, argue that diminishing resources have reduced the quality and quantity of tutor feedback on offer to students. Close-up studies of first-year university students' experiences of study (Christie et al., 2008) highlight the substantial barriers students face when making the transition to the learning, teaching and assessment approaches expected at university.

Assessment for learning

Formative assessment or 'assessment for learning' is often regarded as an important way of helping smooth this transition. It is increasingly invoked as a means of enhancing learning-teaching environments, by reconceptualising the main purposes of assessment from a student-centred and learner-oriented point of view (Black and Wiliam, 1998; Boud and Falchikov, 2006; Handley et al., 2007; McDowell et al., 2005). Nicol's (2009:6) work on the first-year experience of assessment, for instance, calls for a 're-engineering' of assessment in the first year, to help facilitate learners' 'academic-social integration'. This approach promotes assessment, feedback and learning environments that seek to empower students to:

- become motivated and committed to study; and
- exercise more control over their own learning.

There is, however, widespread anxiety that formative assessment across the higher education sector is 'under constant threat' (Knight and Yorke, 2003:43). In response, there has been an explosion of interest in implementing sustainable diverse, effective and embedded feedback mechanisms to improve students' learning experiences (see, for example, Nicol and Macfarlane-Dick, 2006; Gibbs and Simpson, 2002; Hounsell, 2006; O'Donovan et al., 2008; Nicol, 2009).

Introducing enquiry-based learning

In this case study, our lecturers viewed enquiry-based learning (EBL) as a means of introducing research-based teaching (Griffiths, 2004) into the first-year experience of university study to address some of the challenges mentioned above. According to Hutchings and O'Rourke (2002), EBL inspires students to learn for themselves, bringing a genuinely research-like approach to learning the subject. So EBL was seen as an innovative way to encourage first-year Childhood Studies students to begin to explicitly think of themselves as apprentice or 'developing' researchers. This is based on the premise that the learning processes inherent in interactive, dialogic models of learning are remarkably similar to the processes of participation in research (Brew, 2006). To this end lecturers redesigned the first-year curriculum to emulate researchers' 'ways of thinking and practising' (Meyer and Land, 2005) in the relevant subject area. They explicitly highlighted to first-year students 'the link between teaching and research in the design of courses' (Brew and Boud, 1995:272). Particular emphasis was placed on fostering the development of collaborative, informal, formative communities in which students learned by seeing and engaging with other people's approaches.

Kahn and O'Rourke (2005) argue that EBL approaches characteristically:

- require students to draw on and value existing knowledge (rather than assume they occupy a deficit model);
- encourage students to actively explore and seek out new evidence for themselves (rather than waiting for the lecturer to provide all their information); and
- can help support the development of peer networks and relationships with staff.

Baxter Magolda (2001) sees involving students in research and research-like activities as supporting them in developing more sophisticated 'ways of knowing' or conceptions of knowledge, which increase their confidence as learners and heighten learners' capability for independent thinking. Her own findings suggested that students' development of complex assumptions of knowledge stemmed from participation in a mentored, but independent research experience. Baxter Magolda (1999:9) also saw this research-oriented approach to learning and teaching as validating what she described as:

'...constructive development pedagogy ... [in which] teachers model the process of constructing knowledge in their disciplines, teach that process to students, and give students opportunities to practice and become proficient at it.'

EBL theoretically offers an important opportunity to integrate the features of formative assessment holistically, by creating learning environments which promote social learning, dialogue and varied embedded feedback opportunities (Bloxham and Boyd, 2007). It has, however, traditionally focused on subject areas in applied disciplines, such as medicine or engineering. Our lecturers felt EBL had much to offer to the student experience of their emergent interdisciplinary area of study, which raises key pedagogic challenges and issues. Like other more 'traditional' critical-discursive humanities degrees, Childhood Studies focuses on fostering critical academic enquiry, which is applied to the analysis of authentic child-related contexts, rather than training students to develop workplace skills for direct work with children. Many students in their first year struggle to grasp the importance of thinking critically about childhood (Sambell and Gibson, 2006), especially when the literature they are required to negotiate and the concepts they are expected to develop seem abstract and difficult.

Teaching and learning strategy: a staged approach

Traditional teaching begins with abstract disciplinary knowledge that is packaged and presented by the teacher, and memorised by students to use later. In contrast, EBL, like research, starts with a 'real world' enquiry. Our lecturers wanted to motivate students to experience learning as a process of progressively delving deeper into the subject. Students collaborate, try out their ideas, debate and encounter different perspectives and find controversy. This mirrors the working lives of academics, who typically contextualise their own thinking through membership of appropriate and diverse academic communities of practice.

'Signs of Childhood' project

Students were invited, guided by the lecturers, to discover important concepts, explanations and interconnections by conducting a 'Signs of Childhood' project, incorporating three stages of enquiry. At the outset, students were introduced to broad overviews of a number of research projects the module lecturers had undertaken. This enabled the lecturers to offer personal narratives about 'doing research'. These highlighted the ways in which knowledge is constructed gradually as part of an ongoing process involving a wider academic community which involves:

- sharing, discussion and collaborative analysis of data gathered within research teams;
- membership of research networks and communities of practice;
- publishing or discussing one's ideas in a variety of forums and formats and receiving feedback; and
- attending and contributing to conferences made up of peers and experts.

The emphasis on developing communities of practice and communicating one's learning was also felt to be crucial in the context of widening access to higher education. Many students are the first in their families to attend university and may well have little idea of what an academic actually does 'behind the scenes' when carrying out research projects. Many falsely imagine that producing polished papers (and by analogy, a student assignment) is an innate quality (something one just happens to be 'naturally good' or 'naturally bad' at), rather than emanating from a gradual, iterative process of enquiry.

The project developed in three stages:

- Stage 1: Gathering images of (literal) signs of childhood
- Stage 2: Site visits
- Stage 3: Student conference

Stage 1: Gathering images of (literal) signs of childhood

'Signs of Childhood' is a pioneering enquiry-based teaching methodology developed by Knights (2005). It focuses on the collection and subsequent analysis of a series of literal signs that refer explicitly in some way to childhood or adolescence. As Knights explains:

'These everyday signs all define and mark out "children" as a separate (and special) category, but in very diverse and often contradictory ways. They encompass a range of criteria for the child/adult divide, and speak of a variety of attitudes to childhood, from the protective to the wary.'

Examples might include posters in shop windows, announcements and warnings at school entrances, baby-on-board signs in car windows and public notices in parks and play areas.

Students were encouraged to act as research assistants, gathering and analysing data, by capturing digital images of signs they found in their local environment. While disposable cameras were available to anyone who needed them, mobile phone technology predominated. The images were posted to the e-learning portal with a very brief contextual headline, so that they could be shared. Over 260 images were posted by a group of 76 students and loaded into an online album.

The 'Signs of Childhood' methodology is especially appropriate for working with first-year students, because it focuses on gathering and analysing artefacts and documentary evidence from the physical public environment. Students were not working with human subjects when gathering data. This was important, because:

- In this field, textual analysis and primary sources are often used in research contexts. Academics leading the project, for instance, publish research into children's and youth media based on the analysis of similar sources.
- Using such sources involved students in gathering 'real-world' data to lend an authentically open-ended nature to their enquiry, helping them to see the relevance of secondary sources (theory). They could avoid many of the complex ethical issues involving work with human subjects at this early stage in their studies.

The methodology was specifically developed with this in mind, as this is an acutely sensitive issue in Childhood Studies pedagogy and research.

The students' images were then produced as thumbnails on a 'Researchers' Forum' discussion board on the e-learning environment, so learners could begin to informally annotate their images and offer constructive comments to other students. Comments included:

- explanations of the reasons the student had felt the sign was interesting;
- comparisons of different signs;
- observations about common themes and emergent patterns; and
- interpretations of the signs' meanings in relation to theoretical perspectives and constructs studied on the course.

These were discussed in class time and related to secondary reading.

Stage 2: Site visits

Students were encouraged to conduct two site visits, to a library, an art gallery or a museum. They were expected to collect and reflect on data they could gather in these environments. In class time, lecturers shared images of similar visits they had undertaken, which acted as a 'rehearsal', and enabled lecturers to talk through their personal experiences of conducting field visits. When the students went on their own visits, they were provided with accompanying notes to act as prompts in their data collection and initial analyses. Class time was devoted to emergent themes and linked to the literature.

Stage 3: Student conference

A student Signs of Childhood conference was arranged towards the end of the module. Here students were encouraged to bring an example of two images of their choice to compare and contrast. The conference emulated, as far as possible, an authentic research conference, with, for example, booking forms, registration, delegates' packs, (student) conference organisers, keynote speakers, displays. Students were asked to contribute to informal work-in-progress round-tables, hosted by student mentors from other universities. This provided feedback for student presenters (from peers, more experienced students, students drawn from outside their course) on their interim findings. The feedback gained on their 'drafts', as well as the project data students collected and analysed, fed directly in to the module's summative assignment.

Research approach

This research forms part of a systematic university-wide, cross-disciplinary research study into student perceptions of assessment for learning. The aim was to compare students' experiences of innovation within this case study with other cases in which different approaches to assessment for learning were being adopted. Multiple methods of data collection were used, with interview, observation and focus groups generating data in an interpretive approach.

In our case study, 12 students (of the 96 on the module) were interviewed, using a semi-structured interview schedule, both during and after the project. They represented high and low achievers. Interviews aimed to illuminate first years' developing conceptions of studentship as a result of their involvement in the EBL environment and focused on eliciting students' conceptions of 'research' and its relationship to formative assessment. Transcribed interviews and field notes were entered into the qualitative data package NVivo. The data were coded, ordered and structured to identify dominant emergent themes, which represented commonly held viewpoints.

Research findings – student perspectives

The concept of formative assessment was used as a theoretical lens, enabling the students' experiences to be analysed and related to the literature on formative assessment with a view to informing future formative assessment practice.

The role of learner activity and participation

Interviews revealed that many students were conscious of moving away from a passive or transmission model of learning, which they felt they brought with them to university from previous assessment identities (Ecclestone, 2007). They talked, for instance, of remembering how, in the first few weeks of university study, they saw studentship as a matter of receiving the lecturer's knowledge and waiting to be told what they should be doing:

We'd expect the lecturer to tell us exactly what to do, expect loads of direction.

After a few weeks all the interviewees talked about the ways these conceptions of learning were beginning to change. They linked this closely to a sense of students, rather than staff, being the generators of

information and knowledge in class time. Students' views of the form and nature of EBL were key here. They felt, importantly, that EBL was 'very different' from other lectures. Rather than trying to copy down lecture notes from a slide, for instance, they talked about the ways in which the EBL approaches demanded a different mode of working, even in large lecture formats:

I enjoy the way... They don't sit there and just talk at you for two hours. You get feedback on the work you're doing.

For example, when invited to talk about key aspects of the module that stood out in their mind, one referred to the ways in which much class time was spent on producing and sharing group reports on the data they collected. Learning became viewed as a participative activity, with students co-constructing understandings and generating tentative theories. A sense of ownership seemed especially important in the reconstruction of learner identities:

And our work went up on BlackBoard, instead of just the lecturers'. It's our thoughts and ideas, so it makes it more personal. So you are more inclined to read it and remember what it meant because you were more involved in making it.

Low-stakes learning environments

Knight and Yorke propose that higher education could usefully 'work smarter' by developing the curriculum so that it contains more 'low stakes' assessment opportunities, in which 'good formative assessment encourages good learning' (2003:126). Some saw the in-class, large-group discussions of their data and secondary reading as providing timely feedback which would stand them in good stead in improving their work:

It's the way they do it, the way their module is set up so you get feedback after every session so you know at the end, 'Right, I've done the best I can do, I've taken on board what [the tutors] have said' and so hopefully that should improve your mark.

A sense of informality and developing peer communities were important to the students interviewed, appearing to link to 'low-stakes' assessment for learning environments. Students noted, with approval, that their learning was often based on 'informal chat.' These levels of informality were not viewed reductively:

It's actually starting to formulate it in a way that makes sense and in a fun way and in a small group way that you feel comfortable with and then you'll find that different people will take it in different directions.

While students emphasised the informal and casual nature of their interaction they also highlighted its significance to their learning experiences, with one student saying 'the conversations do really help'.

The importance of dialogue

Comments about the importance of dialogue and conversation became a recurring theme in interview data and chimed with findings from other studies within the wider university research project (Montgomery and Sambell, 2008). Discussions within and beyond the classroom were deemed to be vital as a key way of interacting with the subject content, transforming and discussing it with others to internalise meaning and make connections with what individuals already knew.

I think the class as a whole, when they get started with the discussions ... it's amazing. Hearing everybody bounce off everybody else is fascinating. Hearing all of the different viewpoints, you can think 'oh yeah, I should have known that', and seeing how things develop, and if somebody shows that they've got good knowledge on something you can go to them for help.

Sharing ideas and feeding back on their research activity became centrally important from this perspective: Hearing everybody's answers you could see how differently people saw them [the ideas]. It was really interesting, and we don't do that in any other lecture.

The underpinning model of studentship here appears to relate closely to a model of formative feedback which is derived from self and peers, rather than transmitted by lecturers. It resembles 'internal feedback' as defined by Nicol and MacFarlane-Dick (2006), in which feedback is generated in relation to peers' approaches and perspectives. It takes on a forward-looking, formative and developmental role, rather than a traditionally retrospective one in which feedback is tutor-generated.

Indeed, Black (2006) draws attention to the need to develop formative assessment as a new basis for teachers' practice and links this, crucially, to dialogue. He argues that this sort of informal feedback, in which language provides a way of thinking together and jointly creating knowledge, can help students' learning:

Dialogue in the classroom provides one of the main opportunities for formative interactions (2006:100).

The research-based teaching approach appeared to enrich classroom dialogue.

Students often emphasised the ways in which they appreciated the capacity to perceive different ways of seeing data. They valued becoming aware of, discussing and collectively analysing the data their colleagues and staff had gathered as part of the project.

Other people's ideas [were important] as well, and when we were writing things down, and we talked about it afterwards to people, you know, and looked at their notes and they might have had a better example, and you noticed how they were linked together, it helped a lot seeing how other people viewed it.'

The capacity to see others' approaches, rather than working in isolation, was a recurrent theme to emerge from the interview data. This relates closely to aspects of McDowell et al.'s (2005) model of 'Assessment for Learning', in which formal and informal feedback mechanisms are underpinned by learning environments in which students:

- share ideas;
- become actively involved in self and peer evaluation by seeing and learning from other people's perspectives and approaches;
- rehearse and practise the important skills and qualities they are expected to develop in a developmental way; and
- gaining vital feedforward which enables them to change their approaches, if necessary, before it 'counts'.

This can be seen as a matter of fostering students' self-evaluation skills, with students learning to determine for themselves, whether their current modes of engagement should continue as is or if some type of change is necessary. Here, for instance, a student talks about asking herself whether she is 'on the right track':

The first semester the same insecurities are running through every single student – 'my work is not good enough'. Until you see somebody else's, that you're on the same track and you are all learning the same thing, that can really give you a big confidence boost and can make you think – 'I'm right on the right track'. But also if your work is not really that good,

if you read somebody else's it pushes you a bit more because you want yours to be just as good as theirs.

Our findings suggest that students place heavy emphasis on the value of informal collaborative peer learning, have led the module team to place more emphasis on classroom dialogue and group work in their subsequent modifications to the module design.

Student conceptions of research

Students talked of the ways in which they felt that, concomitant with a developing view of active studentship, they were expanding their personal definitions of what it means to 'do research' and forming a sense of joining the research community. All of them had changed their minds to some degree about what 'research' was. Again, they compared their 'new' definitions of research to the preconceived ideas they had on entering university. Some remembered believing that research was characterised by mundane information retrieval:

I thought it was just about finding information from leaflets.

I'd just go on the internet.

Others remembered thinking research was an exclusive occupation reserved for specialists:

I originally thought research was a big thing to do, it required lots of people and money. I thought it was scientists and stuff. I know it's not now. I know I can do it. It's about being critical, looking at what other people have done, then finding a methodology and asking questions.

Conclusion

This sense of 'belonging' at university may well be vital in terms of supporting and retaining not just so-called 'non-traditional' students, but all students. It is more than simply feeling welcome. It is about feeling one can make a positive contribution to academia and its endeavours. This perspective on studentship intrinsically calls into question more traditional views of the relationships inherent in passive or transmission models of being a student, which tend to be constructed around diametric oppositions. Enquiry-based learning contests traditional dichotomies such as:

- staff versus student;
- teacher versus learner;
- researcher-as-knowledge-generator versus recipient of knowledge; and
- expert versus tabula rasa.

Perhaps, as Elton (2006) suggests, the most important change research-based teaching offers is to shift the primacy in the teaching-learning process from teaching to learning and the central role of the participants in the process from teacher to student. This implies a fundamental change in the philosophy of teaching and learning itself.

Our findings suggest that students experienced research-based teaching as accelerating conceptual understanding of threshold concepts, promoting collaborative learning, dialogue and the social construction of knowledge within the discipline. This links directly to other research that focuses on the need to foster explicit ways of helping students make effective transitions to university study.

Enabling students to work with 'real world' data foregrounded fluidity, authenticity and student choice rather than teacher prescription. This, in turn, seemed to foster students' interest and motivation.

A follow-up project (Sambell, 2009) has explored the possibility of adapting and transferring the Signs framework to modules in other disciplinary areas and levels of study, including professional and postgraduate courses.

Inevitably there were qualitative differences and specific challenges to emerge in each local context. However, the tutors involved all claimed to find the framework useful, in so far as it repositioned students in active rather than passive roles in relation to subject material.

In sum, the pedagogic approach of this case study aligned closely with the principles and assessment for learning (McDowell et al., 2005). Formative assessment practice (Black and Wiliam, 2009) lay implicitly at the heart of the project's innovative pedagogic approach, so the approach offers a practical way of embodying assessment for learning environments and driving an assessment for learning agenda. Most specifically, it activated students as instructional resources for each other and as owners of their own learning (Black and Wiliam, 2009).

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