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Supporting learning autonomy and curriculum coverage in university teaching: three case studies of formative assessment

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Abstract

This research investigates formative assessment at a UK research-intensive university, considering the aims and effects of their deployment. The research spans three academic disciplines broadly within the sciences and considers the influence of their history and culture on the approaches taken.

It reports on three case studies originally chosen because of their innovative use of technology in teaching and assessment methods. Each case included mid-term summative assessments that were intended to have a formative function for the students. A triangulation of research methods was used that included documentary analysis, interviews and focus groups. Cultural historic activity theory was used to interrogate the data that emerged from the research. Bourdieusian theory was also used to understand and explain some of the findings.

The thesis explores commonly held ideas about what constitutes desirable learning outcomes. It concludes that teaching and assessment practices do not always deliver on their promises nor support their intended objectives. Even within innovative educational methods it finds deeply rooted practices which fail to support the graduate skill sets that the tutors are hoping to develop in their students. It suggests that formative assessments which *only* reward curriculum coverage encourage narrow and conformist thinking and such thinking is at odds with the behaviours we should be developing within our educational environments.

However, this thesis also describes educational practices that do meet their primary aims: to develop students' learning autonomy whilst they cover the course curricula. These practices are constructed around formative assessments that build community within the student cohort, engage the students in authentic tasks requiring critical reflection and give students a chance to develop expertise within niche areas. The thesis suggests that these practices are applicable in all academic disciplines, independent of the subject, and provides approaches to teaching and assessment that encourage autonomous learning and develop high-level transferable skill sets. We all forget facts and procedures over time, and so it is our students' capacity to know that we must develop within education.

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Acronyms

AfL: Assessment for learning

BME: Black minority ethnic

CHAT: Cultural historic activity theory

EdD: Professional Doctorate in Education

FE: Further education

HE: Higher education

HEI: Higher education institution

MCQ: Multiple choice question

NSS: UK National student survey

VLE: Virtual learning environment

ZPD: Zone of proximal development

Chapter 1: Introduction

I work as an educational technologist in a UK university. My role is to introduce technology into teaching and student study practices. The role has given me a profound interest in the extent to which technology can support student learning. The matter is increasingly important as institutions seek to increase student numbers in order to grow their revenue and technology is seen as a way to support higher student-to-tutor ratios without reducing educational standards. Consequently, my doctoral research began as an exploration into the effectiveness of technological implementations in improving university student learning.

However, during the research process I found that the scope, aim and methods of deployment of assessment practices varied greatly across the university and that these variations influenced the quality of the student experience far more than the technology used to support it. Furthermore the use of technology in higher education teaching is relatively well researched and documented. Therefore assessments, particularly but not exclusively those supported by technology, became the focus of my analysis of the research.

This area of assessments is vitally important to the future of HE and is under-researched (Crossouard and Pryor 2012). Assessments are a major influence on the quality of the students' learning experience because they affect the students' approach to their studies. Assessments traditionally rank students' ability in subjects but formative assessments are a growing area of interest in educational research at all levels of study because they can positively influence study habits (see Chapter 4 for more detail about the term *formative assessment*). Furthermore feedback from assessments is an area in which universities are heavily criticized, particularly by students in the yearly National Student Surveys (NSS) and is a factor prospective students look at when deciding where they should study. Universities across the country have become obsessed with improving NSS scores on student feedback (Arora 2010) and using formative assessment to do so. This thesis therefore investigates a topical area: technological implementations of formative assessments in HE courses.

The research used case studies to investigate the implementation of mid-term assessments designed with the purpose of improving learning in three courses in different disciplines at a UK research intensive university. The courses were selected on the basis of their use of technology, through the institutional virtual learning environment (VLE), to conduct the formative assessments. However, the importance of the medium of the delivery of these assessments was overshadowed by the intrinsic aims of their deployment.

The research finds evidence that assessment methods give students underlying messages about what is expected and that these messages affect their approach to learning (McDowell 1995; Biggs 1999; Prosser and Trigwell 1999; Ramsden 2003; Sambell et al 2013). Some prioritise memorisation and the performance of procedural tasks, whilst others require in-depth personal analysis and reflection.

It finds educational practices which support the development of graduate skills such as

learning autonomy, but it also finds teaching and assessment practices that have been rolled out with good intention but undermine the formation of graduate skills. The differences in the findings between case studies result from the differences in the deployment of formative assessments. Some meet the overall objectives that the teachers have for their students and some aggravate undesirable student behaviours. Some are adopted with the intention of creating a community within the student cohort and others are not. Some support independence in learning and others encourage dependence on feedback. The research considers the history and cultures of the courses and investigates disciplinary influences that are necessary and those that are unhelpful to educating our graduates.

The thesis suggests that in order to develop graduates with high-level transferable skill sets we should be introducing formative assessments that build community within the student cohort, engage them in authentic tasks requiring critical reflection and give them opportunities to develop expertise within niche areas. However whilst some formative assessment tasks develop transferable graduate skills others only support curriculum coverage. This thesis argues that both are necessary, but in university teaching, particularly in the hard, pure disciplines, curriculum coverage is prioritized at the expense of learning autonomy. It builds a theory of teaching and assessment practice drawing from the evidence in the case studies.

In this chapter I provide an autobiographical account of myself which traces the development of my ideas up to the point of starting this research. I begin by recounting and analysing my four experiences of studying in HE. It is an unconventional start to a doctoral thesis, but I use the personal account to draw out two issues that are crucial to this research project. The first is the way in which my epistemological stance has evolved and therefore given rise to the approach to research used in this thesis. Second, my account reflects the idea that disciplinary practices influence our epistemological beliefs. In a landmark piece, Becher (1989) described academic disciplines as "tribes" with knowledge "territories". Disciplinary epistemologies and their relevance to teaching, learning and the construction of undergraduate and Master's level identities are central to the substantive argument of the thesis as a whole.

I conclude the chapter by talking about the research questions that this work addresses and introducing the structure of the rest of the thesis.

My personal history

My undergraduate degree was in chemistry and during these formative years my understanding of the world was influenced by scientific epistemic thinking. I will say more about disciplines later but in short, scientific disciplines describe knowledge as something provable, reproducible and empirical (Neumann et al 2002). A person's scientific merit is often measured in terms of his or her ability to manipulate instruments and formulae, their rationality (Grenfell and James 2004) and the information they can recall on demand. This is particularly true at undergraduate level and below, where the need to innovate is overlooked. Scientific method is often linked with positivism where the goal of inquiry is to explain and predict and develop laws which stay true in as many environments as possible. Many scientists argue that all truth is discoverable and comprehensible to the human mind. My research project was

in the field of analytical chemistry where data was used to postulate the existence of specific antibiotics in bacterial cell walls. I searched for an objective answer to a yes/no question.

After my undergraduate degree I had a number of years of professional experience first as an organic chemist in the pharmaceutical industry, second as a scientific editor writing abstracts for scientific patents and third as a computer programmer for a software company.

My movement through different sectors of the job market led to new career aspirations which had new skills requirements. My first Master's degree was in Business. Business is a social science, however its approach to knowledge is more scientific than social. That is to say, like the discipline of chemistry, it views knowledge in terms of general laws, patterns of behaviour and reproducible processes. It tends to value quantitative over qualitative research methods. Depersonalizing data and analysis is encouraged because an objective, unemotional view on the research object is thought more likely to expose the truth. By distancing the researchers from the generation of data it is thought the results are less likely to be skewed by preconceived ideas or invalidated by their influence over the results.

During my time studying I conducted many interviews which were as structured as possible with pre-set questions and little digression. The pervading view in the discipline was that by taking a structured approach I was improving the validity of the research exercise. In a group project unstructured interviews were used only to build good relations and to get a broad overview of the research topic. Analysis of the discussions, where possible, was reduced to figures, such as how many times a product or phenomenon was mentioned.

On completing the Master's I was appointed as an Educational Technologist at a UK research intensive university, initially in a scientific department. The work was largely self-directed and I made one important role for myself: introducing the School to "blended learning" (see Bromham and Oprandi 2005). The informal nature of my role meant my approach did not need to be highly strategic but there were two main challenges: one, making it technically possible for faculty to provide learning materials online; and two, educating faculty about the pedagogic use of the technology. My role as Educational Technologist became increasingly important to the University. I started to use an open source VLE and a University decision was made to employ this software for use in all academic Schools. I was initially taken on as a consultant in the project and was later fully employed by a central administrative department. I currently work in the e-learning department managing, developing and enhancing the VLE and integrating it with other systems.

Within these roles I was given opportunities to continue my personal interests and studies. My second Master's degree was in media studies. In this department culture was analysed through its creation and consumption of different media forms and content. The approach to knowledge was an act of finding underlying meaning in public communications. It deconstructed the narratives and made sense of encoded messages in everyday discourse, thus revealing the unsaid or metanarrative. The epistemologies

prevalent were more wide-ranging and significant than in the subjects I had studied before. I quickly took up a structuralist approach to knowledge, seeing power structures and social regularities as a principal force shaping culture. I de-emphasized the unpredictability, uncertainness and emergent properties of the social world and questioned the extent to which our agency, human will, was a force in creating our realities.

By the time I started my EdD I had been exposed more than most to the dominant epistemologies in a number of academic disciplines through the sciences to the humanities. In general Education as a discipline seeks solutions to pedagogic challenges through constructivist logic. Despite this, at graduate level and above, consideration is given to all approaches to knowledge. For example, subjectivist and deconstructivist epistemologies offer insights into obstacles to practice.

In my first academic EdD assignment I critiqued a paper by William Dutton, a Professor of Internet Studies at Oxford University. For the paper he and his researchers had carried out a two-year case study of VLE adoption in a US HE institution (Dutton et al. 2004). I chose it because his research was in line with the interests I had when starting my EdD, although upon analysing the text in detail I concluded it lacked academic rigour or findings that were thought-provoking.

My second academic assignment required me to investigate a research method of my choice. I wanted to know how the staff were using the university VLE to supplement their teaching. I thought by asking as many people as possible I would be more likely to get a generalized truth to my question. I believed the best way to do this was via a short-answer questionnaire. As a result, I piloted this on five willing academics. I was creative with my questions and tried to delve deep into the issue. I believed that from likert scales and "yes/no" answers with space for comments I could gather some meaningful data. However, I found the creation of the questionnaire far more complex than I originally thought. For example, through post-questionnaire interviews with the pilot participants I found many of the questions were ambiguous and were difficult to phrase in a way that would clarify their meaning. Furthermore, I found interpreting the results was more of a creative process than I had thought. I used a weighting system for the responses categorizing the research participants' strength of feeling. However, through post-analysis of my process, I realized the weighting system had no basis of validity as a means of making truth. I found I could make claims to knowledge that were on the face of it drawn from the data but were actually based on assumptions I already had.

In my third academic piece, I conducted a short student questionnaire about student uptake and reaction to the VLE. It differed considerably from the initial pilot I did for my second assignment because it consisted of very few, open short-answer questions. The style of questionnaire was very much more conducive to learning something about staff use of the VLE. However, like my pilot previously, I was drawn to categorizing the responses in terms of the number of students who had responded in a certain way and thus I was able to turn a relatively qualitative piece of research into a quantitative one. This was problematic because those factors which were mentioned by most research participants and therefore scored highest were not necessarily the factors which were

the most crucial to answering my research questions.

At this point I experienced a u-turn in my thinking. I found that the questionnaire format put distance between my research participants and me and felt that the results led me to conclude things that were both ambiguous and untested. I decided I needed to probe deeper into the matter and that would require talking to and observing people. It seemed that in order to understand my research participants I needed what Flyvbjerg (2006 p.392) describes as "concrete, context-dependent experience through proximity to the studied reality". Eysenck (1975 p.9) said that sometimes in research "we simply have to keep our eyes open and look carefully at individual cases – not in the hope of proving anything, but rather in the hope of learning something!"

I wanted to trial case study research. I did not think that one could generalize from the outcomes of such research because it could only sample such a small number of people. However, like Abercrombie et al (1984), I started to think that it may be useful in the early part of an investigation in order to learn and provide hypotheses which could then be tested with research methodologies that use more participants further down the line. I thought case study could draw out ideas which I could analyse with a wider-ranging questionnaire in thesis. At this time I stood with many other researchers who assume that a contribution to knowledge, such as one made in a doctoral thesis, is a general law applicable to many situations, but such an outcome would never be possible from a case study (Tellis 1997).

My fourth academic piece was a critical analytic study (CAS) within which I used a focus group-based case study. It was the first case study I had run and I took the point of view that the focus group was a discussion where knowledge would be generated by sharing ideas (Mason 2002). I actively engaged in conversation so that concepts could be jointly developed. My approach stood in contrast to the approach I had taken during my Master's in Business, when I contributed very little to the research interviews except for asking direct questions. I no longer thought that through passive questioning the research participants would be unaffected by my presence and consequently would convey an *untainted* truth. It seemed to me now that by engaging the research participant in discussion, I was far more likely to generate interesting and full data that I could learn from.

The case study elicited evidence of the approach to learning taken by a small sample of an undergraduate course. I recognized that the case study would not make it possible to say how many people thought a certain way, but I found that it did give me a thorough understanding of my research participants and what they said felt like it was likely to be a reality for many more students. Within my CAS, I explained:

> *I engaged with case study for the first time in this doctorate and I found it a surprisingly powerful research method that I believe could potentially support a strong claim to truth. I felt the knowledge that could be constructed was far more reliable than the knowledge I was able to construct from written questionnaires.*

I was able to interrogate approaches to knowledge with more rigour and I was getting

closer to understanding my interpretation of validity in research practices. I had a very different understanding as to what I could hope to achieve through my research.

Research questions

During the taught element I had been developing more research questions, and these were changing in style and substance as my epistemological stance shifted. Whilst my initial interests were on the use of technology at my institution and its effect on student learning, my research questions were now focused around exploring cultural and social structures in HE, the agency of tutors and students and their influence on the student learning experience.

However, even by the time my research had begun my research questions were not fully formed. Whilst conducting the case studies my research questions changed. My initial question was, "How is the VLE technology supporting student study at a UK '94 group university?". Consequently the courses I chose were based on their use of the VLE. But the research provided evidence of innovations to assessment that were more influential to student learning and not dependent on their use of their VLE. The main differences to the student experiences came as a result of the formative assessment tasks they were expected to do and not the technologies they were using. As a result, my research questions changed and I set out to answer:

- *How is formative assessment being practised at UK a research intensive university?*

I shall talk much more about formative assessments in my literature review. Briefly however, they are evaluations of students' work used to improve their learning. Within the scope of this question I started to want to know:

- *How do disciplinary influences affect the implementation of formative assessments?*
- *When are formative assessments most effective?*

During my previous assignment I had been drawn to a number of different analytical research frameworks, including cultural historic activity theory (CHAT). This led to my final research question:

- *To what extent have the theoretical frameworks been useful in identifying the structural and agentic forces at work in the formative assessment endeavours?*

Thesis structure

I have structured the thesis to build up to a convincing claim to knowledge with regards to the research questions. It is set out in the following way.

The second chapter describes the methodologies I have employed. I introduce why case study research was chosen and account for the different research methods, including semi-structured interviews, focus group and documentary analysis. I give a brief overview of how I analysed the data. Finally I reflect briefly about the social aspects of the methods, taking each as an individual case.

The third chapter describes the theoretical frameworks I employ. They include Vygotskian learning theory, Engeström's cultural historic activity theory (CHAT) and Bourdieusian theory.

The fourth chapter summarizes teaching and assessment research in HE, and the arguments and issues scholars are commonly raising. It offers a brief discussion of popular culture's view of learning pitted against sociocultural understandings of learning. It reviews traditional teaching and assessment at HE level and common critiques of it. It then introduces formative assessments and their implementation at this level.

The fifth, sixth and seventh chapters introduce the case studies in detail. The chapters start as in-depth descriptions of the case studies including the teaching and assessment methods, documents and interviews. I then summarize the chapters bringing forth ideas about formative assessments and problematizing them. The summaries identify the different meanings that they can have for the different actors, and give an account of how they were received by student research participants.

The eighth chapter is the discussion where I compare the case studies and identify the ways in which they are working. I use the theoretical frameworks to build an argument regarding the effects of formative practices on student knowledge. I use CHAT extensively to break down the process of learning into its component parts as conceptualized by the framework. I build an understanding of the agentic actions and structural forces which are at work and how they support different aims of student development. I draw upon evidence in the case studies to make a claim about what good-practice teaching and assessment, that supports learning autonomy and curriculum coverage, might look like.

In the final chapter I revisit my research questions in the light of my discussion. I consider the extent to which the theoretical frameworks have supported my argument and propose future directions for this research.

Chapter 2: Methodology

In the first chapter I have introduced myself, my research and the rationale for it. My personal history, including the social and cultural worlds in which I have circulated, has influenced my understanding of knowledge and truth. It has been formative in developing my epistemological stance and my approach to my research.

I recognise I cannot avoid having a pivotal role in the research agenda, nor in the process of constructing interview questions, selecting respondents, conducting interviews and focus groups, analysing the text and the producing of the report. Dunne et al (2005 p.29) say, "The researcher (self-) understanding and position are central to representations of the social within the research writing. Researcher identity, then, is critical to the production of knowledge about the complexities of the social world".

My onto-epistemological position is that there is an absolute *truth* that exists outside of ourselves and exists independently of our knowledge of it (see Sayer 1992). Like Plato, I believe that even if we exist like prisoners in a cave who can only see the shadows of people and animals cast by a roaring fire, ignorant of the world and sun outside of it, there is still a reality which exists despite our ignorance of it.

I also still lean towards structuralism. However, whilst I see social structures shaping our actions, I view the social world as complex, uncertain, unpredictable and emergent. It is not possible to have direct or unmediated access to the social world and it can only be known through theories, simplifications and metaphors. This means that events and processes in the social world exceed our capacity to know them (see Law 2004) and knowledge of it is "approximate and contestable" (Sayer 1992 p.232).

The research process has changed the kind of knowledge I hope to produce. I had always assumed I wanted to be able to make big generalizations that would be true across many contexts, but I no longer have this grand objective. I do not want to prove something; I want to learn something. I take the view that the study of particular cases is more useful than universal principles and that the studies of the local, in all its concreteness and diversity, is more useful than the general and abstract (Toulmin 1990; Kemmis 1992). As Flyvbjerg (2006 p.395) stated, I now think:

> Formal generalization is overvalued as a source of scientific development, whereas the force of example is underestimated

Multiple case study research

Case study research has been chosen as the most appropriate research approach for me to use for my thesis. Such research was described by Yin (2009 p.18) as "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident".

Because my research questions were not isolated to one discipline, I needed to perform more than just one case study (Mason 2002). Multiple case studies were set up to show similarities and differences in the student experience as a result of the different

methods employed and differences in disciplinary norms and expectations.

The choice of case studies was important in order for the research to reflect my epistemological position. Flyvbjerg suggests the different approaches to selecting case studies are either "random" or "information-orientated". In the former, the sample size decides if the case results can be generalizable. In the latter, cases are selected because they are extreme, critical, paradigmatic or have maximum variations. These information-orientated cases can provide more value to the researcher. He (2006 p.395) says:

> When the objective is to achieve the greatest possible amount of information on a given problem or phenomenon, a representative case or a random sample may not be the most appropriate strategy. This is because the typical or average case is often not the richest in information. Atypical or extreme cases often reveal more information because they activate more actors and more basic mechanisms in the situation studied.

Because in my research I wanted to document examples of courses supporting teaching through VLE technologies rather than finding a generalizable truth, I decided that choosing courses that had innovated in this regard would be most revealing. In these courses the students' ideas about teaching, learning and assessments were being challenged, and they were more likely to have reflective thoughts about when they were and when they were not learning.

In order to choose the case studies I made use of prior knowledge available to me. I had worked at the university for nine years and had many contacts. My role as educational technologist puts me in contact with many of the tutors who use innovative teaching and assessments particularly when they involve technology. Further to this, my role meant that I networked closely with the academic practice unit involved in training university tutors and awarding university teaching grants and prizes. They therefore had a good idea about what was happening on the ground. I also had the VLE at my disposal. Through selecting records on the VLE systems management database, I could find the course sites that were being used the most and have an idea about the ways in which they were being used. Furthermore the queries could be anonymized to mitigate ethical issues.

After some investigation I chose three courses, one a Hard Science, one in Soft Science and one in an Applied Technical discipline. They each used mid-term summative assessments with the purpose of improving study habits and learning. The reason given by the tutor for the exercises being summative was to motivate the students to do them, but their intention was not primarily to assess performance. From the point of view of each of the tutors the assessments were formative, although some were more useful for students developing their understanding of, and personal perspective on, the subject materials; and others were more useful for preparing the students for later summative assessments. I describe how I approached each of the course convenors in the ethics section below.

In my research I wanted to use sociocultural theoretical frameworks (Vygotsky 1978;

Lave and Wenger 1991; Bourdieu 1993; Engeström 2001) to analyse the data (see Chapter 3) because they offer a systems view of the educational endeavours rather than individual accounts. As a result, when deciding what to include in my research it was important to cast my net wide enough to catch as many actors and artefacts which influenced them as possible. This included the course documentation, the VLE site, the course tutors and a sample of the students. By doing so I was including the representative actors, tools and symbols, imbued with history and culture, that made up the field.

Research methods

Tellis (1997) describes case study as a triangulated research strategy because it uses multiple research methods to ensure robustness of the data. In this research I used semi-structured interviews and documentary analysis in two of my case studies and a semi-structured interview with the tutor, student focus group, documentary analysis and limited observation in another. In the table 2.1 I list which of the research methods I used in each of the case studies. Each numerical cell contains the number of participants who contributed to each.

Case Study	Semi-structured interviews	Documentary analysis	Focus groups	Observation	No. of tutors	No. of students
Hard Science	4	Yes	No	Online only	1	3
Soft Science	4	Yes	No	Online only	1	3
Applied Technical	1	Yes	4	Online and lecture	1	4

Table 2.1: Research methods used in case studies

I conducted the Applied Technical course case study in the Spring term of 2008 and the Hard Science and Soft Science course case study together in the Autumn term of the next academic year. The differences in research methods resulted from a refinement of the research design over time. In the sections below I describe each of the research methods in more detail and the reasons for employing them and in some cases dropping them. I then describe my process of analysis and provide a brief reflection on each of the case studies.

Semi-structured interviews and focus group

The semi-structured interviews and focus group were ideal research tools for this exploratory exercise (Kvale 1996; Mason 2002; Dunne et al 2005). I did not take an empiricist or positivist approach to them or use the time to ask objective, closed questions as, like Dunne et al (2005 p.31), I think they act "to de-socialize and de-politicize research and the plane of vision to the disembedded individual level". I asked open questions and used an informal style, seeking to reduce the potential for the interview setup to be intimidating for the respondents. I considered the interview as a conversation where I sought to understand the participants' goals, experiences and perceptions. Unlike a "miner" looking for knowledge in the heads of the respondents, of which I would judge the validity in the analysis, I considered myself a "traveller" (Kvale 1996) trying to learn from their stories through prompts and probes (Mason 2002). The focus group and interviews were recorded with a dictaphone so I could fully engage

with the interviewees during the time I spent with them. My approach enabled the exchange to be in-depth and personal and enabled me to "understand the social actor's experience and perspective" (Lindlof and Taylor 2002 p.173).

I developed interview and focus group schedules (see Appendices A-F), but like Mason (2002) I recognised the advantages of taking an open disposition to the interview and therefore practised flexibility in the form and sequence of questions. In some of the interviews I used props such as printouts of the engagement in online discussions.

During the focus group and interviews it was sometimes useful for me to contribute my ideas and thoughts. I recognized the danger of unsettling the interviewee by doing so. Schostak (2005 p.16) says, "Each interview is a partial view of particular states of affairs or events. Any move one person makes to or away from another involves a degree of risk, a risk of misunderstanding, a misjudgement, of misadventure". Despite this I was similarly wary of misinterpreting the data when reading the transcripts alone. I preferred the interviews to be a shared space for the creation of knowledge (Kvale 1996; Dunne et al 2005).

In the Applied Technical course case study, I held a focus group with the students. It had the advantage that a consensus could be reached between the students but I failed to pick up on important points during the session and some of the viewpoints were overshadowed by the students with stronger personality. Consequently, I decided in the subsequent case studies I would be able to get a richer and more detailed understanding if I interviewed each of the students individually.

Documentary analysis

Before meeting the research participants in each of the case studies, conducted a document analysis using the approach of qualitative content analysis (Bryman 2004). I read through the course handbooks and interrogated the course VLE sites, including gathering anonymized data on usage by students. I was able to build an understanding about the structure of the course from the point of view of the texts as well as the metanarratives they communicated (Dunne et al 2005). This involved amongst other things, the levels of trust and respect for the students were conveyed through these texts. For example, the Soft Science course talked of a contract between tutor and student of which both were expected to fill their obligations, clearly setting a collegial and respectful tone, whilst the Hard Science course used capitalisation to give very clear warnings about what the students should and should not be doing, thus setting a more authoritative tone.

Whilst the texts, in particular the course handbooks, gave messages to the students about what was expected of them, they were not the only or most powerful message. Teaching methods and, moreover, the expectations of assessments were even more significant. For example, if the assessment required memorization and interpretation, then these knowledge attributes would be valued as important by the students, but if the assessment required communication and argumentation then those knowledge attributes would be regarded as important. Triangulation of data (Mason 2002; Dunne et al 2005) between the course handbooks, the tutor and the student interviews provided evidence that what the tutor hoped and the handbook said, did not always convert into what the students experienced on the ground through the teaching

methods and the assessments with which they had to engage.

Observation allows the researcher to see interactions within natural settings (Mason 2002; Dunne et al 2005). The initial focus of my research was on the use of the VLE so my observations were mainly of online interactions via multiple-choice quizzes, the discussion fora and engagement with online journals. The researcher, and the way in which he or she impacts on the research subjects, has to be accounted for in face-to-face observations. Equally in online observations, subjects may behave differently if they know their interactions might be used in research (Torrance and Pryor 1998).

The online observations were done before my interviews and the focus group with the students. In some cases I printed the observed behaviours and used them as props in the research. For the most part student online interactions were low but it was interesting to hear students talk about the online site as a space where they could reflect and think before participating. This online observation data was also used for analysis and discussion in my thesis.

In the first case study I also observed a lecture, but I realized that in order to engage meaningfully with observations of face-to-face teaching I would need to run them across the whole spectrum of teaching spaces (seminars, laboratories, tutorials and so on) and I decided that given the scope of this study this would be too time-consuming.

Analysing and writing up the data

Once the fieldwork was done and interviews and focus groups transcribed, I tried to create order and meaning out of it and make an "enclosure of the research texts within a conceptual boundary" (Dunne et al 2005 p.78). The recontextualization of the research was in reference to theoretical constructs. Within each case study I coded the participants' responses so they could be categorised (see Mason 2002). The categories represented common themes and findings between case studies. However I did not want to fall in the trap as I had in previous qualitative research exercises of using the qualitative data for statistical treatment in ways that were unhelpful and unable to decipher the nuances of what had been said. Instead I grouped the themes and findings between the nodes in an activity system (see Chapter 3) (Engeström 2001).

Each case study produced documentary and focus group and interview data of how formative assessments had been introduced to the courses studied, how they sought to meet the tutors' learning objectives and the ways in which they were experienced by students. It was important to get an understanding of the courses' structures, the stated learning objectives, the teaching methods used and the assessment methods. A lot of this was ascertainable from the documentary evidence such as the course handbook, but different data also emerged through talking to the tutors. The research triangulated different kinds of data, not with the expectation that this would provide a single truth, but in order to illuminate the data's complexity and contradictions (Dunne at al 2005).

When writing up the case studies I broke down the research results into the teaching and assessment methods, the course handbook, the VLE site and a summary of the results of the focus group and interviews. Each participant's contribution was discussed individually, including each of the students in the focus group. I used pseudonyms to

respect anonymity. I then concluded each case study with a summary text. In the discussion I brought each of the case studies together and analysed them in terms of the nodes of an activity system (see Chapter 3) (Engeström 2001). I then discussed each in turn as a whole activity system before discussing the overall claim to knowledge that the research supported and finally revisiting my research questions.

I entered into each case study expecting to find good teaching and assessment practice as a result of innovative practices. However my findings highlighted the complexities of teaching, learning and assessments, and students' response to them. My engagement with the wider academic literature and my professional expertise brought an awareness that is not immediately apparent to many practitioners in the field. My findings were grounded in the analysis possible through activity theory and the other theoretical frameworks that I touched upon. My interpretations are threaded through with the awareness of the wider texts and literature.

Notes on the Hard Science case study

The Hard Science case study focused on a first year course with over one hundred and eighty-eight students studying on it. The students were reading for a number of different undergraduate degrees. There was a detailed course handbook and a large VLE site. I categorized the sections of the handbook into their different objectives and analysed the underlying messages and meanings.

I held a semi-structured interview with the convenor using screenshots of the VLE as stimulus material. I held individual interviews with three students. Details about the students are given in table 2.2.

Participants	Gender	English as first language
Rosalind	Female	No
Deepti	Female	No
Mark	Male	Yes

Table 2.2: Hard Science participant details

Notes on the Soft Science course case study

The Soft Science case study used two courses that shared some of the same teaching time. Twenty-nine students were studying towards the former where it was a major course and thirty-six students were studying towards the latter where it was a minor course.

The courses had separate handbooks and a shared VLE site. I used the documentation to understand the structure of the course and its epistemological approach. I utilized the use-statistics on the VLE site to prepare for talking to the research participants.

I had a semi-structured interview with the convenor in the early part of her courses. I used screen shots of discussions held on the online forum and extracts from the online journal as stimulus material in the interview.

I held individual interviews with three students. Details about the students are given in table 2.3.

Participants	Gender	English as first language
Andrew	Male	Yes
Adrienne	Female	Yes
Waisun	Female	No

Table 2.3: Soft Science participant details

Notes on the computer programming case study

This was the first case study I conducted. There were two courses which shared some of the same teaching time. Forty-five students were taking the final year undergraduate course while forty were taking the Master's course. I chose the courses because they used two practical assessments, the first of which was a mid-term peer assessment and was the one of most interest to me.

The departmental policy stipulated that courses did not have a handbook. As a result my document analysis for the course was mainly via the VLE site. I was able to draw out statistics on its use by students through anonymized database queries. I also got access to the completed course approval form, which outlined the course for administrative purposes, and the course feedback forms, from which no statistically significant figures could be drawn as a result of very low return rates.

I had a semi-structured interview with the convenor and held a focus group with five of students. Details about the students are given in table 2.4.

Participants	Gender	English as first language
Savo	Male	No
Kanye	Male	Yes
Vanessa	Female	Yes
Cheng	Male	No

Table 2.4: Soft Science participant details

Research Ethics

The research fieldwork has been conducted in compliance with the ethical consent processes that were in place at the time. This included seeking approval at the departmental level via supervisory review and following the Sussex Institute Ethical Guidelines. Since conducting my research a higher level ethical review process has been put in place across the HEI which requires approval via the Social Sciences review panel.

I contacted convenors on the courses I was interested in via email, explaining the purpose of the study and offering them the opportunity to opt into my research. No coercion or enticements were offered. I did not need to seek any other formal consent from anyone else in the department or university at the time. Similarly the students' involvement in the research was purely voluntary, although an incentive of five pounds was offered in return for participation in the Hard Science and Soft Science interviews as uptake was initially slow.

In each of the case studies I presented myself at the start of a lecture towards the end of the course. In the Applied Technical course focus group I asked willing participants to take part in the focus group immediately after the lecture in which I had introduced myself. In the Hard Science and Soft Science case studies I asked students to sign a

form and I contacted them via email afterwards. I gave an oral explanation of my level of study and the purpose of the research. I also informed them of my professional role. I explained to all research participants that their contribution to the research would be as far as possible anonymized. I gave the research participants a written and signed consent form (see Appendix G) and notified participants orally that they could refuse or withdraw at any time.

My research intention has not been to simply capture the thoughts and understandings of the research participants, as might be the approach in some phenomenographic studies (Mason 2002; Ashwin 2009). It was to gather evidence at a systems level that could interpret what the participants were saying and feeling and piece this together with educational literature.

This research has sought not to make attacks on particular practices. Indeed the case studies were chosen because the tutors were aiming to use what were considered to be institutionally more innovative practices which had been painstakingly thought over and put in place with good intention. However, by its nature the research needed to be critical and some of the observations made may rest badly with some of the tutors who have designed the formative assessment interventions. Consequently, I have gone to great lengths to preserve anonymity. I have changed the names of the individuals involved, not named the institution in which the research was done and deliberately used generic course names: hard and soft science and applied technical.

I am an employee at a university with a specialism in educational technology, so in this sense I was an "insider" in this research (Dunne et al 2005). My employment in HE potentially added a different dimension of politics to the process. The participants knew that comments concerning the technological aspects of the educational environment could affect future developments on the software they were using. Some of the tutors may also have believed that this research could spotlight their teaching and assessment innovations and put them in a favourable light in the sector. Nevertheless the purpose of the interviews was clearly stated at the start and it was made clear that the interviews were separate from my professional role.

Chapter 3: Theoretical frameworks

In this chapter I introduce a number of theoretical frameworks which offer a system view of learning and course teaching. Because of the nature of the field this thesis inhabits, the frameworks are employed in two ways: one, they offer a conceptual account of learning, and two, they are used as tools to learn from the data and make an "expansive" claim to knowledge.

Many of the accounts of formative assessment implementations in the literature use theoretical frameworks that do not focus on how the HE teaching and assessment environment is produced. Instead they focus the analysis on students' and academics' perception of an already existing teaching and assessment environment. As a result, Ashwin (2009) argues that influential research such as the Approaches to Learning and Teaching research (Prosser and Trigwell 1999; Richardson 2005; Entwistle 2007) are not able to provide a sense of how academics and students impact on each other in HE teaching. He says, "they are linked in a fairly distant manner, largely through the examination of the relation between students' and academics' scores on questionnaire inventories" (p.36). Neither were they able to account for the structures which influenced them.

I chose frameworks which would offer me both structural and agentic accounts of the data. Archer (1995) describes *agency* in terms of the projects of human agents and *structure* in terms of the factors that enable or constrain such projects. This dual perspective, incorporating agency and structure, made my accounts of what was happening more complete from my realist position. Importantly the theories I chose recognized the structural and agentic aspects of the phenomena as dynamic processes which were emergent, contingent and unpredictable, and not static containers, fixed and regular (see chapter 2).

The theories that I have used include Vygotskian learning theory, cultural historic activity theory (CHAT) and Bourdieusian. For the main part this thesis draws upon CHAT to explain its findings; however, I use the other theories as a response to limitations of the language and concepts of CHAT which are required to support my analysis of the data.

Vygotskian learning theories

Vygotsky's theories of learning had the broad aim of creating a Marxist psychology which could explain how the collective was incorporated into the individual. His work on child development was most famous for his development of the notion of a zone of proximal development (ZPD). ZPD theory describes the mechanism by which a child is able to do more complex things with the help of a teacher than what he/she could do alone. Vygotsky was primarily a social constructivist and believed human learning to be a social process. He noted:

> Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological) (Vygotsky 1978 p.57)

And:

> It is through the mediation of others, through the mediation of the adult, that the child undertakes activities. Absolutely everything in the behaviour of the child is merged and rooted in social relations. Thus the child's relations with reality are from the start social relations, so that the newborn baby could be said to be in the highest degree a social being (Ivic 1994 p.473)

That led him to conclude that learning was a process of making oneself from *the outside in* - first we come to understand our social environment and then we build ourselves.

Vygotsky was a libertarian. Unlike cognitive constructivists like Piaget he believed our learning was influenced by our environment but we are not determined by it. For Vygotsky, we "develop and learn as [we] actively change the world [we] live in, simultaneously changing ourselves and gaining knowledge of [ourselves] and of the world through changing the world - all in the process of transformative collaborative practices with other people" (Vianna and Stetsenko 2006 p.86). Learning in Vygotsky's model was not simply a process of appropriation of facts and procedures that were already known, but the construction of new knowledge that fed into a body of understanding.

Although Vygotsky focused on child development and my case studies involve HE students, the work is still important because it clearly depicts why learning is enhanced in social settings and why presenting, discussing and defending ideas with others help to consolidate our understanding of the world.

Cultural historic activity theory

Cultural historic activity theory (CHAT) is a framework which helps sociocultural learning theorists conceptualize and explain the learning process. It also comes out of research initiated by Vygotsky but has only been adopted widely by Western academics in the last twenty years. It describes change and evolution within the field through a complicated exchange between learner and environments where learners' identities are entwined in the dynamic systems in which they coexist. Learning emerges from the identification of tensions and contradictions experienced during an endeavour from which novel resources can emerge and become available in subsequent actions (Roth and Lee 2009).

The strength of the theory is that it recognizes the roles of culture, history, tools and artefacts in a learning endeavour (Roth and Lee 2009). It is a theory of learning which incorporates a perspective on how we "*learn new forms of activity which are not yet there*" (Engeström, 2001 p.138). It explains learning as a non-linear process (Engeström 1987) and the trajectories of endeavours without determinism, much like Suchman (1987) describes a wild-water canoeist's descent as being guided by his or her actions rather than determined by them.

To describe its application, it is worth returning to the work of Vygotsky who explained human learning from first principles. Through his work in child development he observed how a baby interacts with his or her family in order to be fed, kept warm and

protected. Vygotsky's explanation describes at a basic level a baby's interaction with *cultural tools* in order to make sense of the world.
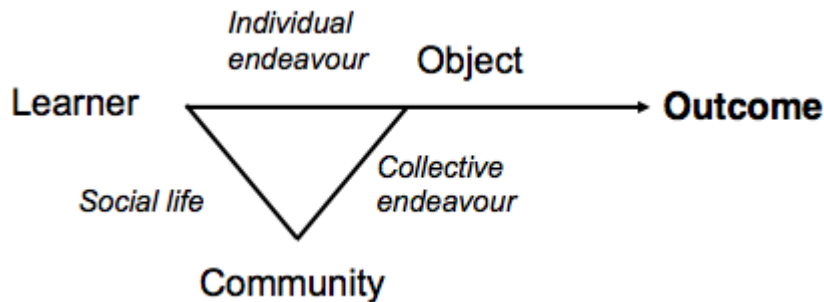
Figure 3.1: simple activity diagram

This general process has been described by Engeström (1987) using a triangle diagram (see figure 3.1) where the *learner* (baby) interacts with its *object* (food, clothing, shelter) with the help of its *community* (family members). The general interactions can be described as individual endeavours, collective endeavours and social life that combine to produce the desirable *outcome* (the baby has achieved his/her endeavour).

This idea was expanded upon by Vygotsky's student, Leont'ev who described the mediation of mind through *human activities* rather than cultural tools. Activity theory differentiates between operations, actions and activities. Operations are activities we carry out without conscious intention, actions are conscious and deliberate and activities are "part of a wider, social context. It cannot be accounted for by referring to what individuals do or think" (Havnes 2004 p.163). Leont'ev described a traditional hunt performed by tribesmen where there are beaters who direct the movement of their prey and hunters who eventually catch it. He describes a beater as a *learner* within the activity system. The *object* of the hunt is the prey and the successful *outcome* is that the tribe have enough meat at the end of it. The tribesmen use *tools* such as spears and beating implements and follow *rules* in order to coordinate the hunt so it is successful. The tribes' people are in a community and there is a *division of labour* between them.

This process adds new elements to the CHAT diagram (See figure 3.2). This includes the tool by which the learning happens, the rules by which the system is usually governed and the division of labour which is used within the system. The system is also influenced by surrounding activity systems (learning endeavours). Learning does not happen as a simple cognitive effort by the individual beater but is influenced by all the factors represented in the system and adjacent systems. This elaborate structure is thought to encompass all the factors which affect a learning endeavour.
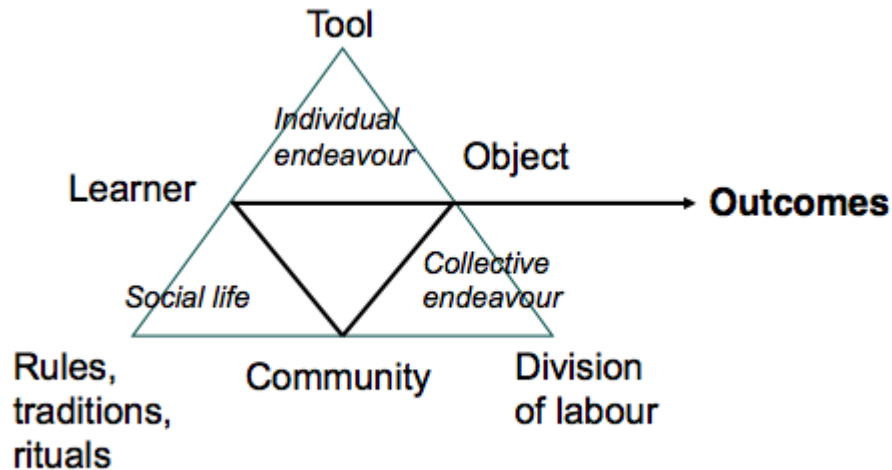
Figure 3.2: full activity system (Engeström 1987)

Socioculturalists understand learning as more than an individual cognitive process. It is a dynamic social system. CHAT establishes a framework through which socioculturalists can describe the multifaceted nature of learning in the context of the tools being used (tool), its social environment (community and division of labour), but also in terms of its cultural history (rules and division of labour).

CHAT works by illuminating tensions and contradictions in endeavours. By looking at the complete activity and elucidating contradictions, Engeström describes the possibility of an "expansive transformation" by embracing "a radically wider horizon of possibilities" (Daniels 2008). Expansive learning occurs as a result of identifying the metacontext of the activity at all its various levels. Although individual identities are an important part of the activity they are not central to it. CHAT describes the learning at a systems level rather than in terms of individuals or cognitive processes.

CHAT has been used by researchers in many academic disciplines, including those looking at the human mind and those looking at social systems, because it explains the relationship between the two. It started as a theory for *explaining* learning but Western scholars have used it as an analytic tool for *understanding* learning (Hakkarainen 2004).

Bourdieusian theory

CHAT describes how learning happens and how systems of activity create the possibility for change and even the construction of new knowledge. However Bourdieusian theory of *reproduction* describes how systems of activity can lead to things staying the same (Daniels 2008).

Bourdieu lived between 1930 and 2002 and within that time conducted ethnographic research developing a sociology of culture or, as he called it, a theory of practice, initially in Algeria and then in France. He covered many social contexts from Education to Art and to science and unlike other French philosophers was open to German, US and British theorists' ideas.

The central theme of Bourdieu's research became how power structures reproduced themselves without being governed by physically enforced rules. Although influenced by both he was not a structuralist, but nor was he conventionally a poststructuralist. He felt that the relativity of postmodernist thought undermined hard-fought conceptual battles in human development. Grenfell and James (2004 p.1-2) described Bourdieu's approach to describing social reality as the "epistemological third way", by which he attempted to integrate the objectivity of knowledge with the prevalent European tradition of subjectivity. Bourdieu (1977 p.3) describes his work as introducing:

> A science of dialectical relations between objective structures... and the subjective dispositions within which these structures are actualized and tend to reproduce them

And Grenfell (2008 p.45) said it was:

> A theory of structure as both structured ([...] thus open to objectification) and structuring ([...] thus generative of thought and action)

He theorized how the learning from one's social background determined an individual's disposition to enter privileged fields of knowledge, but how their entry was not predetermined, but dynamic and changing according to the *influenced* actions of individuals.

Bourdieu uses three key concepts to describe human realities: *habitus, field,* and *capital.* Habitus is delineated by one's social backgrounds but is dynamic and moulded by lived experiences. On habitus Grenfell (2008) says:

> Everything we know about the world is both established and developed as a consequence of individual acts of perception. However, these acts have defining principles which are both pre-constructed and evolving according to the logic of differentiation within the social universe.

Habitus is something akin to socialization but different because it has different meanings in different *fields.*

Fields are social spaces where interactions, transactions and events take place. Individuals within a field carry and generate varying *capitals.* Their capital can be cultural, social or symbolic. For example, the product of an individual's involvement in the field of HE is institutionalized cultural capital. Capitals determine power relations within the field and can be seen as convertible, often to economic capital. Capital in a field is influenced by an individual's habitus. People with more capital usually have privileged roles in many fields and have a tendency to wield power and dominate those fields.

The elite within a field is maintained through cultural norms or *doxa,* that which is taken for granted by those that act within the field. Those in a field who come from deprived or less privileged backgrounds perform in a way that sets them apart and disadvantages them, while those who are from privileged backgrounds perform in ways

which advantage them. For the former they are like "fish out of water" and for the latter they are like "fish in water". It is in such a way that regularities in power relations are continued overtime. Bourdieu describes a symbolic domination, which he says:

> Is something you absorb like the air, something you don't feel pressured by; it is everywhere and nowhere, and to escape is very difficult (Eagleton 1992 p.115).

Bourdieu gives credence to agency. He describes how individuals enter fields through *interest* and endeavour (*conatus*). This adds to the dynamism of a field which is ultimately made up of individuals. It is the conatus of individuals that counters ongoing reproduction through self-serving structures and gives the possibility for the structuring nature of any given endeavour.

Conclusion

Over the taught period of the EdD I developed and refined my research questions. I did not use my research to investigate the use of technology. Instead I interrogated how structures in HE and the agentic endeavours of tutors and students interact, support and impede the students' learning experiences.

I chose case study research because I no longer sought objective, generalized truths. I wanted personal accounts of teaching and assessment experiences that I could learn from. I chose theoretical frameworks which would incorporate both structure and agency as forces shaping the realities I was researching, whilst also recognizing the present as complex, emergent and contingent. CHAT originated from Vygotskian theory. I used it to interrogate my data and describe learning. I referred to Bourdieusian theory when describing social experiences and reality.

There are overlaps between CHAT and Bourdieusian theory (Edwards 2005). In both, learning is recognized to be a dynamic sociocultural event which changes the possibilities open to the learner after it. They view learning as a process which is influenced and shared by the actors, stakeholders and the tools and artefacts that are a part of it, and offer an alternative to reducing learning to an act of individual cognition. They offer a vocabulary and a metacontextual view of data from a structural and an agentic perspective. They foreground interactions between the teaching and assessment environment and the individuals' choices within that environment.

Bourdieu (1993) would not be described as a sociocultural learning theorist, but his social theories fit into a similar model (Edwards 2005). However, as well as the similarities between these theories there are also acknowledged tensions. For example, Bourdieu describes the reproducing infrastructures recreating realities and maintaining the status quo whilst CHAT theorists describe generative infrastructure producing new possibilities and new knowledge (Grenfell 2008).

Chapter 4: Literature review

HE is expected to "value and foster complex learning, with an emphasis on helping students to integrate knowledge, develop sophisticated cognitive abilities and develop lateral, imaginative, critical thinking skills" (Sambell et al. 2013 p.12). Chickering and Reisser (1993) contend students in HE transform their identities achieving competence, gaining autonomy, developing purpose and integrity amongst other things. This is contrasted to school teaching where student learning is much more focused around how much of the curriculum they *know*.

However, it has increasingly become noted, although less well researched, that HE students are able to learn by rote and still get HE degrees. It is argued that they are not gaining the high-order graduate skill sets they once did (Trigwell and Prosser 1999; Gibbs et al 2009; Biggs and Tang 2011). Contemporary media and tabloid reporting will have us believe that the HE system in its current form is failing our diverse student populations by furnishing them with the grades without the skills (Nicholls 2009). Scholars have backed up these claims. It has been noted by phenomenographic theories (Marton and Saljo 1976) and constructivist theories (Sambell and McDowell 1998; Boud 2000; Gibbs et al 2004) that university students are taking an instrumental approach to studying where their focus is not primarily on learning the subject material but passing the assessments (Snyder 1971; Miller and Parlett 1974; McDowell 1995; Dunbar-Goddet and Gibbs 2009; Joughin 2010; Sambell et al. 2013). Sambell et al. (2013) suggest students are becoming more utilitarian in their approach to university study, not because they are morally deficient, but because society encourages them to maximize their grades in order to enhance their employability. Such claims have resulted in suggestions that students are exiting HE having only surface learning rather than a deep understanding of the material (Marton and Saljo 1976). Whilst the idea of surface and deep learning has almost become a cliché (Webb 1997; Haggis 2003), it has endured in popular culture and some academic research (Biggs 1999; Trigwell and Prosser 1999; Parpala et al 2010; Biggs and Tang 2011; Callaghan et al 2011; Beausaert et al 2013).

Much of the literature has ascribed changes in student approaches to learning to changes in the HE environment and the student body (Ecclestone 2001; Gibbs 2004-05; O'Donovan et al. 2008; Gibbs et al 2009; Jenkins 2010). Before the 1950s there was only a small privileged sector of society attending universities. But now there are a far greater number of students coming from a wide range of social classes internationally. This is seen as a boon for social justice because the knowledge held and created in universities is now shared among a greater number of people from different socioeconomic backgrounds and not just the elite. However, it is argued that when the numbers were small, the students had more opportunities to discuss and practise the skills they were learning (Ecclestone 2001; Gibbs 2004-05; O'Donovan et al 2008).

Furthermore, global culture, economics and technology have significantly changed the behaviours and expectations of the student body. This has influenced the objectives of our universities:

> The traditional task of the university, to produce knowledge while (re)producing a small cadre of elite intellectuals, has recently fragmented. The multiplicity of purposes it must now address includes employability for a diverse group of lifelong learners, professional development, wealth generation, specialised knowledge creation and global competitiveness (Pryor and Crossouard, 2010 p.2).

This thesis identifies the importance of students gaining learning autonomy as well as covering the course curricula. Learning autonomy is more than meeting the prescribed curricula goals with enthusiasm. It is the recognition and development of personal learning strategies to optimize their learning capability (James et al 2007; Torrance 2007; Davies and Ecclestone 2008; Davison 2011; McDowell et al 2011; Swaffield 2011). Learning autonomy comes by other names too. It is synonymous with long-term, sustainable learning (Boud and Falchikov 2005; Pryor and Crossouard 2008; Boud 2009; Sambell et al. 2013) and the self-regulation of one's learning (Pintrich 1995; Nicol and MacFarlane-Dick 2006; Boud 2007). These skills require the fostering of independence (Gow and Kember 1990), responsibility, resourcefulness (Pintrich 1995; Nicol and MacFarlane-Dick 2006), and inquisitiveness (Brew 2003). Whilst most educational systems have mastered teaching students curriculum goals, many do so at the expense of these high-order skill sets.

This literature review will investigate wider academic research into how we learn, and disciplinary differences in teaching and assessment; introduce the commonly criticized issues with university education; and examine the employment of formative assessment as a remedy to these issues. The literature reviews span different educational sectors, despite my study focusing on HE students. This is because many scholars cite school years as the time when students first learn to practise instrumental approaches to study (Reisnik 1987; Sambell et al. 2013).

How we learn

The new environment that students find themselves in has meant that "pedagogies, curricula and forms of assessment deemed successful in the past are no longer adequate and need to be rethought" (Pryor and Crossouard, 2010 p.2). In this section I discuss the new theories of how we learn that are emerging and their significance to educational teaching practices (Marshall and Drummond 2006).

Biesta (2011) gives a fascinating account of learning. He says learning is only observable after the event because we judge it on what the person can do after they have learnt. As a result, he argues:

> [Understanding learning] starts from value judgements, judgements about the kind of change that is considered to be desirable or undesirable, as it is only when such judgements have been made that we can identify learning and thus can begin to follow it to generate an understanding of what promotes or impedes such learning (p.216)

So what follows is a review of the literature particularly from sources that have made

similar value judgements to me regarding the scope of HE and the desirable changes it should aim to provoke in our students.

Many of us take for granted that knowledge is made up of chunks of information inside our head. If we add more chunks of information we get more knowledgeable (Sfard 1998; Hargreaves 2005; Davies and Ecclestone 2008). This folk psychology of learning is embedded in our culture and language and to some extent frames most aspects of Western educational systems.

The idea was supported by bodies of work in the field of Psychology. Behaviourism was a theory of learning which dominated the 20th century (Duit and Treagust 1998; Boghossian 2006). This theory posits that the learner is purely reactive to conditions in the environment. Learning is a result of rewards and punishments experienced as a consequence of specific actions and equates learning as a response to an environmental stimulus (Duit and Treagust 1998). Behaviourists contend that behaviours can be isolated, measured and changed by setting up the right conditions. B. F. Skinner was perhaps the most influential advocate of behaviourism. He believed freewill was an illusion and that human action was based entirely on past positive and negative experiences.

However, behaviourism as a model for human learning has been largely dismissed because it has been recognized as one dimensional and unable to account for learning that happens outside reward and punishment conditions (Duit and Treagust 1998). It has been argued that such models of learning encourage authoritarian teaching practices which consist of giving students chunks of information for them to consume and exercises to practice reciting the information on request (Gibbs 2004; Torrance 2007). These prosaic goals often result in the tutor and students creating a pact where they attempt to get the students the best grades at the expense of the quality of learning. Davies and Ecclestone (2008 p.84) say:

> In many courses, learning and achievement have become synonymous, reinforcing [teaching] as coaching for grade achievement and little more.

If learning is simply a well-constructed tower of blocks of knowledge it can be evaluated as such under examination conditions with closed, objective questioning. Such assessments only evaluate what information the student has memorized and can regurgitate on request. Anderson and Hounsell (2007) argue that it is theories such as these that may be the cause of the high numbers of students exiting universities with qualifications but without the high-order graduate skills they are expected to have.

Paulo Freire (2000) went further when he described the emerging educational system from such a theory as based on a "banking" concept that divorced us from our humanity. He argues educational systems based on behaviourist theories of learning squash human inquiry and therefore intelligence.

In the latter half of the twentieth century cognitive constructivism replaced behaviourism as the leading understanding of the way people learnt (Greeno et al 1996; Bichelmeyer and Hsu 1999; Boghossian 2006). This theory has a far more sophisticated

take on learning, describing it as the individual construction of knowledge. Piaget introduced schema theory which describes thinking processes in terms of learnt neural pathways that we use until we meet a *cognitive conflict* and need to create a new pathway. Most scholars agree that cognitive constructivism is a substantial improvement on behaviourist learning theories because it has a means of explaining the improvements in learning that are seen when students actively "engage" (Sfard 1998). It describes the process of active learning as a method of consolidating and merging old and new knowledge held by the student. If the information is reinforced, discussed, practised and so on then so much better; the context of the information is embedded into the minds of the individuals as knowledge.

However, critics of cognitive constructivism argue that while it has improved upon the behavioural view of learning, it has not fundamentally changed it (see Sfard 1998). Knowledge is still something we can potentially acquire in the absence of context. Furthermore it does not develop a convincing account of how new knowledge in the world is created. Cognitive constructivists, such as Piaget, argue that we "develop, learn and achieve knowledge - all in the spirit of adapting to existing conditions in order to fit in better with them and the environment as a whole" (Vianna and Stetsenko 2006 p.86), but this model offers a reduced and limited outcome to a learning endeavour; the best being to learn as much of the syllabus as possible. In most cases this will mean learning exactly the same as peers and what generations of students before have learnt and this, it is argued, is not an inspiring outcome (Sambell et al 2013).

In contrast to such views of learning, sociocultural theories of learning have been becoming increasingly popular since the 1990s. I have introduced some of these theories in my theoretical frameworks. This view of learning emphasizes the importance of the interchange with others, "especially more proficient domain practitioners who can model the internal standards and habits of mind that define advanced competency" (Bennett 2011 p.9). It recognizes the process of learning as one that entails "within-person changes, which modify ways in which we interpret and may act on the world" (Edwards 2005 p.50). The changes result as a consequence of engagement in activities (Engeström 2001; Havnes 2004). As we usually choose to engage in activities we enjoy, the theory emphasizes the importance of motivation and learning autonomy. Importantly, sociocultural theories of learning incorporate a theory of how knowledge is created: individuals bring with them their own unique experiences and learn things with their own particular slant. In turn their learning impacts the world. As we change ourselves we change our local environment.

Sociocultural theories of learning have sparked a lot of debate about the nature and practices of education. In the UK we have seen the introduction of much more coursework in secondary school assessments as a result. However scholars point out that the behaviourist models of learning still structure a lot of HE and FE teaching practices, particularly in the sciences (Torrance 2007; Davies and Ecclestone 2008; Torrance 2012). They note that it may be incomplete models of learning that are reducing the skill sets of our graduates. Much of the teaching time of undergraduates is still spent sitting in lecture halls listening to the tutor deliver material, and many of the assessments do not reward learning autonomy or criticality, but simply require the students to regurgitate the material under examination conditions or in essays. The

ratio of time spent doing teacher-to-student presentations is greater and the opportunities for students to practice what they have learnt are fewer. Scholars note that rising student numbers and reductions in investment only make the matter worse (Gibbs et al 1996; O'Donovan et al 2008). Changing teaching practices requires time to rethink academic courses and redesign teaching spaces. All this is an expense that many institutions are not prepared to incur.

Teaching and assessment practices in higher education

In this section I describe traditional teaching and assessment methods in HE and the critiques put forward by scholars challenging their effectiveness at supporting learning. I note the differences in traditional school and FE teaching to teaching in HE. In the former there is a lot more time dedicated to student practice and there is a lot more handholding and scaffolding of student learning. However teaching methods employed in school and FE teaching have come under intense scrutiny because it has been found that teaching in these environments is being aimed at increasing students' chances of passing assessments at the expense of improving their ability (Davies and Ecclestone 2008). This has meant many fourteen to eighteen year olds tirelessly answering examination questions in classroom settings rather than engaging in learning activities that expand their understandings of themselves. HE teaching on the other hand traditionally expects much more autonomy. Students are expected to go to the library, read around subjects and create reading groups with their peers. Although similar criticisms as school teaching have been directed at HE they are less widespread and less researched.

Entwistle (2007), Ramsden (2003) and Prosser and Trigwell (1999) have reported in detail on HE teaching in their *Approaches to Learning and Teaching* research. They described the core components of higher education teaching as comprising:

- Introducing a syllabus of topics and skills that the students' ability will be assessed against through lectures, course handbooks and course websites
- Presenting information through lectures, prescribed readings and educational resources
- Setting up situations and environments where students can practise their learning and receive feedback through seminars, tutorials, workshops, practical laboratories, online discussion fora and so on
- Assessing students' work and offering feedback through examinations and returned assignments

Their overriding finding was that the quality of a student's learning was in part a consequence of the teaching method and in part a result of the "academic orientation of the students" (Biggs 1999 p.58; Haggis 2003; Meyer and Land 2005).

Researchers have noted that teaching and assessment styles can be influenced by the discipline that is being taught (Becher 1989; Becher and Trowler, 2001; Neumann 2001; Trigwell 2002; Lueddeke 2003). Neumann (2001) argues that depending on the culture and epistemology of the discipline they need to be taught in different ways. Trowler (2012) helpfully categorized the makeup of a discipline into three significant parts. One, a discipline produces and stores knowledge through culturally-influenced

research practices and distribution rules. This he calls discipline-as-research. Two, a discipline transforms knowledge into a pedagogic discourse making it appropriate for teaching through the recontextualization of rules. This he calls discipline-as-curriculum. Three, a discipline defines evaluation rules in which the knowledge can be reproduced and evidenced. This he calls discipline-as-pedagogic-text. Bernstein described the rules which render disciplinary knowledge into a form in which it can be taught and assessed as "the pedagogic device" (Bernstein 2000; Maton and Muller 2007; Ashwin 2009). He argues research practices that generate disciplinary knowledge influence teaching and assessment practices. Consequently each discipline has what Shulman (2005) describes as signature pedagogies.

Disciplines have been described as hard and soft and pure and applied (Neumann et al 2002 p.412). It is argued knowledge constructs in the sciences are "hard" as they are often provable through experimentation and therefore not open to debate, whilst knowledge constructs in the humanities are "soft" because they are discursive, open to interpretation and political. Mechanical engineering is "applied" because it has an obvious use in industry, whilst some mathematics is "pure" because it does not give you skills that are directly usable outside academia. These knowledge constructs often translate into the teaching methods used in education. Teaching within hard disciplines usually involves delivering concrete facts to students and expecting them to practise procedural tasks because this is what is valued in the field. In contrast, teaching in the humanities usually gives more space for the students to communicate their opinions because personal interpretation is valued in the field.

From the perspective of the analytical frameworks adopted for this research, disciplines are an important factor. CHAT and Bourdieusian theory understand the broader context of the learning process including the disciplinary structures, rules and communities. However, other scholars note that the influence of a discipline on teaching can be over-emphasized (Young 2010). They argue that although disciplines can influence teaching styles ,there are other factors including epistemological beliefs (o'Siochru and Norton 2013), gender (Parpala et al 2010) and specific locales (Kember and Lueng 2011). Agency is a big factor in the tutors' approach to teaching and assessment (Bain et al 1998; Hativa and Goodyear 2002).

The effectiveness of lectures

The main teaching method in undergraduate HE is the lecture which is a method of presenting information. Edwards (2001) noted in that it is used in all disciplines of HE and despite the rhetoric around new methods of teaching "the stark reality [...] is that lecturing is the major teaching and learning method used in universities, and is likely to remain so" (p.2). Indeed, thirteen years later there is no sign of this statement being less true.

The lecture has been popular because the tutor, disciplinary expert and researcher, can share their knowledge to many students at once. Lectures are also an attractive proposition when the teacher-student population is high because the teaching activity is indifferent to the number of students there are (Biggs 1996). Economic rationalism has meant larger classes, which has meant more time spent on the provision of materials through lectures and less time devoted to setting up activity-based situations

through seminars and so on.

However, a relatively small movement by educationalists to highlight the inefficiencies of lectures has been underway since the 1990s. With the standardization of courses, it is argued that the content delivered through lectures can be relayed by anyone, anywhere, at any time, particularly since the advent of the internet (Laurillard 2001). The information is seldom unique to that lecturer and their spin on the day may be no more revealing than a few clues as to what might be in the assessment.

Furthermore many educationalists have recognized that learning through listening alone does not lead to in-depth understanding of the subject matter (Biggs 1999; Freire 2000; Nicol and Macfarlane-Dick 2006): at best the student can pick up isolated nuggets of information, but even this is difficult to retrieve and recall over time and difficult to use when trying to explain something (Chickering and Gamson 1987). While lectures are effective for giving students opportunities to hear their lecturer/disciplinary expert speak, and for the lecturer to pass information to the student, they do not enable students to practise the material being presented to them. Research conducted by Tan (1992 p.255) led him to argue:

> Lectures failed to affect the way that students represented, structured and selected their knowledge, which remained encapsulated in the textbook context and was non-functional.

His research found that while lectures increased the students' familiarity with the subject they did not lead to long-term improvements in their abilities. He saw that their effectiveness "is crucially dependent upon their integration with more active subsequent learning activities" (p.266). Learning which enables students to synthesize convincing critical arguments requires a broad "framework of meaningful inter-relationships and understanding" (p.266). He argues that efficient and effective retrieval of knowledge depends on its structure in long-term memory which can only be achieved through student argumentation and practice of the learning material in social situations, authentic environments and simulations. Despite these realizations, opportunities for student practice and discussion are decreasing in our HEIs.

Lectures are problematic from the perspective of the analytical frameworks in this research too. Whilst they offer contact time with the lecturer/disciplinary expert, they do not offer the students a view of the lecturer's work in an authentic situated setting and nor do they engage the students in an authentic activity that would provide a context for their learning.

Today there are even more calls for more teaching time to be dedicated to practice as a result of the affordances offered by internet technologies. An educational movement has been established called flip classrooms that understands that 'talking' at students in lectures is inefficient. "[Flip classrooms] are an 'inverted' teaching structure in which instructional content is delivered outside class, and engagement with the content – skill development and practice, projects and the like – is done in class, under teacher guidance and in collaboration with peers" (Ojalvo and Doyne 2011). When the teaching time is at a premium, flip classrooms encourage tutors to use videos, the internet and

books to give the information that the students need and to use face-to-face teaching time for supported learning activities. However, flip classrooms are still rare in HE teaching. HEIs are set up to support traditional teaching and assessments. Furthermore, academics are rewarded for achievements in their research and not innovations in teaching practices, thus innovation in teaching is rare (Knight et al 2006).

Assessments as structures

Scholars are not only criticising HE teaching methods. The biggest cause for their concern is the way HE assesses its students and the effect this has on their approach to their studies (Ecclestone 1999; Boud 2000; Knight 2002; Knight and Yorke 2003; Boud and Falchikov 2005; Carless 2007; Price et al 2011). This section talks about traditional HE assessments and highlights claims that they can discourage students to employ discipline-specific learning in favour of assessment skills. The criticisms levelled, although less widespread, are similar to those directed at school and FE assessments.

HE students are subject to a number of assessments in accordance to the modules they take and each contributes to the students' certificate of achievement. This certificate will have a grade that indicates the students' level of success in a subject from the point of view of the institution and put a value on the student's academic ability. Assessments use criteria, based on disciplinary norms and evaluative rules (Bernstein 2000), that the students must meet in order to pass. These are often facts that the students should be able to recall, arguments they must make in essays and skills they should be able to perform (Ecclestone 2001). Assessments legitimise and reify aspects of student identity (Pryor and Crossouard 2008). For example, it is the assessment grade that a potential employer will look at, that will determine the student's qualification for a further HE degree and will influence the student's *cultural capital* on exiting their degree program.

Assessments influence the students' approaches to learning (Sambell et al. 2013). As Resnick and Resnick (1991 p.59) point out:

> You get what you assess; you don't get what you don't assess; you should build assessment towards what you want […] to teach

From the point of view of the students, assessments are a major structural element in their educational career (Sambell et al. 2013). Brown and Glasner (1999) say they are "an exercise of power" that prioritize the knowledge of the institution over their own knowledge.

However, many critics claim that the tactics students employ to navigate traditional assessments pose a risk to the quality of their learning (Snyder 1971; Miller and Parlett 1974; Sambell and McDowell 1998; Taras 2003; Gibbs and Coffey 2004; Torrance 2007; Gibbs et al 2009; Torrance 2012). They are described as having a "backwash" effect on teaching and learning. Biggs (2003 p.140) describes backwash as occurring "when the assessment determines what and how students learn more than the curriculum does".

Furthermore, the assessment grade is often more important to students than the

content of their studies. It is contended that students, having gone through years of the educational process, from childhood to their twenties, quickly learn what has become known as the "hidden curriculum": not "how can I learn?", but "how can I pass the assessments?" (Snyder 1974; Sambell and McDowell 1998). Gibbs at al (2004 p.16) suggest:

> Students can tackle assignments that are intended as learning activities so as to maximize the marks they obtain rather than maximising the learning achieved from engaging with the assignment

It is argued that if students can find a way to get a good grade in the assessment other than learning the material, many of them will use it because they believe it is the grade that they will be ultimately judged upon. This often results in rote learning and employing memorization techniques (Bergenhenegouwen 1987; Crooks 1988; Tan 1992; Biggs 1999; Prosser and Trigwell 1999; Boud 2000; Gibbs and Coffey 2004). Rote learning comes at the price of deeper learning, such as the ability to make "fundamental judgments" or explore "the criteria for making them" (Sadler 1989 p.121). This straightjackets the learner and narrows their learning potential. It encourages an approach to learning which is one of avoiding failure and doing better than others rather than mastering the task.

Research has suggested that many students see preparing for assessments as synonymous with learning (Black and Wiliam 1998a; Taras 2003). They feel learning outside of this endeavour goes unrecognized. As a result they lose responsibility for their learning and their own interest in the subject is replaced by that of the institutional assessment regime. Their thirst for accreditation encourages them to cram information into their short-term memory without gaining a deep understanding of the subject (Gibbs et al. 2009).

Furthermore, assessments can encourage the perception that learning is a competition with peers and one's learning is in relation to the learning of others (Orpen 1982; Tan 1992; Sambell et al. 2013). Specific assessment structures lead students to adopt attitudes and practices where students compare their ability with their peers and other more meaningful self-reflection is sidelined and limited (Torrance 2012).

The most common and traditional form of assessment, particularly in the sciences, is the end-of-term examination. The examination is usually held in large rooms with students sitting at separate workstations where they are asked to write answers to questions written in examination papers, alone and in silence. They provide a snapshot of the students' abilities in order to measure the culmination of their learning during their course. Taras (2005 p.468) describes it as a "judgement which encapsulates all the evidence up to a given point. This point is seen as a finality at the point of the judgement". However, many commentators suggest that examinations are the greatest threat to student learning (Sambell and McDowell 1998; Taras 2005).

Sambell and McDowell (1998) note that for the most part, examinations interrogate the students' short-term memory recall and their on-the-spot calculative abilities under unrealistic conditions. It is the assessment method that most encourages students to

memorize facts and procedures without gaining a deep understanding of them. It supports the banking model of learning which Freire (2000 p.72) described as minimizing and annulling "the students creative power". It is also one of the least authentic assessment methods because it is not in high stakes and pressurized exam rooms that analytical and critical thinking or research is carried out. In the real world we are rarely judged on our performance on just one morning's or afternoon's work.

Tan (1992 p.262) found that examinations left students "dissatisfied", with "no time to 'really study' and to follow-up on their own interests". In his study many students felt overloaded, bored and complained that their learning lacked meaning. The most criticized form of exam question is the multiple choice (MCQ) because this is the type of question that is easiest to answer correctly based on disparate information stored in short-term memory. It does not invoke any of the situations that one is likely to come across in authentic workplace or life scenarios. However, the MCQ is becoming used more and more in examinations (Scouller 1998; Joughin 2010; Paxton and Rubinfeld 2010; Torrance 2012) due to increased student numbers and the speed at which examiners, or indeed machines, can mark them.

Scouller conducted a study with two hundred and six second-year students in Education. The study looked into the preparation and perception of a multiple-choice test in comparison with an essay as a method of assessment. She (1998 p.470) concluded:

> Some students may actually be disadvantaged by employing deep learning strategies (an important objective in most course outlines) when preparing for their examinations.

Others have noted that examinations are not the only assessments that lead to the students developing poor study habits (Curcio and Jones 2008). Essays can also lead to instrumentality if not well implemented. For example, they can simply encourage students to rehash others' ideas. Brennan (1995) argues that students often approach them as a procedural task rather than a learning opportunity. Sambell et al. (2013 p.16) report hearing students say:

> In essays, all you have to do is, basically, go to the library and copy down the information in a different language.

They say "some students 'hide' behind the essay, mimicking academic writing conventions by regurgitating large chunks of reading, loosely strung together" (p.17). Furthermore the creation of academic texts is not suitable for all subjects and is unlikely to be the only skill that the students are expected to acquire (Sambell and McDowell 1998). McDowell (1995 p.303) argues they are "unrealistic and artificial tasks unlike the kinds of learning and communication activities to be found outside of academia".

Scholars have noted that, like teaching, assessment practices are influenced by the discipline (Lonka and Lindblom-Ylänne 1996; Smith and Miller 2005). In hard, pure fields "assessment tasks commonly take the form of 'objective' tests, which call on

students to be tested frequently, comprehensively and unequivocally" (Neumann et al 2002 p.408). In contrast soft, pure fields assess the students' "degree of understanding of a complex qualitative domain" and "elicit their own judgements on debatable issues" (p.409). Parpala et al (2010) note that as a result of disciplinary differences, students in the humanities are more likely to take a deep approach to learning while students in the sciences are more likely to take a surface approach.

Many critics claim that the induction of instrumentality is not an inherent problem of summative assessments, rather their application (Taras 2005; Daly et al. 2010; Pryor and Crossouard 2010). Cartney (2010 p.551) argues that while assessments can prevent learning from taking place it can be a "a crucial factor in enabling" it. Taras (2005) argues that summative assessment should not be viewed negatively. She says, "Society at large, naturally and rightly, makes judgements; misuse of these judgements does not invalidate or minimise the necessity for the judgements" (p.469).

Although some assessment practices discourage students they can also be a motivator for deep, contextual and personal learning. Gibbs and Simpson (2004 p.26) propose:

> There is more leverage to improve teaching through changing aspects of assessment than there is in changing anything else.

Bennett (2011) points out that while summative assessments fulfil their "primary purpose of documenting what students know and can do" (p.7), they can also support learning. If the "content, format and design" (p.7) of the assessment is sufficiently rich, then preparing for it can be a formative experience (see also Shepard et al 2006). Preparation for assessments encourages students to consolidate and organize their understanding, rehearse the execution of processes and strategies and gain "greater automaticity in execution" (p.7). However, he points out that only those which have been designed with the secondary purpose of supporting learning will provoke such preparation, such as through linking performance with learning progression (Popham 2008; Cororcan et al 2009).

Biggs provides the concept of "constructive alignment" of teaching and assessment. This concept has two aspects: one, teaching is simply a catalyst for learning and students construct meaning for themselves through relevant learning activities; and two, the teaching methods and the assessment tasks are aligned with the learning activities assumed in the intended outcomes. Through applying constructive alignment, Biggs (1999 p.2) says, "The learner is in a sense 'trapped', and finds it difficult to escape without learning what he or she is intended to learn".

An intervention: formative assessment

Many scholars are calling for the introduction of formative assessments to establish teaching and assessments methods that support student learning. The term was first introduced by Scriven (1967) in the context of programme evaluation where formative evaluations were those which suggested programme improvements (Black and Wiliam 2003; Bennett 2011). However it was Bloom (1969) two years later who used the term with respect to students to describe the process of providing "feedback correctives at each stage in the teaching and learning process" (p.48). Formative assessments have

the purpose of provoking learning. They are also called "assessment for learning" or AfL. This is differentiated from summative assessment which is "assessment of learning". For some an assessment is considered formative if it changes the teaching method of the tutor (Sadler 1989), for others it is formative if the student has learnt from it (Harlen and James 1997) and for others still it is formative if it has provoked either of these outcomes (Daly et al. 2010).

One understanding of formative assessments is that they are staged events that have the purpose of encouraging learning rather than assessing student ability. Such conceptions include mid-term essays with feedback, peer assessment tasks and student presentations. Others conceptions of formative assessments, including my own, also view formative assessments as being performed during everyday teaching (Torrance and Pryor 1998; Yorke 2003; Popham 2008; Black and McCormick 2010; Bennett 2011). They include situations where assessments are made of a student's understanding and are responded to in order to improve the students' learning. Such acts include classroom conversations where a tutor or peer assesses student comments and responds with enough information so that students can improve their understanding.

Black and Wiliam (1998) summarized the use of formative assessment in school classroom environments in a landmark review. The principal finding was that teachers of courses which had implemented formative assessments saw learning gains in their students significantly greater than those in control groups. They have since extended their studies in formative assessment to include FE and HE. Their interpretation of formative assessment is anything that provides feedback about a student's piece of work, whether from a tutor, a peer or even from oneself (Black 2005). The feedback will normally inform the student of their current level of learning and what their next steps might be in order for them to achieve their learning objectives (Ramaprasad 1983; Yorke 2003; Covic and Jones 2008; Daly et al. 2010; Jenkins 2010). Furthermore, most scholars recognize that feedback must also "feed-forward" into upcoming pieces of student work or risk being ignored by the students (Boud 2000; Nicol and Macfarlane-Dick 2006; Ellery 2008; Hounsell et al 2008; Jenkins 2010)

Pryor and Crossouard (2010) cite three generic types of formative assessment. The first kind of assessment is "concrete/procedural", which evaluates and improves a student's ability to regurgitate a fact or perform a formulaic task. It is of often a stand-alone chunk of information which is immediately useful for the student. The second type is "reflective/discursive" which encourages deeper reflection "with substantive and methodological concepts in the field, in relation to both the task in hand and future work" (p267). It evaluates and improves the student's ability to discuss and reflect upon a theory or activity. And the third kind is "discursive/existential" which expects that the students "do identity work relating strongly to the disciplinary context and its social rules" (p. 267). It helps the students to personalise their learning, make it their own and form personal opinions on it.

There is often difficulty in getting students engaged in formative assessments if they are not perceived to contribute to their final grade (Scouller 1998; Gibbs et al 2004; Wen and Tsai 2006). Like many scholars, Gibbs et al think the task of assessing students for

accreditation should be constructed within the dual purpose of moving the students' understanding and ability forward. These scholars state that summative assessments influence students' approaches to learning and if designed wisely can enhance learning.

As a result much of the literature on formative assessments regards them as staged "formative-summative" assessments that the student is expected to do and get feedback on (Black and McCormick 2010; Bennett 2011). In HE they are often perceived as a solution to the students' call for more feedback through the National Student Survey (NSS), a government survey established in 2006 to drive improvements in universities. They are often mid-term activities that give implicit and explicit feedback to learners about their progress whilst studying for the course. They can have the additional functions of informing tutors how individual students are getting on (Daly et al 2010), providing motivation for the students to adopt good study habits (Hernandez 2012) and reducing the need for tutors to duplicate teaching activities by combining teaching with assessing (Taras 2005).

The research in this thesis focuses on mid-term formative-summative assessments which are designed to encourage the students to learn rather than solely to test their performance. It is important to clarify this is not the only interpretation of formative assessments or my own (Torrance and Pryor 1998; Yorke 2003; Popham 2008; Black and McCormick 2010; Bennett 2011). Formative assessment is a process that produces a "qualitative insight into the student understanding" (Bennett 2011 p.6) which the tutor uses to adapt their teaching in line with the students' needs (Popham 2008). "Such adaptations will typically occur over short cycles, within or between lessons" (Bennett 2011 p.6) and not only in larger assessment activities.

Formative assessment interventions in the spirit and in the letter

The implementation of formative assessment to positively influence quality learning has been met with varying success (Sadler 1998; Yorke 2003; Hounsell 2003; Boud and Falchikov 2005; Swaffield 2011). A project in the Economic and Social Science Research Council's (ESRC) Teaching and Learning Research Programme with younger students highlighted the difference in teachers' approaches to formative assessment. Marshall and Drummond (2006) conducted a study of twenty-seven school classrooms and found formative assessment could either be performed in the spirit or the letter. They explained their use of the terms thus:

> We use these headings – the 'spirit' and 'letter' – […] because they have a colloquial resonance which captures the essence of the differences we observed. In common usage adhering to the spirit implies an underlying principle which does not allow a simple application of rigid technique. In contrast, sticking to the letter of a particular rule is likely to lose the underlying spirit it was intended to embody (p.137)

These ideas are appropriate in higher education also. Formative assessments in the spirit go beyond helping students meet course objectives and encourage the development of high-order graduate skills combining "better performance with engagement and good learning habits in order to develop 'learning autonomy'" (Ecclestone 2007 p.318). They require the students to make judgements, often in

collaboration with their tutor or a peer so that a dialogue is generated, and expect them to interrogate, defend and/or explain their judgements (Sadler 1989; Knight et al 2006; Sambell et al. 2013). They understand the learning generated to be intrinsically valuable even if not what the tutors expected. They do not help students acquire nuggets of information for recital later but actively involve them in the material and help them become "a different person" (Lave and Wenger 1991, 53). They help students learn how to learn so that the skills they develop are sustainable throughout their life (Yorke 2003; Black et al 2006; Torrance 2007; James and McCormick 2009).

The best formative assessments do not focus only on improving the students' curriculum coverage, they also help develop the students' identities in relation to the discipline. The students' performances in formative assessments are a product of their current identities, and their engagement in a formative assessment task will also contribute to the evolution of their identity (Pryor and Crossouard 2008). When made explicit, students can consider their actions in the performance in the light of future or desired identities. Thus, if well designed, the formative assessments tasks can create spaces where students consciously develop new identities, usually through collaborative processes. Pryor and Crossouard (2008 p.16) describe idealized formative assessments as "a means whereby learning activities become relevant to students' desired identities and futures". In a Bourdieusian sense the students are building capital within their discipline which can be used to engage in discipline-based discussions or negotiate job interviews.

Scholars note that the best formative assessments develop the students' ability to perform authentic tasks (Sadler 1989; Torrance and Pryor 2001; Fook and Sidhu 2010; Davison 2011; Swaffield 2011; Bloxham and Boyd 2013). They argue that evaluating students in authentic settings provides more opportunities for context-rich student learning that is "intrinsically useful and worthwhile" (Sambell et al. 2013 p.12). Sambell et al. (2013 p.10) say, "The principle of authenticity is vitally important when it comes to designing effective [formative assessment] environments. [It makes] assessment mean more to students than just jumping through hoops". However authenticity in education can be a murky area (Brown et al 1989). Authenticity in applied disciplines, such as Engineering, is more straightforward than theoretical subjects such as Philosophy. Sambell et al (2013 p.12) offer solutions. They broadly define it as "the use of activities that are inherently meaningful, interesting, relevant and have long term value".

Importantly, much literature around formative assessments cites peer learning and social interactions (Topping 1996; Boud et al 1999; Falchikov 2002; Havnes 2004; Black and Wiliam 2009; Wiliam 2011; Sambell et al. 2013). Sambell et al. (2013 p.8) say, "[Formative assessments] need to operate within learning environments that are characterized by collaboration, social interaction, [and] peer learning [...] Participation is not just an option for learning, [...] but essential". There is increasing interest in how curriculum can incorporate peer learning. Boud et al (1999) say that peer learning promotes: working with others, critical reflection, communication and articulation of knowledge and skills, management and responsibility for one's learning and self-assessment.

Authenticity and peer learning in formative assessments are recognisable as good practices through the analytical frameworks for discussing learning that I have chosen to adopt. Vygotsky (1978), CHAT (Engeström 2001) and Bourdieu (1993) recognise the importance of peers in supporting and underpinning the learning process, giving students context and motivation.

Peer assessments are also cited as an effective formative assessment tool. They can encourage the formation of skills such as evaluating knowledge and justifying points of view (Topping 2006; Vickermann 2009). They can also be regarded as a genuine use of student learning rather than just recital for the tutor (Sambell et al. 2013). It has been noted that it can provoke self-reflection and allow students to get insights into their own work (Vickermann 2009). Sambell et al. (2013 p.150) say:

> Becoming involved as an assessor, rather than waiting for someone else to assess your work for you, is an important aspect of becoming a graduate who takes responsibility for their own learning

However, caution is noted regarding summative peer assessments, particularly regarding the validity and reliability of grades (Brown et al 1994; Grieves et al 2006).

Torrance and Pryor (1998) introduced the concepts of "convergent" and "divergent" formative assessments. Convergent formative assessments evaluate whether a student can achieve a set aim and provide feedback which will help the student meet that aim. They are useful for getting students to familiarize themselves with concepts and practices. Divergent formative assessments evaluate what a student can do and provide feedback to develop the student further. They give space for the student's personality and own interests. Divergent thinking enables students to engage critically in academic discussions, reflect deeply on their work and change themselves as a result of their learning. If, as most course outlines suggest and many scholars contend, the principle aim of HE is to create resourceful and autonomous learners (Torrance and Pryor 1998; Boud 2000; Yorke 2003), then "formative assessments (and summative assessments, for that matter) must contain a significant proportion of divergence" (Yorke 2003 p.480).

The way in which courses adopt formative assessments is usually influenced by the academic discipline in which they sit. Where the knowledge is considered black or white, such as the sciences, formative assessments are often convergent and prepare students for the recital of information and the ability to perform procedural tasks. And those disciplines that are more based on interpretation, prediction and argumentation, such as the humanities, are more likely to be divergent (Lueddeke 2003; o'Siochru and Norton 2013). However this divide does not necessarily make good pedagogic sense. The research practices in the discipline do not determine the best educational model (Shulman 2005), only the ease of translation of the knowledge created (Trowler 2012). Formative assessments that are divergent may be as valuable in science teaching as the humanities.

Unfortunately, many implementations of formative assessments have not been in the spirit of it (Knight and Yorke 2003; Gibbs and Simpson 2004; Boud 2007; Carless

2007; Davies and Ecclestone 2008; Swaffield 2011). Formative assessments in HE can provide students with more support and scaffolding in their learning, but many are deployed so that the students perform better in assessments at the expense of developing learning autonomy (see Wyse and Torrance 2009). It is argued such deployments can reduce the quality of the learning to schooling and FE standards because they do not support or reward independent thinking. On their own they can jeopardise the students' progress and intrinsic interest in the subject (Davies and Ecclestone 2008) and create a dependency on them. The most serious claim about these types of formative assessments is not their ineffectiveness but their effectiveness at encouraging narrow and conformative thinking (Torrance 2012). For example, it is a widespread idea in school practices and now HE teaching that making assessment criteria explicit is important so students understand what they are doing (Sadler 1989; Black and Wiliam 1998; Carless 2007). However Gibbs and Dunbar-Goddet (2007) note that making the goals and standards overt can lead to students "narrowing their attention and their effort to those things that they were told would be assessed" (p.24).

The rise of formative assessments comes at a time where a large body of students has been heard to be asking for more feedback through the NSS. This message has been a focus for many tutors wanting to improve their teaching practices. As a result, assessments with feedback have almost become synonymous with formative assessments (Black and Wiliam 2005). Many students contend that more feedback would give them more opportunities to learn from their mistakes and to improve. They argue that feedback from summative assessments is often inadequate, too generalized or irrelevant to the students by the time they receive it.

Many methods of providing more feedback have been tried and many have reported quantitative success in their efforts. After all, the more feedback the students get the more guidance as to what the assessment will expect and so do better in assessment tasks. However some have warned against feedback used in the wrong way (Carless 2007; Crisp 2007). Whilst feedback can encourage self-reflection it often just tells the students what the tutor wants to see. Scholars are increasingly acknowledging that feedback in itself is insufficient (Carless 2006; Crisp 2007; Gibbs et al. 2009; Cartney 2010). In concrete and procedural formative assessments the feedback rarely provokes critical reflection and very often fails to prevent the student repeating the same mistakes again (Cartney 2010).

Sambell and McDowell (1998) say that too much tutor feedback can discourage students from evaluating the quality of their work themselves and induce learned dependence on the teacher (Butler 1998; Wingate 2010). They prioritize the teachers' expectations of their work over their own (Gibbs et al. 2009). It can give a message to students that the only way to learn is by doing what the tutor wants, and the only thing to know is what the tutor will assess. Such feedback risks creating student drones focused on narrowing their knowledge so it fits the criteria of the assessment. Yorke (2003 p.489) describes the results of some formative assessments as "a vicious spiralling-in towards 'performance goals'" and a practice in "identifying the rules [and] accepting them"". Miller and Parlett as far back as 1974 described students as becoming increasingly "cue-conscious". This cue conscious behaviour can be encouraged by formative assessments which give the students constant feedback, which they use to

improve their grades while ignoring their intrinsic motivations for learning. This can lead to students "playing it safe", thus effectively disempowering and demotivating them further.

Furthermore many of these formative assessments contribute to the course grades, but as a result researchers note that students can focus on their grades rather than the formative elements of the task. If there is feedback it is often left unread, misunderstood, unused and unneeded (Black and Wiliam 1998; Nicol and Macfarlane-Dick 2006; Daly et al. 2010).

Conclusion

This literature review has brought forward a number of ideas. Some scholars suggest that there is a crisis of legitimacy in HE teaching as a result of the changes in student populations, the changes in university aims and a lack of investment (Nicholls 2009). Behaviourism is still our default conception of learning and the teaching and assessment practices it encourages are not developing sustainable approaches to learning in our student populations (Duit and Treagust 1998). Lectures, examinations and impersonal essay assignments are frequently failing to provoke study habits that require analytical and critical thinking (Tan 1992; McDowell 1995; Sambell et al. 2013). Formative assessments have at times been implemented in such a way to consolidate the problem (Yorke 2003). The tasks focus the students on curriculum coverage which requires convergent thinking, reducing students learning autonomy further. Consequently the formation of graduate skills, including independence, resourcefulness and inquisitiveness, is often being sidelined (Edwards 2005).

However, many of the same scholars highlight the emergence of sociocultural theories of learning which better represent how learning happens. Sociocultural theorists posit the importance of system thinking when considering learning and in particular recognize the significance of the students' intrinsic motivation. Such theories suggest well-designed formative assessments that can be a solution to problems such as student instrumentality and tutors' "teaching for the test". Ecclestone (2007) described them as conforming to the spirit of the endeavour. They are sustained through a high proportion of divergent tasks which are framed so they still cover the curriculum (Pryor and Crossouard 2010). They are usually authentic tasks and replicate scenarios that exist outside educational environments as well as within them. They develop and support peer interactions which require on-the-spot judgement-making and reflection as well as providing a context-rich learning environment (Havnes 2008). Many have also reported the benefit of peer assessments. Seeing each others' work provokes analytic and critical thinking as well as self-reflection (Topping 1997). However, caution is advised when using peers to summatively assess each other (Sadler 2009; Vickermann 2009; Sambell et al. 2013).

It is noted that different disciplines have different knowledge discourse and different requirements. It can be unfair to compare teaching and assessment practices across disciplines because of the different objectives and epistemologies (Neumann et al 2002). However some have noted that hard sciences are more likely to use teaching and assessment practices which provoke shallow and instrumental strategies (Duit and Treagust 1998) - in particular didactic teaching, content-filled curricula and

assessments which require extensive memorization (Parpala et al 2010).

Final points

There are many factors that can compromise innovative assessment interventions. The students may have had many years of education based on models of learning as knowledge acquisition. For many successful students memorization for examinations is easy compared to the emotional involvement with the learning material that discussion, argumentation and reflection can cause. Project-based work simulating real world applications of their learning can seem time-intensive and difficult compared to alternatives which only require a surface approach to learning. In a study conducted by Tan (1992), he found that at least a quarter of students preferred such methods of teaching which required a surface approach to learning, a majority of whom were those who did better in traditional assessments. He (p.262) speculated:

> These students probably adopted a surface approach because they merely equated learning with the acquisition of facts, or they were perhaps aiming at achieving their goals with minimum effort

This response to discursive/reflective and discursive/existential formative assessments can be demotivating for tutors who have implemented them, but they should not be surprised if they are familiar with Bourdieu's notion of *reproduction*. Cultures reproduce themselves because the barrier to change is high.

For those tutors who care about the quality of their students' learning, it is difficult to change teaching and assessment practices. HEIs are geared towards supporting notions of teaching and assessment based on knowledge acquisition. Structures are set up which make it straightforward for tutors to give lectures and set up closed-book examinations and essay-based assessments. Very little structure and support is available for other types of assessment.

Chapter 5: Hard Science case study

The case study used a first year autumn term undergraduate Hard Science course. The student cohort comprised students reading a wide range of subjects. Almost two hundred students were taking the course. The course made up half of the full-time students' learning commitment for the autumn term.

The course objectives included introducing the students to:

- The rules and standards required of them in HE
- A large number of biological principles and facts
- Scientific writing
- Critical analysis of the readings
- Biological laboratory techniques

Teaching and assessment

The course material was covered in ten weeks with teaching sessions including lectures, laboratory practicals and tutorials. The lecture was the primary teaching tool. It was during these sessions that the course convenor relayed the core themes the students were expected to learn.

There were two practicals which gave the students an opportunity to acquire practice-based experimental skills, such as those that would be required in a discipline-based research activity or employment in the field. One practical required them to draw and analyse what they saw through a microscope and the other required them to work in groups, perform a number of calculations and construct graphs from raw data. The number of practicals was constrained as a result of the number of students studying the course and therefore their importance in the students' eyes diminished.

The three tutorials divided the cohort of students into smaller groups. The students were expected to participate in discussion about set scientific articles that were in addition to their core reading expected for the lectures. Their participation was recorded in their tutorial report, which was given to them at the end of the term. The teaching in tutorials was shared between a number of academic tutors. This could have been an important teaching space for the students to develop critical and analytical skills, but the research showed that the students did not appear to value the importance of the space as I will discuss later.

In total there were forty-seven hours of teacher-student contact time over the term. The large number of teaching hours for disseminating information meant that the students were very busy throughout the term with learning facts and procedures.

The students were assessed through an end-of-term multiple-choice examination as well as mid-term exercises that were designed to determine whether the students understood or could do predetermined things. They could be described as concrete and procedural formative assessments (see Pryor and Crossouard 2010 for a discussion about these formative assessment types), and sat on the convergent side of the convergent-divergent continuum. They included:

- A mid-term written exercise. This required the students to write a condensed version of an academic paper. It was a procedural exercise which can be viewed as authentic (see Sambell et al. 2013 for discussions on authenticity). It gave an opportunity for the students to experience performing a task that a neuroscientist might actually do. It required the students to perform a useful and transferable skill - condensing text without losing the meaning
- The write-up from two four-hour laboratory practicals. These were an important part of a students' educational experience where they practised authentic tasks that neuroscientists actually do. There was a "pre-lab" before the practical where the activity was introduced and a "post-lab" lecture where group feedback about the practical reports was delivered. The practicals developed the students' disciplinary-based skills and knowledge
- Weekly multiple choice quiz questions. These were assessed and encouraged the students to study throughout the term or lose grades. It was designed to motivate students to keep up with the material that was being presented in lectures

There were also online "lesson activities" that were not assessed. They introduced the students to new concepts but did not undermine their responsibility for learning. They included gateway questions to further reading. These questions gave the students an opportunity to test their understanding without the fear of their response contributing to their end-of-term grades.

The only opportunity for divergent formative assessments were during the tutorials, which were a space for discussion and personal reflection. However, they were few and unassessed and therefore not considered of importance by the students, as will be discussed.

Overview	Teaching methods	Assessment
Discipline: Neuroscience First term, first year students No. of students:188	19 lectures (2 hour) 2 laboratory practicals (3 hour) 3 tutorials (1 hour) VLE site	1 Multiple-choice exam (40%) with no qualitative feedback 2 practical write-ups (20%) 1500-word essay (20%) 6 sets of online multiple-choice questions (10%) 1 midterm written exercise (10%)

Table 5.1: Hard Science course delivery and assessment tasks

The course handbook

The course handbook was available to students as a hard copy or from the course VLE site. It was a dense twenty-one-page document that introduced the students to the course, provided a summary of the material that would be covered and what was expected of the students each week.

The course was in the first term of the first year of the students' studies and so the handbook dedicated space to preparing students for what was expected of them at this

level of study. It explicitly compared the standards expected of them at school and FE with the standards expected at degree level.

The course aims were expressed in the handbook in terms of the scientific topics and skills they intended to cover. Some of these aims were not well-supported by the teaching or assessment methods employed, such as obtaining information from diverse sources or the critical reading of scientific literature. More will be said about this later.

Approximately half of the course handbook was dedicated to explaining how the students would be assessed on the course. It described each assessment method including the purpose, what was expected of them and how it would be marked. It explained how they should plan, write, include graphical representations and conclude their essays.

The handbook gave an explicit mention of when and by whom the students would receive feedback on the course and how they should use it to "*improve and progress*". It is interesting to note that despite this advice each assessment task was different in nature and in substantive focus to all subsequent tasks and therefore the specifics of the feedback would not be needed again on this course.

The handbook had an "*independent learning*" section where it explained that the material covered in lectures was a "*framework from which to progress to further study*". It stated that it was the basis of their learning but they should do "*further reading*" and their own "*literature searches*" as well. Despite this, the course teaching and assessment left very little time or space for independent learning and little effort was made to reward it through the teaching and assessment methods employed.

The handbook followed with a detailed description of how students should reference works. It suggested journal databases where they were more likely to find journals with articles of the quality they would be expected to be referencing. It stated:

> Do **not** rely on Wikipedia. It is full of errors. It is **not** an acceptable scientific, or indeed academic, work of reference (bold in original).

In such a way it reinforced the formality of the learning process and the hierarchy of knowledge holders. I note that the advice varied from the Applied Technical course case study, where Wikipedia articles had direct links from the VLE site. The handbook emphasized the importance of being able "*to judge the quality of source material*".

The handbook encouraged participation and engagement in the course and in some places encouraged the students to work together. In particular it described discussion as an activity which would stimulate and develop the abilities needed to formulate and express arguments. It cited tutorials as the place where students could "*develop the abilities needed to formulate and express arguments*". It emphasized that the students should "***Join in the discussion***" (bold in original). Despite this, none of the student research participants thought that the ability to discuss the learning material was an important skill to acquire in order to do well in the subject and none of them thought

there was a formal space for them to engage in it within the course. I will take this up further in the discussion.

The handbook stated that to meet the standards demanded by the course, the students would have to develop their ability to express themselves based on their understanding of the topics. It read:

> *That means expressing the ideas, hypotheses, arguments,* **in your own words** (bold in original)

It warned against learning "*a list of facts*", and promoted "*understanding the principles, and the logic in the experimental investigations and conclusions*". It encouraged students to focus on the "*mechanisms*" and "*function*" rather than isolated facts and "*to extrapolate logically from this knowledge base*". It told the students if they do not "*engage in their own learning*" they "*will not progress*". I note this advice was in direct contradiction to the aims of some of the student research participants who wanted to be able to remember all the materials presented verbatim (See Rosalind and Deepti).

In summary, the majority of the handbook text was about the assessment process, reflecting the importance put on assessments by the students. The language used was authoritative, suggesting a mistrust of the students' intentions and motivations (see Sambell et al. 2013). Space was dedicated within the text to encouraging students to gain learning autonomy, engage deeply with the topic and discuss and debate the issues, but unfortunately the teaching methods did little to support this.

The VLE site

The course had a VLE site which comprised four sections. These were an introduction section, lecture-relevant materials section, tutorial-specific section and further information and multiple-choice quiz section.

The introduction section provided links to student support services at the University and a document created by a different UK university which provided guidelines to the referencing style that the convenor expected the students to use in the course. There was also a glossary of terms that were introduced to the students through the course.

In the second section there was a list of lecture slides and lecture notes, including four or five files made available to the students at the start of each week. This was followed by a section which provided materials necessary for the tutorials. It included the instructions and preparation materials for the mid-term written exercise and a drop-box which allowed students to upload their assignment to the site so that the tutor could mark it and return it online. A separate facility was provided on the site for late submissions.

The site had a section with a list of "lesson" activities, which were made available each week. These were topic-based information portals with gateway questions that the students had to answer correctly to get access to more information. The information

expanded the subject matter with examples and gave leads for the students to read around the topic.

There were six sets of weekly online multiple-choice questions which probed the students understanding about the topics being covered. The questions were summatively-assessed, contributing a small part to the students overall grade for the course but had a formative intention. The quiz questions were relevant to the topics the convenor was attempting to cover in a given week. They were only open for that week. By limiting the time span that a student could do the quiz it encouraged them to keep up with the course material as it was presented. Those students who did not do the questions in the week got another opportunity to do so later in the course, but their grade was penalised. The students got an automated feedback response to their answers. Whilst this was appreciated because it was immediate (see comments by Rosalind), it was also described as cold and demotivating (see comments by Deepti). They were given two opportunities to get the right answer. If the student used this second opportunity their grade was also penalised.

The participants

Dr. Kliver

Dr. Kliver took over as course convenor for this course five years ago. She was strongly committed to teaching and learning.

She described the course as directing the students to scientific and specifically biological ways of thinking and doing things. She said that the course introduced the students to "*doing science*" in "a *science way*" and becoming a scientist. She wanted her students to ask questions such as:

> *How do I write? How do I think about science? Do I just parrot it?*

She felt strongly that students should be engaging and critically analysing the materials that were presented to them and that they read. She said:

> *If you don't evaluate, engage, think further, have sidesteps and discuss things with people, then it isn't science in my book*

She felt that as scientists the students needed to learn how to challenge the body of knowledge in order for new theories to develop. She described scientific research as generating "*massive amounts of discussion*" and she thought that discussion was a crucial part of her students' development. She said:

> *There isn't a fixed book of facts that you can just learn by heart. If you do that, then yeah, you're a book, but you're not a scientist*

Within her teaching she tried to encourage students to take an exploratory approach to their learning. She said she did not want her students to "*find the answer*", but "*make the answer*". She added:

> *They don't like it because it's hard work, but it's the way to get there.*

She wanted the course to introduce the students to "*how to do science*" at undergraduate level. She felt the students had to understand "*the basis of experimentation, deduction and debate*".

Through talking to Dr. Kliver about her aspirations for her students I was led to believe that she favoured a situated cognition approach to learning where she would focus her students on practising being scientists. Her emphasis on becoming a scientist also appeared to highlight her appreciation of identity work through engagement with the disciplinary field and its embodied practices. However, in line with cultural and disciplinary norms (Duit and Treagust 1998), her teaching and assessment methods did not fit well with such progressive goals. The overall focus of the course was more in line with Freire's banking model of knowledge than Lave's (1991) idea that learning was a process of becoming someone new.

Because the course was an "*introduction to the topic*", no effort was made within the teaching or assessment methods to support the students' intrinsic motivations for studying the course. Dr. Kliver explained that the students were "*not ready*" to make choices about their learning, but there would be opportunities later in the degree programme when they could make "*informed decisions*" about what they wish to explore. Instead, the goal of this course was to introduce the students to "*a huge body of knowledge*". She explained that the students would need to be able to recall it in order to pass this course satisfactorily. She did not recognize any conflicts between this and her earlier depiction of the subject as involving contention and debate.

Dr. Kliver sometimes encouraged groupwork, for example to handle the high numbers during the practical element of laboratories. However, at this level of study she did not recognize the benefit of groupwork for learning *per se*. She even cautioned against it stating that it might result in them sharing misleading information. She was also concerned about the practice because she felt it easily amounted to collusion.

She had designed the course so that sixty percent of the course grades were awarded for coursework completed during the term. She believed mid-term assessments improved the quality of the course for a number of reasons:

- Students performed best on the day of their assessments because they had been motivated to learn the material. By distributing assessments through the course the students were "more often at their best". This concurs with research by Sambell et al. (2013)
- Continuous mid-term assessments limited the extent to which it would benefit the students to cram-revise for the final examination as this contributed to only a part of the course grade
- Continuous mid-term assessments would encourage the students to improve their study habits. It is a common observation that students only do what is assessed (Boud 2000; Gibbs 2004-05). Dr. Kliver said, "*Students don't read. They do things last minute. To some extent the last minute bit has always been the case, but students do not read unless they're absolutely forced to any more*"

- Mid-term assessments gave her and the other tutors on the course an opportunity to give the students feedback on their progress - although she admitted she had rarely altered her teaching as a result of the student performances in mid-term assessment because there was so much material to cover

Whilst Dr. Kliver's attempts to grade as much as she could were for good reasons, it had the effect of de-prioritizing skills and abilities which were not graded. Much of what was graded in this course were convergent skills, such as reciting facts and performing procedural tasks. What was not graded were more divergent tasks such as discussion and personal invention. Dr. Kliver explained this was because the students were not advanced enough in the subject at this level to engage in reflective and discursive tasks, but this was also the reason for the lack of invention evident in some of the student research participants' comments, as I will discuss later.

When Dr. Kliver was asked what could make the course better she said, "*Less students*". She said:

> *It just feels like if it was a smaller class, with this type of course, it could have been much more effective.*

Whilst Dr. Kliver's observation is likely to be true, it does not fully account for the teaching and assessment practice's lack of support for her long-term aspirations for the students. She wanted to create critical students capable of debate, not students who could just parrot back course material she had delivered, and yet the teaching and assessment methods in her course supported a banking model of learning more than any other. Dr. Kliver had a passion for teaching but her methods constrained student development towards defined goals without room for divergence. In essence her desire for developing inquisitive, motivated students fought against competing desires for the students to fill their heads with facts and procedures. In line with cultural and disciplinary norms in scientific subjects, information acquisition was prioritized over practising, discussing and critically analysing knowledge in terms of the students' personal contexts (see Young 2010). She had a hierarchical model of knowledge and seemed to believe that knowledge flowed best from the teacher to the student. She did not value peer-to-peer working at this level of their studies.

Rosalind

Rosalind was a mature European female student. She said she wanted to be a medical doctor as a result of reading many books relating to a condition she had suffered from. She felt she could help medical patients because she had "*been there*" herself. Rosalind did not have sufficient qualifications to get into the medical degree course but believed she might be able to get on to it through a side door if she started this related degree. She said she studied hard, and did not feel her younger peers were as committed as she was.

She felt that her primary aim in the course was to lock the material she was being presented with into her memory. She felt that if she could memorize the material she would be "*knowledgeable*" and that would help her "*grow*". She said that in scientific professions, such as a medical doctor, it was important to have information at the front

of one's mind and through adopting memorisation techniques she would eventually understand what was being presented in the lectures. Reflection, criticality or taking a personal perspective on the subject material were all absent from her discourse. Contrary to the desires of the convenor, Rosalind appeared only to be concerned with being able to recite back what she had read and been told as if she was trying to become a scientific encyclopaedia. She talked of the pain she felt about remembering "*so many facts*". She described lectures as being "*too crammed with information*" and "*hard to follow*". She recounted how other lectures focused in detail on specific areas so you could follow the thread, but this was not the case on this course. It was "*bang, bang, bang*". She said:

> *It's hard to ask questions, because you have to keep up with her, and at the end of the lecture, you've heard things, but you haven't really memorized anything*

> *I'd be better off with a textbook, because at least I could go my own pace, stop, you know, check things*

She could not think of any tactics she used to reflect on her learning material except for printing out the online material and re-reading it. When I prompted her she thought discussing her reading with someone else would have been helpful. She was evidently excited by the idea, but she said that she had not had the opportunity to do so.

Rosalind said she liked mid-term activities that gave her feedback during the course. She described feedback as having "*a snowball effect*" to her understanding of the subject and therefore useful. However despite all the feedback she was still not clear of the objectives of the course and, contrary to the objectives of encouraging independent study as stated in the handbook, Rosalind thought she would "*always need feedback*" and would "*never*" be able to assess whether her own work was good enough herself.

The interview with Rosalind indicated the extent to which the teaching and assessment methods employed supported curriculum coverage and a banking concept of knowledge more than any other. There were very few indications that Rosalind was becoming more critical or analytical, was developing sustainable learning strategies or that she was in the process of forming an identity within the field of study. She had not joined a community of learners and did not have any peers to talk with about the subject. She had not identified the tutorial as a space where she could do this. To Rosalind, becoming proficient at this subject meant remembering all that she could about the materials being presented to her so she could regurgitate them on demand. This was at odds with the stated aims of the convenor and much of what was written in the handbook, but it was not because she was lazy or unmotivated as Dr. Kliver had suspected.

Deepti

Deepti was a young Indian woman who spoke English in a slight American accent. She had spent two years studying for a technical degree in India, but had developed a passion for Hard Science and moved to the UK where she believed they had the best laboratories. She expressed a deep-rooted personal interest in the subject and came across as knowledgeable and committed. The course at the University had been her programme of choice and she had made personal sacrifices to study there.

Lectures were Deepti's favourite part of the course. She felt good about herself after a lecture or when reading her notes because she was learning something new. She claimed:

> *I think for me that's good for my brain. It's really good!*

Deepti said she was particularly motivated when she came prepared for a lecture by having done some background reading because she could keep up with the material being presented. She described how the new material being introduced to her was giving her new ways of looking at things. She said the course was creating a "*new relationship to knowledge*".

She enjoyed the mid-term written exercise because she felt she had the opportunity to use the knowledge she was developing. She praised the tutor for having given her "*the method*" to break down the complexity of the article and understand it, despite much of the wording being unfamiliar. She said she enjoyed searching for the answers which she found buried within the text. The exercise required her to practise procedural skills which were useful and authentic in the discipline.

Like Rosalind, Deepti felt one of her greatest challenges on the course was memorizing the material. She attempted to gauge areas where she thought her understanding was weaker and focus her study time on those areas. She said that if she read something once she felt like she was "*skipping through it*" and she would forget. Consequently she would read through texts twice. The study habits she employed to succeed in this course reduced the time available to her to "*read around*" or engage in "*independent study*" as the handbook encouraged her to do.

Like Rosalind, Deepti expressed how important she felt feedback was with relation to being able to know one's current ability. She thought that the feedback she was given through the automated features of the online lesson and quiz was potentially useful and she liked the fact that you had two attempts to answer the questions. However she hated that the online quizzes were summatively assessed. She described herself as being "*paranoid*" about them. A low grade would crush her self-esteem and she would spend "*a lot of her energy thinking about it*", despite it contributing a minimal percentage to the final assessment. As they were so frequent (more than once a fortnight) they prevented her from enjoying her course at all and it was a distraction to her learning. She felt the demotivational effect of a low grade could be cushioned if she was given explanatory feedback, but that quiz question feedback was very "*cold*" (See Butler 1998; Dweck 2000; Wingate 2010 on the negative effects feedback can have).

Also like Rosalind, Deepti immediately understood the value of discussing her learning with peers. She said that if she did, it would help the information to go "*to the part of your brain where things make sense*" and prevent it from going into parts where "*it doesn't come out again*". She thought it would transform it from "*just information*" to information that she could "*interpret*". However like Rosalind she said she did not have opportunities to engage in discussion. She was not friends with her peer group, and

contrary to the demands of the handbook to "join the discussion", she did not recognize the tutorial as a place where she could.

She felt "*in harmony with the instructor but not other students*". She thought this was because there were so many students studying towards different degree programmes. She also felt that this feeling of separateness was reinforced because of the absence of spare time resulting from the amount of material the students were expected to cover.

Deepti's comments provided further evidence that the teaching and assessment practices on the course were supporting curriculum coverage, but failing to develop students' criticality or learning autonomy. She was trying to remember as many facts as possible but not reflect on them or challenge them. She had no peers with whom she could interact and the tutorials were again completely overlooked as a space where she could discuss her subject. Contrary to the views expressed by the convenor and the text in the handbook, the teaching and assessment methods had indicated to her that neither developing a critical perspective or engagement in debate were important to succeed in this subject.

Mark

Mark was an English male who came across as extremely focused on the subject. He studied hard and had friends in his student cohort with whom he could discuss his studies, but he did not socialize outside the cohort very much. During our interview he found it hard to divorce the subject material from the process of learning which was what I was trying to interrogate. He talked in detail about the content of the course and was able to give interesting anecdotes which arose from the course material.

Mark had won awards for his academic achievements in his A-levels. He had chosen this subject because he felt it would complement his skills and would distinguish him from his peers. He described himself as "*fascinated with biological groups of behaviour*" and was able to produce a number of examples such as "*the phantom limb syndrome*", "*the Alice in wonderland syndrome*" and "*how rabies will give you a very specific phobia of water*". He wanted to know how psychological behaviours were constituted biologically. He then related this at an existential level to his understanding of God. He said:

> I do believe if there's anywhere where a kind of God exists, or anything like this, it's definitely kind of deep-rooted into the human psychology

Mark said he wanted to "*biologically see where God's fingerprint plays upon the mind*". He was very inquisitive; he said he could see himself in a research laboratory and it had been suggested to him by his girlfriend that he became a consultant neurologist.

Mark described the shift in the standards expected from A-level to degree as one of introducing increased complexity. He said that theories that were taught as fact at A-level were questioned and expanded upon at degree level. The difference was that in order to make sense of a subject matter at degree level, he had to synthesize knowledge from many sources, not just what had been presented to him on the course. He said the course standards required him not only to "*regurgitate and know*" facts, as his A-levels did, but to be able to use them or at least to "*tweak things*". Mark said that when he

probed a theory deeper he would find things so much more complex than he had imagined. He exclaimed, "*I wouldn't have even have asked the question at A-level*". He was initially motivated by working at this level because he found the complex material gave him "*a real buzz*", but said "*the novelty [had worn] off a little*".

He recorded the lectures using a dictaphone. He said that he used these recordings to go over the lectures and make sure he had understood everything. Whilst re-listening to his lectures he said he would find that he had misunderstood the complexity of important theories. He had strategies for studying such as mapping out the theories and facts being presented visually and connecting the dots between them.

Mark was the only one of the students who felt he had adequate opportunities to discuss the course material with his peers as he had lots of friends on the course. They would talk about topics that would arise through the course. Mark felt it was important to talk about the subject material in his own words and said it motivated him to study harder. He thought his discussions with his friends were not the thing that contributed most to his learning because they dwelt on elements of the course that they thought were "*cool*" at the expense of developing "*a broad knowledge*" of the subject.

He found the online course site "*lessons*" useful because they required him to check his knowledge. He found that they generated discussion between him and his friends. The online questions were also useful to him because they made him think critically about the material he was reading, although he said he could sometimes work out the answer without really understanding it.

He liked the continuous assessments through the course. He said he "*stressed out*" when a grade was reliant on one end-of-term performance which was "*make or break*", and he would rather have the "*safety-net*" of spreading the assessments. Mark thought while they were appropriate for this course, they would not be appropriate for other courses where the material "*built on itself*" and "*didn't vary so much*".

He had become far more adept at assessing his ability than he was before he started the course. He could identify areas where he was having difficulty and determine whether the difficulties were a result of the way he was attempting to learn the material or if it was the content of the material itself. He could use this knowledge to modify his study mode to meet the challenge. He explained that he could now "*pick up on [his] own mistakes*". He concluded the information imparted during the course was sinking into his mind "*as [if he were] breathing [it] in*".

The teaching and assessment methods had suited Mark's learning style better than the other participants. His comments indicated that he was well-versed in the curriculum but he was also developing criticality and analytic skills. He showed he was developing graduate skills including learning autonomy and inquisitiveness. It appears to me that the difference in his learning to the other research participants arose because, despite the absence of valued formal teaching time dedicated to discussion, he had developed a network of friends to engage in the parts of the course that interested him.

Hard Science case study summary

Much time and effort had been spent structuring the course. From a traditional science pedagogic perspective it checked all the boxes and might have expected excellent results. It got a large number of students to memorize a lot of material, engage in two observation practicals and practise summarizing academic texts. However, when I talked to the student research participants, they did not recount experiences of critical engagement with the subject material or feel like they were becoming scientists as a result of the teaching and assessment practices.

The case study indicated that despite the wishes of the tutor, or all that was written in the course handbook, the teaching and assessment methods encouraged students to prioritize curriculum coverage over developing their learning autonomy. There was a lack of formal teaching sessions dedicated to developing the students' identities in relation to the subject material, their criticality, reflective abilities or supporting their intrinsic motivations. It felt as though Dr. Kliver was in a double bind. On the one hand she wanted the students to develop scientific ways of thinking with enthusiasm and a personal perspective, but on the other she wanted them to cover large amounts of the curriculum in a relatively short period of time. The latter objective seemed to have taken precedence on her course design and, as a result, her methods simply did not develop the students' capabilities in the direction she claimed she wanted to.

Academics who design courses are influenced by the world in which they have studied, researched and now taught and they recreate learning environments with which they are familiar. In this case, reproductive forces seemed to have worked to keep the learning environment the same despite efforts to improve it. As Young (2010) suggests, there is a common belief that science curricula must impart extensive information to the students and within such cultures "it is unlikely that arguments to the contrary would have any power unless drawing on discipline-based research" (p.112).

The different formative assessment tasks invoked different qualities of learning. The online "lessons" and the multiple choice questions were pedagogic tools for improving the students' capacity to acquire convergent knowledge, whilst the laboratory and written exercise gave the students opportunities for practising authentic, but procedural, skills required in the discipline. However, in and of themselves they did not support Dr. Kliver's longer term goals for the students: for them to become independent, resourceful and inquisitive scientists. They were not designed to be expansive processes in the students' development, nor to promote "learning" autonomy (Black et al 2006; Torrance 2007). To achieve such goals the course needed to include more divergent formative assessments (Pryor and Crossouard 2010).

These existed, but in far lesser measure. There were three course tutorials for which the students were divided into much smaller cohorts than in the lectures. They were a space where students met their tutor and fellow tutees and they could discuss set scientific articles. The convenor cited the tutorials as the space where students could engage in discussion and debate relevant theories, both of which were important skills she hoped the students would pick up from the course. In theory the tutorials were a key part of the course because it was a space where students could practice talking about the new theories they were grappling with. They were a natural space for

reflective and discursive formative assessments where student learning could be reviewed, improved and contextualized. Often engagement in discursive environments can be the glue which the students can use to piece together their learning experiences (Boud et al 1999).

However, the student participants failed to recognize the tutorials as such a space. There were at least three issues. One, their low prioritization was symbolized by their scarceness - only three. Two, the focus of the sessions was on additional material so the students felt it was just "extra work". Three, the assessment methods did not evaluate the kind of knowledge that discussion provokes and consequently they were not thought of as core to their learning. Rosalind and Deepti reported that they did not have anyone with whom to discuss their learning, completely overlooking tutorials. These issues resulted in the tutorials not being the glue that the course needed.

The imbalance in convergent and divergent formative assessments created other issues too:

- Continuously assessing students' ability to acquire concrete facts and procedural skills reduced the students' independence and resourcefulness and consequently added to the students' stress. Rosalind and Deepti felt bombarded by everything they were expected to memorize and the breadth of skills they were meant to practice. Rosalind said, "*you don't have time to think, and ask questions. She just goes too fast*".
- The assessments did not support the students' intrinsic motivations for studying the course or their inquisitiveness. The interviews provided evidence that each had entered the course intrinsically motivated, but that the teaching and assessment methods caused their motivation to ebb away rather than reinforced it. Even Mark said he had lost his "*buzz*" of doing university standard work after the first couple of weeks. Dr. Kliver, too, appeared rather defeated by their effect on her students. She reported that the students just do the bare minimum, rarely going to the library or doing the additional reading
- The feedback the students received from the formative assessments was objective-focused, pointing students towards the right information, and useful in giving the students an idea of their progress on the course. However, it did not provoke self-regulated learning strategies which would help the students more generally in the future (see Nicol and MacFarlane-Dick 2006 for self-regulated learning). Consequently the feedback that the students received from the assessments created a reliance on it. Rosalind said she lacked confidence in her ability to judge her own work without comments from their tutor (see Boud and Hicks 1993; Falchikov 1995 with regards to learned dependence); and Deepti called the feedback she receive from the multiple choice questions as impersonal and damaging to her confidence (see Yorke 1999, Yorke 2003 and Torrance 2012 for the potentially damaging effects of assessment on students' confidence)

Dr. Kliver recognized the core of the problem as the number of students doing the course. Deepti said the wide range of student from different disciplines doing the course was off-putting. The course was constrained by market forces resulting in

institutional pressures to funnel more students into fewer courses. Nevertheless, by shifting more significantly from disciplinary norms in teaching and assessment practices and through the utilizing of peers, more divergent and motivational approaches that met the convenor's aims of creating critical and motivated scientists could have been found, as will be discussed.

Chapter 6: Soft Science case study

This case study focused on a first-year undergraduate Soft Science course for students reading English. Enrolments to the course were from two cohorts of students. For one, the course was half of their termly workload and for the other it was a quarter. Both groups shared the lectures, but had their own independent seminars and only one group had workshop teaching sessions.

The course objectives were to develop:
- An understanding of basic concepts relating to words and meaning
- An understanding of some of the applications of linguistic analysis within different fields
- Discipline-specific skills in linguistic analysis

Teaching and assessment

The teaching aims of these courses were to introduce the students to "scientific method", practical writing and research skills. It had lectures where material was presented, seminars where learning activities were played out and, for one student cohort, it had workshops where students learnt practical skills relating to Soft Science such as writing and critical analysis.

The lectures, seminars and readings were aligned so that the students' understanding was scaffolded. The weekly topics, readings and exercises were planned to be reinforcing, building upon each other week by week, thereby embedding the knowledge into the minds of the students (see Biggs and Tang 2011 for more on constructive alignment).

Overview	Teaching methods	Assessment
Discipline: linguistics First term, first year students No. of students: 29	13 lectures (1 hour) 6 workshops (1 hour) 10 seminars (2 hours) VLE site	Portfolio, including research report (essay), draft report, presentation slides and feedback, course participation record, and any other chosen material

Table 6.1: Soft Science (major) course delivery and assessment tasks

Overview	Teaching methods	Assessment
Discipline: English First term, first year students No. of students: 36	10 lectures (1 hour) 10 seminars (1 hours) VLE site	Portfolio, including research report (essay), draft report, presentation slides and feedback, course participation record, and any other chosen material

Table 6.2: Soft Science (minor) course delivery and assessment tasks

The course was assessed through a portfolio of work. The portfolio would consist of a completed essay, a draft essay that the students had submitted for peer review and review from the tutor, a presentation feedback form filled in by the tutor and a course participation record (CPR).

A major strength of the course was the requirement it had of the students to adopt a word. This word would become a personal focal point of the course. The students looked at the different linguistic aspects presented through the course and related them to this one word. The student essays, presentations and most of the formative assessments within the seminars expected the students to focus the topic in relation to it.

The seminars included weekly reflective and discursive formative assessments (see Crossouard and Pryor 2008) that could optionally be included in their CPR. The formative assessments applied the knowledge that the students had been hearing in lectures and reading about. This was done in a number of ways:

- They created a vibrant peer community. This meant that the students' learning was challenged frequently and they were forced to defend their own understanding (Sambell et al. 2013). Discussion requires the learner to make judgements about their learning, prioritizing the significance of some parts over others
- They created a discursive environment
- They introduced concrete facts and procedural skills through reflective and discursive practices

The course handbook

Each course had its own handbook that contained an overview of the material it would be covering and the skills it would be expecting the students to practise. The handbooks described the structures of the courses, including the purposes of the different teaching sessions and assessment tasks.

They laid out what would be expected of the students, including attendance, preparation, participation and adherence to regulations; and what they could, in turn, expect of the tutor, including the returning of work with feedback within a set time, being available during her office hours, responding to queries and being clear and fair in assessments.

The language used in the handbooks set a mature tone and emphasized that the students' success depended on responsible actions to be taken by both the tutor and the student. It was like a contractual agreement between them. I note that this differed from the handbook for the Hard Science course, which set an authoritarian, parental tone. Also, unlike the Hard Science course, there was congruence between the course goals specified within the handbook and the teaching and assessment methods employed.

The VLE site

The course had a clearly-organized VLE site. At the top of the site it had three discussion fora where the tutor could ask questions to provoke academic discussion and post announcements, and students could engage in discussion about the course topics and ask administrative questions about assessments and so on. It had two sections with administrative material for each course. These sections included the handbook, assessment documentation and essay and referencing help sites. This was followed by a section with weekly readings and complimentary materials including presentation slides, lecture notes, and links to related web sites. There was then an online word journal which each student shared only with the tutor. It was a space where students could record words of their choosing with their meanings and the tutor could feed back comments to the students about their entries. At the bottom of the VLE site was listed a number of relevant external web sites of the tutors.

The participants

Dr. Barelli

Dr. Barelli was the course convenor. She was not a native English speaker but an experienced linguist. She described herself as passionate about teaching and learning and the welfare of her students. This came through from interviewing her.

Dr. Barelli considered her role as one which guided and facilitated a network of learners who were able to learn a lot from each other (see King 1993; King 2002). She thought collaboration between students was beneficial to student learning and recognized group-work as a transferable skill that she wanted the students to practise. She said it was important to learn from the tutor, but it was "*as important to learn from peers*". Many of her seminar activities depended on students bouncing ideas off each other. She said group activities got students emotionally involved even when they were not actively participating. I note that this reasoning differed from that of the Hard Science convenor, who thought student collaboration at this level of study might result in them confusing each other.

Dr. Barelli encouraged student choice. She emphasized the importance of "*independent, creative and critical thinking*" and "*independent and group research*". She described the creativity she expected as involving:

> *...nurturing themselves, their own interests, it's a kind of self-belief, I suppose. They have to choose their own words and they have to choose topics that they will focus on there. So that already makes them quite independent and [...] they have to kind of reflect on what topic did [they] find interesting*

Dr. Barelli also talked of the importance of students finding their own way of appropriating knowledge. Many of the activities were optional, which gave the students the "*freedom to [...] self-express*". She said the course prepared them to find their own views and voice in the subject. It introduced them very gently to the nature of research and led them towards the ability to present a linguistic argument. I again note that the reasoning was at odds with the Dr. Kliver's, who did not believe the students had enough knowledge to make informed decisions at this level of study.

In the seminars, Dr. Barelli asked probing questions which revealed what the students were remembering from week to week. She said she attempted to familiarize herself with each of the students individually. By doing this she was regularly checking the students' knowledge and moving their mental models on appropriately, according to their understanding (see Vygotsky 1980 on zone of proximal development). She said:

> *I know if [the students] are building the relations that I'm expecting them to build and if they are getting the concepts I'm explaining to them.*

Dr. Barelli had a sophisticated understanding of feedback, classifying different types of feedback from the "procedural" to the "conceptual". She used a number of methods to deliver feedback during the course including general announcements in the class, written feedback when returning the work that had been submitted and one-to-one feedback during face-to-face meetings. She was more likely to give procedural feedback for activities that they were to do again, such as technical mistakes in the written report. Such feedback could be used to improve in later written tasks. She was more likely to give conceptual feedback for the activities they would not do again, such as the presentations. This feedback focused on the theoretical content.

Despite this she found that many of the students did not take feedback on board. She described some of her students as being "*very precious*" about changing things and thought this might be a result of students being new to the practice of critical reflection with respect to their own work. She was reflective about this and said she would need to consider how she could improve the students' response to her feedback.

Dr. Barelli illustrated skill and passion at developing expertise in the discipline, introducing concepts, facts and procedural skills at the same time as high-order graduate skills such as research, criticality, debate and a personal perspective. This differed from Dr. Kliver who also had a passion for teaching and desire to develop similar high-order skills in her students, but who had the belief that they should practise these skills after they had a solid bedrock of knowledge in terms of facts and procedural skills.

Andrew

Andrew was a male, English-speaker. He had a clear sense of what and how he was learning and could offer many insights into how the teaching and assessment methods were working for him. He understood social interaction to be important and said he had learnt a lot from working with his peers.

He reflected upon the shift in standards between FE and HE. In particular he felt the responsibility for the standard of the work he produced now rested with him rather than the teacher. I note this sentiment differed from those of the Hard Science students who still felt the push to study came from the tutors and assessment regime rather than their own motivation.

He thought the best way to learn was to "*do something*" with the material which would mesh it with his own experiences. Andrew said:

> *When someone's just giving you knowledge to use, if you don't kind of utilize it and use it again, then it just sits there and kind of, I think, deteriorates. Whereas if you're going to put it towards an essay or a presentation then you're using it, and when you think of it again you've got something to relate it to and therefore you know the context and how to use it.*

It was evident that Andrew learnt from social engagement. He said discussion was more enjoyable than other modes of learning because *"rather than just you saying your point and then the tutor talking, it's everyone having discussions"*. He participated in discussions because he was interested in how his peers would respond to his ideas, and he listened because their ideas helped him see things from a different perspective, some of which were new to him.

It was useful for him to see other people's methods of solving similar problems that he was grappling with. By listening to the presentations given by his peers he saw how everyone approached a subject differently. He enjoyed revelations such as these. They gave him more options and new strategies to tackle his own learning. By listening to the presentations of others and engaging in discussion afterwards, he was gaining a better understanding of his preferred approach to the topic. However some of the discussions worried him because they highlighted his lack of understanding compared with his peers.

He did not always like to participate in discussions and he would sometimes prefer to *"sit back and see what other people say"*. He was particularly comfortable doing this in online fora. He enjoyed reading online discussions because he could see the argument develop and the working process his peers were going through.

The seminar discussion and quizzes encouraged him to do the reading because it felt like he was being checked upon, but not *"nagged"* in the same way he was in his A-levels. He felt the course participation record (CPR) put the onus on him to be self-disciplined and responsible with regards to his work. He felt it reduced the pressure to achieve week on week, but encouraged him to do so. He also liked it because he knew that if he got just below a grade such as a first or a two-one, his grade could be boosted by his performance through the term. He thought that without it he might leave it all to the last moment and then panic. He said the CPR motivated him to do *"his own research"*, which, in turn, made him look forward to continuing in academia after his undergraduate degree (see Brew 2003). He said in courses which used end-of-term assessments he would take the material presented at *"face value"* and *"wouldn't be thinking - just be taking information"*, whereas in this course which was assessed with a personal portfolio, his opinions were *"expanded"*.

His new understanding of the English language helped him *"pick up on things"* he would not have otherwise, thus making them *"all the more interesting"*. He was able to apply his knowledge in every day contexts and this made him feel like he was being rewarded for achieving in his studies. He had become more aware of *"grammar and the semantics"* being used when reading newspapers, surfing the Internet and watching programmes. Andrew started talking to his friends who were not on his course about his learning and found himself in a teaching role in respect to them. This motivated

him to study harder and learn more about the subject (Havnes 2008). He was also able to use his new knowledge in other creative ways. He described how through understanding phonetics he was able to think about the way he speaks. He felt he spoke too quickly and slurred, but by thinking about the composition of words he found he could slow himself down and pronounce words more clearly.

Andrew commented that the extra reading that the tutor made available meant that he felt there was a lot of flexibility and that there was a lot of opportunity to explore his own interests within the course syllabus. For example he said that he was using his new learning to critically engage in current affairs. This differed from the Hard Science students I interviewed who did not feel they had time to focus on anything outside the curriculum. Interestingly, despite having many learning strategies, Andrew described the learning process as "*just happening*" and that it was "*sometimes like an absorption process*" much like the Hard Science student research participants.

Andrew provided evidence of how the formative assessments methods were encouraging creativity and the development of his identity within the disciplinary framework. He was exporting his learning outside the classroom and into his life (Havnes 2008). He was trying out new learning techniques, thus practising sustainable learning strategies (Boud and Falchikov 2006).

Adrienne

Adrienne described herself as a focused individual and perfectionist who knew what she liked. She enjoyed the seminars in this course because the open discussions allowed her to discover how other people think about things. At first she was worried her peers would be cleverer than her, but quickly found she could "*argue her corner*" with them. After a month or so on the course she told me she was openly competitive with her peers and enjoyed demonstrating how much she knew about the subject. The drawback with her competitive nature was that she sometimes felt alienated and paranoid that the other students knew more than her.

She made conscious choices regarding the prioritization of her time which she divided between her studies and external interests. She felt responsible for her own learning and governed her own time. She recounted how one weekend she "*got all the reading done, finished the essay [and when] everything was completely fine*" she managed to go to Barcelona with a "*free mind*".

The course covered much of the same material that she had covered in her A-levels, but each component part was more abstract and more detailed. She had learnt how to identify quickly the salient parts of texts and this enabled her to "*read the text in a completely different way*".

Adrienne really liked the assessment methods on this course because she "*loved coursework*". She could spend as much time as she wanted on coursework which suited her perfectionist nature. In contrast she disliked examinations because they forced her to do something in a restricted time span and then leave it. The CPR motivated her to attend all the seminars because she would "*kick herself*" if she missed an extra credit.

She had never done presentations before so when she was asked to do one she was stressed. However her competitive nature meant that presenting in front of her peers was a powerful motivation for her to learn the subject material. She found the experience very formative and described how it pushed her to express "*academic ideas in a non-written form*". She explained that the presentation, like coursework, suited her perfectionist nature because she could devote as much time preparing for it as she wanted. She said:

> *[I could] really work on something and shape it and develop it and put so much effort into it.*

She also enjoyed the online word journal. She used it to combine her interest in music biographies with her studies.

Adrienne provided evidence of the ways in which the course teaching was supporting her independent and responsible approach to her studies. She was exhibiting learning autonomy and the ability to critically reflect on the curriculum. This was underpinned by the flexible nature of the assessments.

Waisan

Waisan was a Chinese student and a young mother. She had a clear sense of how the English education system was different to the Chinese education system. She felt the English system gave her a lot more opportunity to discuss and get involved in activities than she had experienced in China and this meant she was "*producing knowledge*" rather than "*just receiving it*". In particular Waisan thought the seminars were a powerful method for improving her understanding. She said,

> *I find the seminar really useful and it's different from my… the education system from China. […] In China we just do the lectures, the teacher gives us information but in seminars [in the UK system] we can say our own ideas and I think it's really helpful and useful.*

Discussing the learning materials with peers had enabled her to produce her own ideas and develop new personal knowledge she could feed back into the group. She found it extremely "*helpful and useful*" to be able to discuss her ideas in relation to the course material. This enabled the subject material to became relevant and personal to herself and helped her learning to become incorporated into her understanding of herself.

She also liked the concept of a portfolio for assessment. She felt it motivated her to work through the term and the final grade would more accurately reflect her ability.

The course learning was giving her new ways of doing and thinking about things. She described the process as slow, but affecting her "*personality*". She said,

> *It's not only the knowledge you learn but also the habit, the ability*

Her comments indicate ways in which the formative assessment strategies were supporting her development of identity in relation to the subject. She demonstrated a metacontextual understanding of the learning process as well as ways in which learning

was changing her as a person. She was gaining learning autonomy as well as covering the curriculum.

Soft Science case study summary

The teaching and assessment strategy on this course supported learning autonomy, peer interaction as well as curriculum coverage. It encouraged the development of identity through discussions and tasks which gave them new roles and responsibilities such as through presenting and engaging in peer review.

The tutor recognized that social engagement was significant for success (see Tinto 1997) and had implemented "an expansion of the didactic structuring of student learning into this sphere of peer interaction" (Havnes 2008 p.194). Locally-defined rules for course participation and peer interaction were set up in the course through seminar activities and formative assessments. Within the classroom a community of learners was created in group pursuit of knowledge, thus "activating learners as instrumental resources for one another" (Wiliam 2011 p.12). Seminars had a number of games where they were expected to work together and discuss and defend their learning. Discussion required them to make on-the-spot decisions and judgements with regards to the subject (see Orpen 1982, Sadler 1989, Topping 1997, Black and Wiliam 2009, Cartney 2010 and Sadler 2010; for more on peer learning). Sharing their ideas helped them to work their thinking through and make it robust (see Black and Wiliam 1998; Boud 2000; Boud and Falchikov 2005). Accordingly the students knew more than what they had heard in lectures or read in papers - they knew what they had talked about, argued over and evaluated. Significant, existential changes were evident as a result of the formative assessment experiences. Waisan talked of learning as a process of developing habits (see Shepard 2000 for developing disciplinary habits) and she was not receiving knowledge but producing it.

The practice of using the students' adopted-word as a focal point for formative assessment activities meant that:

- Although the students were learning the same topics, they were relating it to something different. As a result each student had a personal perspective on the topic and ownership and mastery in relation to their word
- It allowed the students to be novices in the field of Soft Science but experts with regards to their chosen word. When discussing their word they had an elevated status within the group.
- The students naturally had something new to bring to each discussion - the relationship between the concept being discussed and their adopted word. This made social interaction more spontaneous because there was a genuine interest in each others' words
- Ideas could be shared without being copied

The weekly student presentations expected one or more students to present and the others to ask questions to the presenter. This changed the dynamics of the group. It allowed them to be an expert in their subject, a senior peer for the duration of the presentation. The student presenters would carry a different cultural *capital* in the cohort at least for the duration of the presentation because of their privileged position.

They became the teacher on the linguistic aspects of their adopted word and the question time afterwards forced them to contextualize and defend their knowledge. It meant students were invited to take different roles with respect to the creation of knowledge. Sambell et al. (2013 p.25) say:

> The requirement to explain one's thinking to a 'live' audience, which will ask follow-up questions and probe the rationale for decisions that have been taken, prompts many students to adopt deep approaches to learning in an effort to really understand the material.

Andrew and Adrienne both expressed ways in which their experience had been rich and formative and how defending their knowledge had grounded it and made it more their own (see Joughin 2007 for students perceptions of oral presentations).

Dr. Barelli used peer assessment which required students to give each other feedback about their essays before they were redrafted for submission to the tutor. The feedback amounted to peer-to-peer comments which the students could take or leave. The real benefit of the exercise was not in receiving feedback but giving it, because it required the students to reflect on the quality of their own essays, the criteria that would be used to assess it and their understandings of the course (see Sadler 1989; Lundstrom and Baker 2009; Sadler 2010).

The course participation record (CPR) encouraged students to take a responsible and independent approach to their study (see Nicol 2009 and Davison 2011 who explore student responsibility for learning). The seminar activities which were optionally submitted with their CPR created a 'low stakes' environment where students could take risks and get it wrong without being penalized (Knight and Yorke 2003). They were experienced as forgiving spaces which helped the students try things out (Sambell et al. 2013), but their attempts would also be valued. They were usually conducted in social environments, where students could gradually develop through practice and rehearsal (Brown and Adler 2008).

The reflective and discursive formative assessments appeared to be changing the students in ways that other teaching methods do not. It provided evidence for learning theorists who have claimed that we do not change by memorizing facts and procedures, but we do change when we engage in theoretical discussions and practices (Boud 1999). It was evident from the case study that the students' lives outside their study was being affected by their learning on the course (see Mark's comments about personal relationships, Adrienne's comments about time management and Waisan's comments about changing her habits). Furthermore, the seminar activities permitted the students to bring what they were learning outside the course into the discussions. In this way the reflective and discursive formative assessments were meshing their course learning with their external lives in a way that was impossible through other teaching and assessment methods (Havnes 2008).

Finally, the linguistic course used formative assessments which reduced the inequalities in the student cohort by comprising the full gamut of environments that stimulate learning within teaching time, and not leaving it to chance or the students' habitus and

social capital (see Hughes 2011; Sambell et al. 2013 for community reducing isolation, lack of engagement and poor study habits).

Chapter 7: Applied Technical course case study

The Applied Technical course case study focused on two courses which had shared teaching time. One of the courses was for third-year undergraduate students and the other was for Master's students. Shared teaching across educational levels is a common practice in the science schools of this university. Both courses took half of the students' workload for the term.

The course objectives were to:

- Create "*basic*" content using the prescribed software editor
- Identify "*the technological basis*" for the production and distribution of the content
- Describe "*human perception*" of the content
- Recognize "*the wider issues*" involved with "*production and distribution*" of the content

Teaching and assessment

Forty-five undergraduates and forty Master's students shared ten sixty-minute lectures and ten sixty-minute practicals. The primary teaching tool was the practicals where the students were given programming tasks. The lectures gave a theoretical perspective of the practical work, but they were distinct and a student could go to one without having attended the other and still keep pace. The loose coupling between lectures and practicals may have helped encourage student responsibility but aligning the theoretical and the practical elements could have focused the cohort (see Biggs and Tang 2011 regarding constructive alignment).

Overview	Teaching methods	Assessment
Discipline: Computer Science Second term, third year students No. of students: 45	Mixed cohorts with Master's students 20 lectures (1 hour) 10 practicals (1 hour) VLE site	Unseen Examination (50 %) with no qualitative Practical (30%) with no qualitative feedback Practical and peer assessment (20%)

Table 7.1: Applied Technical (undergraduate) course delivery and assessment tasks

Overview	Teaching methods	Assessment
Discipline: Computer Science Second term, Master's course No. of students: 40	Mixed cohort with 3rd year undergraduates 20 lectures (1 hour) 10 practicals (1 hour) VLE site	Practical (75%) with no qualitative feedback Practical and peer assessment (25%)

Table 7.2: Applied Technical (Masters) course delivery and assessment tasks

The most notable thing about this course was the mid-term summative assessment. The idea of this summatively-assessed assignment was to prepare the students for the bigger end-of-term coursework assignment. The assessment task was split into two parts. The first part expected the students to create a computer program using a

software editor. As a result the students were challenged with an authentic task which required creative and analytic engagement as well as procedural computer programming skills. This part gave them prior experience of the design and production of computer programs before starting the main practical task. The products they created were unique, although the audio track, the software language and the meaning of the object created were chosen by the tutor. The task was performed in laboratory settings where collaboration between peers was not condoned but nor was it punished. The students learnt primarily from the tutor and not from each other on this part of the task.

The second part expected the students to peer-assess each other's work. This part of the task would get students used to thinking about the assessment criteria; by marking their peers' work it was intended that they would reflect on how their work would be marked (see Gielen et al 2011). The students shared the artefact they had created with three others through the VLE "workshop activity". The students would then assess their peers' artefact by going through a set list of assessment criteria, award a mark and leave feedback. This part of the task was problematic because the students did not feel competent to mark each other's work, as can be seen from the students comments in later sections.

The grades for the assignment were in part a result of the scores their peers awarded them; and in part a result of a calculation made by the VLE technology based on the similarity of the score they awarded to a peer's artefact to the scores other peers awarded the same piece of work. By having the students do and assess the products created by their peers they were forced to engage in the issues that the later assignment would pose them. The self- and peer-feedback could be used in the second practical exercise and therefore incorporated a "feed-forward" element.

For me, the peer assessment task had a number of problems. For example, the fact that it used technical apparatus and peers, non-experts, to assign grades devalued the exercise in the eyes of the students because the tutor was not involved in grading it; their peers' comments and marks did not matter to them and the reliability and validity of the grades were compromised. Sadler's (1989) account of why and how peer assessment is useful does not recommend it for grading other students' work in a summative way, but for showing them what counts as good quality work in an experiential way, as seen by the experts within a particular discipline.

Furthermore, the aim of peer assessment itself was problematic: its sole function was to elucidate the assessment criteria. Whilst some have argued that this is desirable (Bloxham and West 2007; Carless 2007), others have noted that it can lead to students narrowing their attention on what will be assessed (Gibbs and Dunbar-Goddet 2007), and place emphasis on audit and measurement over learning and pedagogic process (Sambell et al. 2013). This was paradoxical as the general issue of student instrumentality had been alluded to by the convenor in my interview with him (see Dr. Williams later in this chapter).

The course documentation

Throughout the University there has been a culture of producing course handbooks for the students which specified the course objectives, learning outcomes and times and methods of assessments that would be used in the course. All the courses in my other case studies made extensive use of these handbooks. However, in the Applied Technical course's department they did not give students handbooks and instead relied on the course web page to get low-level institutional information about the course from the administrative database. As a result the paper documentation for this course was minimal and relied upon the course approval form and the web as a means of distribution. Although this policy was primarily a cost cutting exercise it was clearly more acceptable in this discipline as a result of its applied roots and technological focus.

The VLE site

The VLE site provided useful supporting documentation, including lecture slides, audio recordings of the lectures, notes, and links to web sites and library resources. Some of the links on the VLE pages were directly to Wikipedia. I contrast this with the Hard Science handbook which warned against ever trusting material from this site. This indicated to me a difference in the way knowledge was regarded and the authority one needed to have to be considered knowledgeable.

The site gave a basic breakdown of the assessments and how much they contributed to their final grade (see table 7.1 and 7.2), and dedicated a large section to the online assessments including how they would work. The peer-marked assignment used a VLE tool called the "workshop activity" (see Mostert and Snowball 2013 who used same tool with mixed results). It was set up to allow people to upload their assignment and for their peers to grade it (see teaching and assessment section for a description of this assessment).

The participants

Dr. Williams

Dr. Williams was the course convenor and a pragmatic lecturer motivated to use technology in his teaching where he could. In line with the norms of the applied discipline (see Neumann 2001), he wanted the course to prepare his students for the job market. The objectives of his course were to teach the students programming skills, whilst also introducing them to the theoretical discussion around the technology. He had been submitted for internal teaching awards for innovative teaching and assessment methods a number of times.

Dr. Williams kept his lectures interesting and dynamic. He recognized that simply talking about theory without real life examples "*turned the students off*". He used multimedia animations and topic-related trivia to illustrate his points and to make them more interesting. I note this approach differed from the Hard Science course where the students' attention spans were expected to last the duration of a full, theoretical lecture.

The laboratory activities consisted of short achievable tasks that the students designed to keep the students focused and motivated. The students had their own projects which meant they could work together without colluding. He felt that this created a healthy

crossover of skills between students. However Dr. Williams did not use group-work in his teaching because he did not feel that there was much scope for group-work in the vocational market he was teaching for. He did not appear to value group-work as useful *per se* for student learning and motivation as Dr. Barelli did, and did not recognize that by keeping it informal it could prejudice minority groups within the student cohort who did not have peers to discuss their learning with (see Chapter 8).

Dr. Williams thought there was an intrinsic problem in getting students to do adequate preparation for their assignment. He also noted that they would often "*go off on complete tangents and do a huge amount of work that [didn't] actually address the learning outcomes of the course*". At the same time he was concerned that explicit learning outcomes and assessment criteria discouraged the students from exploring areas that interested them (see Torrance 2007). He said, "*A strict criteria can be a bit restrictive. I would like [the students'] work to be a bit more open ended*". He said:

> *It's not about passing assessment, it's about learning and I have a niggling feeling that by telling them I want them to do "this, this and this", they are not learning other material.*

I note that this thinking seemed at odds with his implementation of peer assessment which focused exclusively on making the assessment criteria explicit, but he did go a little way to remedy this. He used a marking structure where twenty percent of the grades were awarded for "advanced features", thus encouraging students to think creatively and explore areas of interest which might boost their grade. He felt that if the assessment criteria were looser his students would not be as instrumental in their approach to their assignments and would "*read around*" the subject more.

It is likely that Dr. Williams's assessment strategy had been guided by the technological features (and limitations) of the tool rather than his pedagogical aims. Although the peer assessment was an authentic activity, there were a number of alternative options that he could have pursued which would have reached his stated goals and reduced the inherent contradictions of the activity. For example, the assessment could have been purely formative, or the students could have assessed some sample pieces of work. This would have the advantage that the pieces could have distinct differences which would provoke the intended reflection and learning.

Savo

Savo was a European, male third-year undergraduate student doing the Applied Technical course with American Studies. He was completing his second degree programme as he was not satisfied with the outcomes of the first. He was a confident student who participated a lot in the focus group. Savo described his learning as slow but he was impressed with the progress he had made. He did not think that he needed to attend lectures to pass the course.

Like Kanye and Vanessa (see following sections), he questioned the reliability and validity of the peer assessments (see Sadler 1989). He said:

> *[My assignment] was assessed by a student after a month of doing the course so the student isn't really an expert. That is still my main point and I am not very happy about that.*

He felt it may have been helpful to discuss ideas with his peers and get *"a rough idea of what people had done",* but did not think he should be marking their work or for this mark to contribute to their final assessment.

The peer assessment did make Savo reflect upon how his work would be viewed by an assessor. He described how in order to get better grades next time he would bulk up his descriptions and take more time on the grammar as this made a difference when he was marking his peers' work. However, he did not value peer feedback. He said he did not try as hard for the assignment as he would have one if it was to be marked by the course tutor.

Savo's comments provided evidence that the majority of his learning was on the peer assessment process which he considered flawed. He was consumed by the validity of the grades he had been awarded and this overshadowed the reflections that peer assessment activity might have provoked. His resistance to the process provided evidence of autonomy and he showed criticality regarding the assessment but he did not display criticality in relation to the disciplinary content.

Kanye

Kanye was an English, male, Master's student with a BME background. Kanye confessed he was focused on doing the minimum he could get away with and still passing the Master's.

Kanye was rather ambivalent about the peer assessment. He wanted to achieve high grades and was not interested in what his peers thought or the feedback on the assignment that they left him. He said:

> *All I am after is a good grade, so if they are not contributing to the final assessment I am not bothered. It doesn't interest me. At the end of the day, if my grade rests on what my tutor thinks and only a small percentage on what my peers think, I am not interested.*

Kanye thought the integrity of the grades that he received from the peer assessment was questionable. He said students were not taking much care to mark each other's work and were giving high (or low) grades just for the sake of it. Like Savo and Vanessa (see following section), he concluded this reduced the validity of the assessment (see Vickermann 2009). He thought students that challenged the grades they had been awarded by their peers were justified. He said:

> *If it was a student who ultimately cost them their grade, they do have a good argument that the student is not an expert.*

Kanye liked the fact that the peer-marking scheme explicitly gave grades for innovative thinking and advanced features and thus encouraged the students to be creative and reach for extra marks. However he did not like much else about the marking scheme.

He thought it was too highly prescribed. As a result the grading of his peers' work was very mechanical and it did not provoke reflection into the standards of his own work.

Kanye provided evidence that some students are grade-focused and played the system (see Miller and Parlett 1974). He was pragmatic about his learning, largely autonomous and focused, but, like Savo, his critical reflections were more about the questionable peer assessment process than the subject content.

Vanessa

Vanessa was an English, female, Master's student. She said she attended the lectures out of interest, but, like Savo, did not feel it was important for her success in the subject which would be determined by her grades on her coursework.

She described the feedback she had received from her peers in the peer assessment as "*wide*r" than she would get from her tutors and thought it could have been "*more valuable*". However she would have preferred feedback from the tutor as this was who would be marking her next assignment. She said:

> *I think the feedback is valuable but there are trade-offs because the university by nature is assessment-driven.*

Vanessa was extremely focused on what would get her good marks and was aware that most mid-term assessments were useful simply because she could get an idea of what the tutor would award marks for (see Snyder 1971 for the hidden curriculum; Miller and Parlett 1974 for cue-consciousness). She said:

> *Normally if you get feedback from the tutor you get an idea of what they mark, what they look for, what bits of your work went down well, which bits they didn't, maybe, warm to as much and so in the next [assignment you can be more strategic].*

It is interesting to note that whilst her approach can be constructed as instrumental, it also shows detailed understanding of the assessment criteria and tacit rules by which most assignments are judged (see Sadler 1989 and Nicol and MacFarlane-Dick 2006 for awareness of the practices and implicit standards within a discipline).

She described the grades she got in the peer assessment as "*pot luck*" because it depended on who was marking it. She thought grades would be more consistent if the tutor marked all their assignments (see Sadler 1989 and 2009 for the tacit, guild knowledge of marking) because he would have "*more of an interest*". She said that if she had thought an expert were marking her work she would do more background research and want to demonstrate her knowledge. But, like Savo and Kanye, she said she did not work as hard because she knew that the work would be marked by her peers.

Vanessa did not like marking other people's work because she did not feel qualified even with the marking scheme. She particularly resented the fact that the peer-marking scheme gave grades for innovative thinking and advanced features. She did not feel knowledgeable enough in the subject to determine what these would be so felt she could not fairly award these marks. The marking scheme did include some examples

but she found them indecipherable. Furthermore, she did not appreciate having to give feedback on her peers' work. She said:

> *No one would ever read [the feedback I have given] anyway. No one would look at it and say okay. 'she put this because of that - so that is something to look into', so it not really being used.*

Vanessa provided detailed evidence of how she played the system applying complex assessment rules. She was tactical and had learning autonomy, but like Savo and Kanye, her critical engagement was not with the subject material, but the educational game.

Cheng

Cheng was a non-native English speaking, male, Master's student. He was not a fluent English speaker and had a significant stutter.

He was positive about the peer assessment. He felt he had learnt through the process. He had become aware of how his work was being received and assessed and this had given him an insight into why he was not receiving the grades he thought he deserved. He said he had done too much work on areas which were not being assessed and that in future assessments he would focus his efforts more closely on the assessment criteria as prescribed by the convenor.

Cheng also said that the process had taught him to step back and design his product before rushing in, thus avoiding making preventable mistakes and wasting time. He said he would approach his learning "more systematically" in future. He provided evidence that peer assessments can provoke useful reflection such as following guidelines and planning.

Summary of the Applied Technical course case study

The course had a large practical element which was appealing to students. It introduced them to seemingly contemporary, tradable skill sets with value in the workplace. The student research participants expressed an interest in developing the skills that were being introduced. They could see how the skills were relevant to them and where they could put them in to use. As a result the laboratories were the part of the course which the students valued the most. It was the first time many of the students had written such programs and they were intrinsically motivated.

However, there were a number of issues with the peer assessment which are worth highlighting:

- Students take more time to reflect on feedback when they have opportunities respond to it (Crisp 2007). This is even truer of peer feedback than tutor feedback because they do not necessarily respect their peers' views. This peer assessment was limited because students could not respond to the feedback and as a result they did not take leaving or reading the feedback seriously.
- The peer marking needed a rigid marking schema set by the tutor to maintain a level of validity and reliability. Consequently the main outcome of the task did not provoke reflection on the learning and pedagogic processes that they had to go through as well-designed peer assessments can (Boud 2007). Instead it

highlighted the assessment culture prevalent within education and focused the students on audit and measurement (see Gielen et al 2003). It did little to engage the students in "the complex and challenging business of making judgements about the relative worth of academic works" (Sambell et al. 2013 p.125) or preparing students for self-monitoring and self-regulation (Gielen et al 2011).

- The students did not feel they were qualified to assess their peers' assignments (see Orsmond and Merry 1996). Sambell et al. (2013 p.139) say: "It takes a lot of careful preparation, practice and effort to develop student confidence and expertise in such high-stake assessment contexts". This was not done.

- Equally they did not like being assessed by their peers, who they considered novices, and thought the process was unfair (see McDowell 1995 and Orsmond and Merry 1996). Consequently they did not put much effort into grading or providing feedback on the work of their peers and did not value the grade or feedback they received from their peers, in some cases not reading it at all (see Orsmond and Merry 1996 for student response to peer comments; see Crisp 2007 for more about the underuse of feedback in general).

- They had to assess three other pieces of work which the tutor hoped would provoke critical reflection about approaching their own work. However the pieces they had to assess were random and in many cases were very similar or undistinguished. As a result the students were not necessarily looking at pieces of low, medium and high standard through which they could make clear comparisons (see also Sadler 1989; Sambell et al. 2013).

- The peer assessment was anonymized so it did not build positive peer pressure (See Topping 1998, Hanrahan and Isaacs 2001 and Ballantyne et al 2002 for more on positive peer pressure) or even a sense of shared endeavour. Instead the students felt less inclined to try in the task than they would if it was marked by the tutor, it created resentment between students and reduced credibility in the assessment process.

- The tutor devolved his responsibility to assess the students' work to other students and the VLE system which gave the students the sense that the activity was not important.

In conclusion peer assessments are not something to be implemented lightly. They can provoke deep and meaningful learning, but if introduced without being well thought through, they can simply reinforce the grade culture, increase student instrumentality and upset the students' sense of being graded through valid and reliable means.

It is interesting to note that the Applied Technical course expected a lot of creativity, particularly in the creation of their product, but that creativity was not mentioned as one of the goals of the course in the interviews or the supplementary documentation. It is possible this lack of specification was influenced by a technicist culture of the discipline.

Chapter 8: Discussion

This research has examined three pockets of innovation at a research intensive university where teaching and assessment strategies have been created to improve student learning. I have looked at cases where the convenor has implemented mid-term summative assessments with a formative intention. They have been used to improve student study habits and the quality of their learning. The innovations have been introduced in isolation from other courses in the degree programme which usually used more traditional teaching and assessment. I am not in a position to evaluate the overall success of the courses and nor is it my intention but I do have data on which to base a discussion of the effect of the approach to formative assessments on some of the students taking the courses.

Within this chapter I analyse the case studies through the lens of cultural historic activity theory (CHAT). I then draw conclusions based on the findings of the analysis and the literature I have read in the field. I have assumed all the tutors shared the common goal of HE in creating independent, resourceful and inquisitive graduates, always framed by their particular disciplinary spaces. However, while tutors clearly have very worthwhile intentions, the realization of those intentions is always going to be fraught with difficulty and complexity.

Activity systems in higher education

In this section I describe each case study as an activity system (Engeström 2001). I put the students in the subject position. This approach is not unique (see for example, Barab et al 2002; Berglund 2004; Havnes 2004). It is important to note that the tools for learning have been created by the tutors through their own activity systems.

Teaching, learning and assessment in their "standardized form" are often considered "in the form of a linear path or a cycle where *teaching* leads to *learning* which is then *assessed*" (Sambell et al. 2013 p.150 - italics in original). In this educational model, teaching is used to frame much of our educational experiences. Using activity theory, *learning* might be placed as the *object* of the educational venture, the *teacher* might be considered the *tool* which enables learning, and the assessment grade might be the *outcome* of the venture (see Figure 8.1).
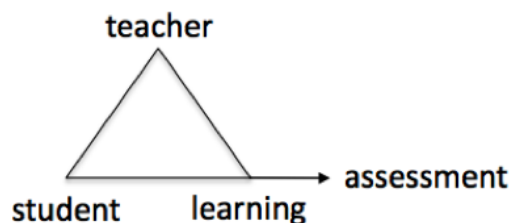

Figure 8.1: expected activity system when employing traditional assessment

In this model learning is instigated by the teacher and assessment is a snapshot of the students' learning.

However this is an over-simplistic view of the educational model. There is not a one -

way funnel from the teacher's mouth to the students' brains. Students do not learn only from what the teacher says. The students learn from the whole educational experience, the scenarios in which they find themselves (Davies and Ecclestone 2008). They learn from the university environment, from the timber benches and the graffiti-ed desks to the student-to-student whispering in lecture halls. Moreover, they learn the rules of the game (Snyder 1971; Miller and Parlett 1974; Bourdieu 1993; Biggs 1999; Prosser and Trigger 1999; Biggs 2003; Carless 2007). Vanessa and Kano, postgraduates experienced in the field of education, openly admitted the assessment strategies they employed in the focus group I held with them. But assessment strategies can squeeze out discipline-based learning from the activity system (see Havnes 2004). From a CHAT perspective, assessment skills are the tool, the assessment is the object and learning is just an incidental outcome which is superseded by the primary outcome, the assessment grade (see Figure 8.2). The institutional rules and traditions, the divisions of labour and the community have all affected the students' learning, but their potential has not been harnessed to the benefit of student learning in these systems.
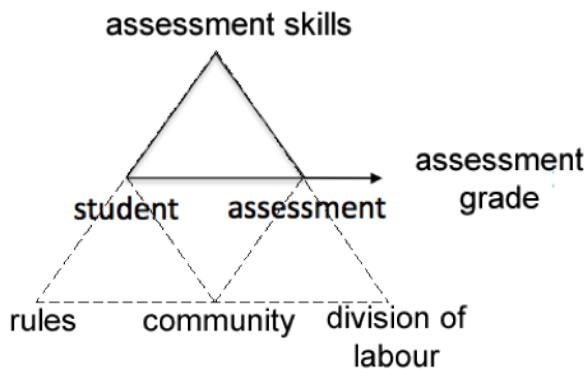

Figure 8.2: actual activity system when employing traditional assessment

Figure 8.2 shows that traditional models of education can eliminate disciplinary and intended learning through student adoption of a narrow focus on learning outcomes and criteria. Torrance (2007 p.283) argues:

> Assessment procedures and practices come completely to dominate the learning experience, and 'criteria compliance' comes to replace 'learning'.

Learning is replaced by the students' ability to perform in assessments which can be passed using assessment skills only useful in unrealistic conditions. They usually require memorization or cognitive challenges without the tools that would normally be available to them. These types of assessment test their capability to learn but rarely their actual learning.

In an attempt to counter this trend, commentators are looking for ways to change assessments so that they contribute to student learning rather than stifle it. It is increasingly recognized that "assessment is not something that just happens after learning, but is integral to learning, embedded within pedagogic action and rooted in learning and pedagogic identities" (Crossouard and Pryor 2008 p.223).

The tutors in the case studies were acutely aware of the instrumentality of students who bypassed a deep engagement with the course content in pursuit of better grades. All the

tutors I spoke to commented that students would not do study tasks unless they were assessed. In response they had made changes to the assessment tasks to re-introduce learning. They had all implemented mid-term summative assessments with the intention of having formative effects on students. The assessments they had set became not only the outcome of the learning experience, but also the tool for learning (see Figure 8.3). They all intended to implement constructive alignment strategies (see Biggs 1999). "Students should, by carrying out the assessment task, acquire the knowledge and skills that they are intended to learn" (Sambell et al. 2013 p.36). In this way the product and grade of the assessment would become the object of the teaching model reflecting the genuine motivations of the students.
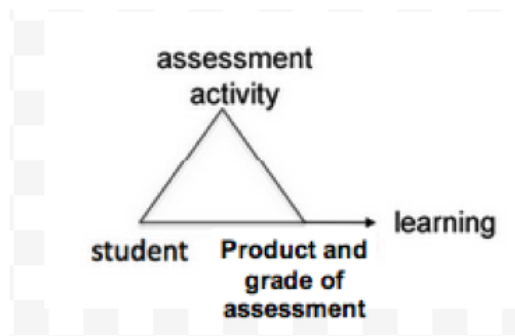

Figure 8.3: progressive assessment activity system

While the activity system in figure 8.3 is common to all the case studies the outcome has been different due in part to the different conceptions of learning.

Nodes of the activity systems within the case studies

In the following sections I talk about each of the courses in relation to a node of the activity system (see figure 3.2, chapter 3) and identify primary tensions/contradictions where they exist.

The student identities

When considering the students' identities it is their agency in relation to the activity system that is important. Because my focus is on learning and transformation of their identities through learning, in my activity systems identity is a dynamic node. Consequently, like Crossouard and Pryor (2008 p.10), I have "a slightly different 'take' on activity theory since it renders unstable what is often seen as a relatively stable part of the activity system and can essentialize identity".

In the following analysis, student subject positions have been assumed to be immersed in the same activity system if they are studying the same course. However, this assumption is not absolutely tenable. For example, Rosalind and Deepti had not found a community of learners within the same cohort with whom they could discuss their learning whilst Mark had. Consequently, Rosalind and Deepti inhabited a different activity system to Mark (see also Ashwin 2009 for weaknesses in some deployments of CHAT).

The object

The root of the tensions in activity systems lie in the conceptualization of the object. Edwards (2005 p.53) notes that "the objects within particular activity systems elicit behaviours that are appropriate to that object in the system". They are the "true motive"

for the activity (Leont'ev 1978 p.62). As a result the object of course activity system should support the aims that the institutions, the teachers and the students themselves have for their learning.

The object for the "student-formative assessment" activity system in the Hard Science course was:

- digesting information
- answering short answer questions about it
- condensing academic texts
- laboratory activities
- discussing further readings in tutorials

The object was stretched and covered a wide range of curriculum knowledge and skills and created rules for rapid curriculum coverage. The sheer scope of what the course intended to cover caused tensions in the node because the learning objectives struggled to support each other. In particular critical reflection and learning autonomy were largely overlooked by the students as a result of the multiple convergent summative-formative assessments.

The object for the "student-formative assessment" activity system in the Soft Science course was:

- recontextualizing the concepts being presented in relation to their adopted word
- discussing and defending their learning
- presenting to other students
- reviewing their peers' draft essays

It expected use of the knowledge presented in the lectures and readings. The object was supported, scaffolded and reinforced through the teaching methods, which utilized peers and different divisions of labour to build the students' expertise and fluency in the subject. It required the students to practise high-order graduate skills including debate, research and critical review to embed curriculum knowledge.

The object for the "student-formative assessment" activity system in the Applied Technical course was:

- using a software program to create a computer artefact
- assessing their peers' work

The object divided rather uncomfortably across these two tasks. There were primary contradictions which were not well resolved and did not support student learning. Creating the computer artefact only to have it judged anonymously and assessed summatively by peers did not sit comfortably with the students and this tension was not well supported through training (see Chapter 7). Furthermore the peer review focused the students on the assessment criteria but not in a discursive or reflective way. This caused a contradiction between the aim of getting students to reflect on the standard of their work and encouraging students to be even more instrumental and

convergent in their approach to studies through only doing what they knew would be assessed (see more in the summary section).

The tools

Different assessment tools encourage different teaching styles which promote different qualities of student learning (Bennett 2011). This can be at a granular level as not just one teaching style is used on a course. The teaching methods themselves are influenced by the community and the rules in the discipline so the cultural history of the subject impacts students' approaches to and motivations for learning (Knight et al 2006).

In this section I describe mid-term summative assessment tools that have a formative intention. I have classified the formative assessments in terms of where they sit on the convergent-divergent continuum. All types of formative assessment can be important for student development, but they contribute in different ways (Pryor and Crossouard 2010).

The Hard Science course used a number of formative assessments on the convergent side of the convergent-divergent continuum which included the mid-term written assignment, two laboratory practicals, online "lesson" activities and weekly multiple choice questions. It included comparatively few divergent formative assessments. There were three tutorial activities where the students were able to discuss additional readings, but, as already discussed in Chapter 5, these were largely considered to lie at the periphery of the students' concerns as the learning styles were so different to the many convergent formative-summative assessments they were set.

The Soft Science course used a number of formative assessments on the divergent side of the convergent-divergent continuum. These included student presentations, draft essay peer and tutor review and seminar games which could contribute to their course participation record (CPR). The activities were primarily social. Importantly all of these could be related to their adopted word - a word they had chosen at the start of their course and to which they could relate the concepts introduced through the teaching.

The Applied Technical course used a formative assessment which had different components on either side of the convergent-divergent continuum. It included a number of laboratory classes which allowed the students to practise computer programming. These were largely procedural but had divergent elements because the students could create what they wanted. It also included a mid-term assessment which included the production of a computer program and then anonymous assessment of their peers' work. The production side of the task was relatively divergent, although would have been more so if the tutor had allowed them to choose their own music. However the peer assessment was relatively convergent as a result of the marking schemas needed in order to maintain any level of reliability (see Sadler 1989 for an interesting discussion comparing the reliability and validity of assessments).

The rules of the endeavour

The history and culture of HE practices, the institution and the discipline have influenced the rules of the course activity systems in a number of ways. These can be thought of as adjacent or overlapping activity systems to the specific course activity system, or they can be thought of in Bourdieusian terms as fields (James and Biesta

2007). These fields have been influential on the tutors' understanding of teaching and learning, which in turn has contributed to the structure of the course and produced regularities in the teaching and assessment practices. They have influenced the students' experiences on the course, and their approaches to learning, through involvement in the teaching and assessments and, prior to this, their expectations of the course.

The habitus of the agents has also influenced the rules of the activity system. On the one hand the tutors' habitus has influenced the way in which they have set up the course and on the other, the students' habitus has affected how they have conducted themselves in the learning environment (Crozier et al 2008). Those who are familiar with the norms in HE have a tacit understanding of what is expected of them, others have less to draw upon.

Many of the rules within the activity system are followed with the unknown complicity of agents (Bourdieu 1977; Ashwin 2009). They can act as reproductive forces which keep HE systems the same or they can be game shifters which change local disciplinary practices. The rules that are set up within a course are fundamental to the operation of course learning. They can legitimate some approaches to learning and outlaw others. For example, the extent to which students can collaborate with their peers is set up within the rules of the activity system.

The rules common to all three cohorts of students from the courses I researched were that they must:

- Abide by the institutional regulations, such as attending lectures and not plagiarizing when producing assessed work
- Produce work that meet the assessment criteria

Further to these rules were the specifics set up by the teaching and assessment methods employed in the course and particularly the formative assessments.

The Hard Science course used a number of different formative assessments. These, alongside the students' previous experience and expectations, set up the rules which were specific to the activity system from the perspective of the students:

- Rapid curriculum coverage was expected. They should acquire the scientific facts and theories which are presented in lectures and through the readings. They can test the extent to which they have done this by completing the short answer questions. This appeared to be the rule that the student research participants understood the best
- They should practise procedural skills including abstracting the important points from research papers and performing laboratory practicals. This was less well understood by the research participants
- They should be able to discuss academic papers, such as they were expected to do in the tutorials. This seemed to be an optional concern for the research participants; a kind of nice-to-have
- They should do assessed work alone (see Sambell et al. 2013 for similar

discussions). As for many scientists and science students, there was a heightened awareness of collusion. Learning was understood to be a personal acquisition which should pass from tutor to student or book to student, and not from student to student. The problems that arise in educational assessments when students work together, because its hard to know to whom to attribute what, appeared insurmountable to them

The rules set up through formative assessments were the ones understood by the students, but they did not match the more academic rules for critical engagement and independence as written in the course handbook or spoken about by the convenor (see also Havnes 2004 for a similar discussion). The rules that the students understood in order to achieve in this course did not involve engaging in research, debate or developing their intrinsic motivations for studying the subject.

The Soft Science courses also used a number of different formative assessments which helped set up the rules from the perspective of the students:

- They should translate the concepts presented in the lectures and reading to their own specific context: their adopted word
- They should be prepared to discuss and defend their knowledge verbally
- They should be able to critique and review the work of their peers
- They should be able to make judgements about the material being presented (Beckett and Hager 2000; Knight 2006; Sadler 2010). Learning was not something done to them. They had the responsibility to do it

The rules set by the formative assessments were reinforced by having fewer lectures than seminars and workshops. This structure helped translate the difference in expectations that were had of the students compared to those on the other courses. These rules were closely aligned to the expectations and aspirations of the tutor.

The Applied Technical courses used practical laboratories, and a mid-term practical assignment which included peer assessment. These rules set up in the course activity system were:

- They should be able to perform authentic computer programming tasks
- They should be able to assess the work of their peers

This second rule had significant contradictions with the rules that the students' previous educational experiences had taught them - in other words contradiction with overlapping activity systems - and the students were not well-enough supported to learn from these contradictions. Furthermore there were contradictions in the rules of the peer assessment that the students understood and the tutor intended. The students understood the task as one of exposing the assessment criteria so that they could meet them in future pieces of work, but the tutor wanted the task to teach them to be able to assess their work for themselves (self-monitor and regulate) without the need of such criteria.

Communities within the case studies

When an individual becomes a HE student they become part of a number of

overlapping communities (Ashwin 2009). They become part of:

- An international community of students studying at university level
- An international community of undergraduates reading the discipline
- A community of the specific university's undergraduates
- The department's community of undergraduates
- The community within the specific course cohort

The course activity system is influenced by all these communities. However, the community within the specific course is the one over which the tutor has most leverage. It can be strongly influenced by the teaching and assessment environment he or she sets up in the course. The tutors on the courses can be considered as part of the community (Mwanza and Engeström 2006), but generally they are part of a different activity system in relation to the course with a different object (see Ashwin 2009). The community is a structuring force on the students' learning but the student is also agentic and in turn affects the community.

Communities develop in all activity systems because by definition they group people who are working towards a common goal. However the type of community that is created varies significantly. Some can be supportive and task-orientated and others are not. Supportive communities contribute to their ability to learn (Tinto 1997; Havnes 2008) because knowledge is constructed in the moment between minds and bodies, and learning results through social exchange and practice (Lave and Wenger 1991; Engeström 2001; Latour 2005). The process of learning is one of making oneself from the outside in (Vygotsky 1978). We become and change through social interaction because we understand ourselves first through the eyes of others. Working together with a common aim can be a valid and honest way of learning, making it personal and giving it context (Tinto 2005). It is an opportunity to perform and practice the learning material and generate knowledge in social settings (figure 8.4).
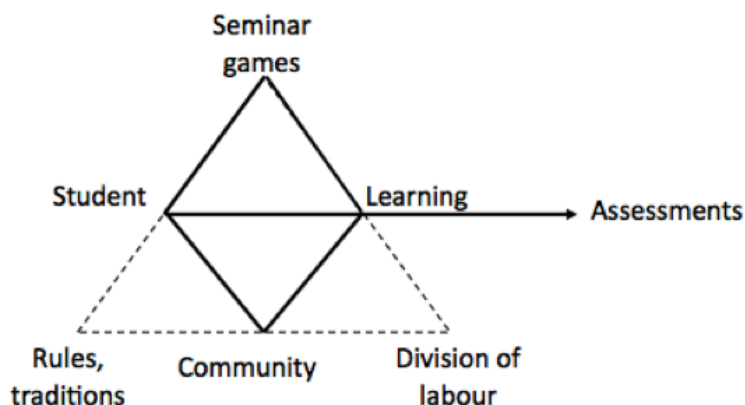
Figure 8.4: activity system where peers are utilized as a resource

In the Hard Science course the tutorial activities paid lip service to the creation of a unified student cohort with shared goals. The discussions about further readings attempted to get the students talking. Unfortunately other teaching activities and the bulk of the skills that they would be assessed on did not support peer-to-peer engagement. As a result I found significant differences in the activity systems between

the student research participants. Mark, who was a native English speaker and male, had created a network of friends within the course with whom he could discuss materials and tasks. He had a created his own exclusive community based on his cultural and social capital. However, Rosalind and Deepti, who were non-native English speakers and females in a science subject, experienced a community of students who were doing the same course but with whom they had very little to do outside teaching sessions. This resulted in a different quality of learning that these two groups reported.

A lot of effort was put into creating a community within the Soft Science courses. The seminars in particular had games and group-work which brought the students together. As a result the students were used to working with and learning from each other and the sense of community was strong. At times students took elevated roles, such as during their presentations.

Competition between students is often veiled and students tend to withhold knowledge from one another so they can do better in assessments (Boud et al 1999; Dweck 2000; Sambell et al. 2013). However in courses such as this one, with a strong community, knowledge was shared freely. Vanessa said she was competitive with her peers but she did not want to hide her knowledge to do better in assessment tasks - she wanted to show off how much she knew about the subject. This allowed others to learn from her.

Like the Hard Science course, no strategy was in place to create a community within the Applied Technical courses. Consequently the students' cultural and social capital determined the extent to which they were surrounded by a supportive community. The peer assessment activity was anonymous and as a result it did nothing to bring the students together - in fact it only had the possibility to drive them apart. This was evident from the disharmony within the focus group and the visceral comments towards the peer assessment process. Had the peer assessment been face-to-face (and purely formative), more community could have been built. The students would have engaged in discussion and debate about what constituted quality and what could have been done to improve the pieces of work. Face-to-face feedback can give the chance for a deeper reflection and the development of a critical stance (Nicol 2010).

Division of labour

Students enter academic disciplines as novices and through their studies gain expertise. The tutor's role is to help the students to increase their expertise through relaying knowledge and setting teaching and assessment activities. The tutor however is not the only person that affects the students' learning. The students will learn from other academics in the field and other students including their immediate peers. They will also come with outside experiences. There will be many people with different roles which will contribute to the students' learning. CHAT (Engeström 2001) describes these roles as the division of labour in a learning endeavour. Different divisions of labour support learning in different ways. Some courses utilize peers as instructional resources while others do not (Black and Wiliam 2009).

The Hard Science course had a flat, traditional division of labour. In the majority of the teaching and formative assessments the tutor was the voice of authority and the student mainly had to do what she asked. She delivered the learning materials via lectures, readings, the online "lessons" and the multiple choice questions that helped the

students test the extent to which they were keeping up. The laboratories and written exercise gave the students practice at skills that the tutor wanted to see in them. Only within the tutorials were the students given opportunities to talk with peers about what they had learnt about non-core texts. This traditional division of labour was reinforced by the authoritative tone set in the text of the course handbook.

There was very different division of labour in the Soft Science courses. The convenor delivered the materials via lectures and readings, but the two thirds of the teaching time was dedicated to seminars which involved a high level of peer interaction through tutor-devised games. They also included at least one presentation by a student per week thus taking the role of a teacher within the cohort. The students performed a peer review on draft essays, therefore engaging critically and analytically in one another's work. Consequently peers were utilized as a teaching resource taking up different roles with respect to one another depending on the task and the moment. This loose division of labour was reinforced by the collegial tone set in the course handbook which described a partnership between tutor and student in terms of a contractual relationship.

The Applied Technical course also had a very non-traditional division of labour. The peer assessment task required the students to mark each other and for the software system, the Moodle workshop, to in turn assess the consistency of their marking. Two tasks which normally would require the expertise of the tutor had been farmed out to peers and a computer system. This caused a contradiction between this activity system and activity systems that these third-year and Master's students had experienced in other courses. The contradiction was implemented as a teaching aid because it enabled the students to look closer at the assessment criteria and to reflect on how their work would be judged, but it was not well supported and as a result the students' reflections were overshadowed by their sense of injustice over their grades and the expectation for them to judge others.

In other ways the course was quite traditional for scientific disciplines. There was no formal group-work or teaching time dedicated to learning from each other.

The activity systems of the courses

In the following sections I discuss each course as a complete system and focus on the outcomes. I highlight tensions between nodes which sometimes support the intended learning and sometimes prevent it. At points I identify overlapping and influencing activity systems which impact on the course systems I am focusing on, including quaternary contradictions. I also reference Bourdieusian frameworks to consider the habitus of the individuals and the fields in which the activity systems operate.

Learning is a transformation in individual identities. A sociocultural understanding of learning posits that transformations are rarely experienced alone or affect only the individual. Using CHAT we gain an understanding of learning/transformations that happen within activity systems (Engeström 2001; Barab et al 2002). In educational courses tutors develop learning environments to provoke learning. They do not create the course activity system, but contribute to its creation and its perpetuation. How they contribute is a result of the activity systems they are engaged in (Knight 2006) or put another way, of the coincidence of their habitus and the fields which they inhabit

(James 2000; Ecclestone and Pryor 2003; Reay et al 2005). They are instrumental in providing the teaching apparatus, often formative assessment, by which the students are encouraged to learn. Depending on their teaching approach they can also develop course-specific rules, a community between the cohort and non-traditional divisions of labour.

The expected outcomes of an individual taking an HE degree include a development of their independence, resourcefulness and inquisitiveness. Students are expected to be able to self-regulate their learning (Pintrich 1995; Nicol and MacFarlane-Dick 2006; Boud 2007) and have "learning autonomy" (Torrance 2007). They are expected to become someone new with HE competences, including criticality, analysis and research skills (Chickering and Reisser 1993; Brew 2003). Further to this, each HE course is designed with specific aims in line with disciplinary knowledge and skills. The courses within these case studies had used specific formative assessment tools that shared the key goal of encouraging regular, evenly distributed study through the course term (Gibbs and Simpson 2004).

The Hard Science course as an activity system

In this section I analyse the Hard Science course as a complete activity system. When discussing the course within this framework we are concerned with what the teaching method was intending to "transform" (Engeström 1987; Kuutti 1996; Barab et al 2002). In this case the transformations expected were students without a base level of knowledge and skills in the subject into those who have. Courses later in their study would expect the students to engage in critical and analytical discourses and the knowledge and skills acquired in this course could be drawn upon to make their arguments.

Activity systems within the discipline of Hard Science

The methods used in this course were well supported by disciplinary structures. In activity terms this means that it replicated many other activity systems across the discipline in HE in the past and present. The pedagogic device in scientific disciplines means academic discourses are usually presented as facts to be learnt (Bernstein 2000). The model of teaching in the sciences is primarily one of transmission where information is passed from teacher and textbook to student (Luckett 2009; Maton 2009). It traditionally comprises lectures, examinations and essays that require the students' to reword other people's research (Neumann et al 2002; Sambell et al. 2013) just as this one did. Making sure the students have the facts needed in order to practise and discuss the course's learning material is prioritized over actually practising and discussing the material. The type of teaching is convergent and does not require deep reflections from the students. In line with the scientific discipline, the formative assessments in this course encouraged the acquisition of facts needed to be a neuroscientist rather than encouraging the students to "do" science. The formative assessments encouraged learning that was in line with what the tutor wanted them to know, but left little room for divergent learning in line with what the students were interested in, despite what the convenor purported to want for her students.

The Hard Science course tensions between the tool and the object

Within the course activity system the expectations for the students to dedicate the majority of their study time to convergent learning can be translated as the object. The tools were designed to keep the students on task during the term because it was

believed otherwise that the students would leave everything until the last minute and cram revise. Tensions were created between what the students could recall and do currently and what they were expected to recall and do on demand. The learning for the students was the apprehension of facts and procedures.

However the tools and object of the activities did not support all the long term aspirations that the tutor had for her students. The tutor appeared to favour a situated cognitivist approach to teaching and assessment whereby she recognized her role as introducing the students to becoming scientists, engaging critically and analytically with the material, but the majority of her formative assessments, and thus the object of the course activity system, required the students to focus on acquiring concrete knowledge and procedural skills for use in later courses. It did not support the expectations we have of undergraduates to be able to self-regulate their learning (see Nicol and MacFarlane-Dick 2006; Boud 2007; Swaffield 2011). Edwards (2005 p.60) argues "in a classroom where the object is the curriculum, the mediating tool is the textbook and the rules are rapid curriculum coverage and no questioning of that rule, there will be little scope for moving beyond the narrow view of the curriculum encapsulated in the textbook".

Had the formative assessments been followed up with teaching methods that would allow them to reflect, discuss, challenge or defend their learning, the students could have gained a personal perspective on the material, criticality and motivation for further research (see Pryor and Crossouard 2010; see Nicol 2007 for successful multiple-choice questioning strategies), but the tutorials were the only space that had provided opportunities to support this and they were too peripheral for the students to take them.

Outcomes of the Hard Science course activity system

Learning inevitably happens as a result of an activity system. Transformations in the individuals occur whether they are the ones intended by the tutor or not. In this course students focused on keeping up-to-speed on the subject matter through rapid curriculum coverage. They did not feel it necessary to engage in deep reflection, critical accounts or analysis. This sentiment was echoed by the tutor who felt they would be better placed to critically engage in courses later in the students' degree programme, although she expressed frustration about the students' lack of motivation in this regard.

The formative assessment methods in the Hard Science course had encouraged Rosalind and Deepti to spend their study time remembering enough of the course syllabus to answer a wide range of short answer question about it, but they had not supported their learning autonomy and had not motivated their criticality or analytical minds. Mark, who had created a network of friends and peers to whom he could discuss the study material, had spent his study time assimilating the materials and their logical relationships and the discussing the topics with friends. Consequently, he did appear to be gaining a greater conceptual understanding of the materials presented and acquiring a critical edge.

The outcomes of the activity system were students who had acquired facts and performed procedures which they could draw upon in later courses. For example, the students were able to recite biological theories, condense texts succinctly and use

microscopes and analyse the observations.

Using this theoretical framework I argue that in line with the rules and the traditions of science teaching, convergent formative assessment tools had been set up in the Hard Science course which had supported the acquisition of knowledge and skills through memorization processes. It provided evidence to support claims that tutors who have the intention to develop independent, critical learners often, in practice, set up conformative assessment procedures (see Swaffield 2011; Torrance 2012) that support their "knowledge about" over their "search for meaning" (Edwards 2005). Edwards argues "knowledge about" is an important part of learning, but often gets prioritized over critical and analytic thinking.

The Soft Science course as an activity system

The activity system within the Soft Science course was set up to transform the students into individuals who had a critical and analytical stance and personal relationship with the disciplinary knowledge presented. The convenor in this course had diverged from disciplinary and institutional norms to implement an innovative and effective teaching and assessment strategy.

The Soft Science course tensions between the tools, community and division of labour

Within an activity system the formative assessments take the position of the tools. The tools employed did three things:

- Developed rules that differed from traditional educational rules and included the sharing of knowledge between peers (this was made easier and was challenged less by the students as they were first-years and new to HE). The rules created and supported a community of practice within the student body with healthy competition, which included showing off their knowledge to one another
- Divided labour in non-conventional ways - giving the students elevated roles when doing presentations and peer reviewing each other's work
- Created tensions between what the students currently knew, and what they were practising

The tensions were supported by the convenor and the course framework. The community that was created within the student cohort was an important element of the learning system because it became a student support network, paving the way to becoming motivated and critical researchers.

The social nature of the learning environment had other effects too. It brought forth tensions between their current level of knowledge and the knowledge of their peers. The tension provided motivation for the students to study during term-time in order to impress or just keep up with their peers. However, the social nature allowed choice and specialization. Sometimes they could be quiet and sometimes they could speak up, thus engaging in different levels of discourse according to their interests. This accords with Nicol and MacFarlane-Dick's (2006) and Yorke's (2003) call for more support of self-regulated learning. The fact that their social interactions could be recorded in their CPR and contribute to their final grade indicated to the students that it was valuable and recognized by the tutor.

The result was the provocation of existential shifts in students in line with the course objectives. The students internalized their learning with critical, analytical and personal perspectives.

The outcomes of the Soft Science course activity system

The outcomes of the course activity system was that the students had discussed, challenged and defended the knowledge presented in spoken and written form. They had analysed, reflected upon and repurposed the learning theories and were able to take a personal and critical stance in relation to them. This had resulted in the research participants being able to provide me with sophisticated theories of how they were personally learning (see Boud 2000, Yorke 2003 and Boud and Falchikov 2006 for long-term learning). It was evident that the course tools and system had contributed to "their meta-learning as well as their curricula learning" (Havnes 2008 p.201). These were the individuals who provided the most evidence of expansive learning as a result of the well supported contradictions within the activity theory which were recognized and responded to by the students (see Edwards 2005).

The tensions within the course activity system were intentionally provoked and utilized to deepen the students' understanding and personal relationship with the subject material. This enabled them to gain a deeper contextual understanding of the course, their learning and themselves. The tutor was focused on "cognitive functioning" that transcended curriculum knowledge and concerned "how students related to that knowledge" (Havnes 2008 p.194). The material they had learnt was concrete and procedural and was also reflective and existential. Further to this there was evidence of expansive learning. Comments by Andrew and Adrienne indicated ways in which they had applied the material to everyday circumstances in their life. "In addition to learning the curriculum, and meeting the study requirements and assessment criteria, they [were] striving to come to terms with the social practice in which they have become peripheral participants" (Havnes 2008 p.201).

Within this course an activity system had been engineered which offered the possibility of giving: "opportunities for students to both learn and develop learning autonomy" (Black and McCormick 2010 p.495). Formative assessments had been set up which supported the acquisition of disciplinary knowledge through using it and, at the same time, supported the overarching aims of HE to develop independent, resourceful and inquisitive students.

The Applied Technical course as an activity system

In this section I illustrate why the peer assessment in the Applied Technical course had unsettled the students and made them question the validity of the assessment process rather than encouraging reflection or a capacity to judge their own ability. The strength of the assignment was that it provided the students with authentic, procedural and analytic skills for creating software, its weakness was the use of summative peer assessment through the VLE.

Activity systems in the Applied Technical discipline

Assessments that contribute to a student's final grade are usually graded by the tutor. In this course the assessment was graded by both a computer technology and student

peers. This caused unresolved tensions between the activity system set up in this course and other courses the students were studying towards. This is because courses which use summative peer assessments compromise validity of the assessment grade in the eyes of the students and in order for them to be effective the students need intensive preparation and practice to develop student confidence (Sambell et al. 2013). This was not done, and as a result Savo, Vanessa and Kano did not feel competent to judge their peers' work and found their peers' grading and comments unreliable and invalid (see also Sadler 1989; Boud 1990; Elliott and Higgins 2005; Vickerman 2009). It is perhaps significant that these were third-year and Master's students, all of whom had a lot of educational experience and therefore were no doubt more entrenched in their understanding of the educational rules than they would be if they were they fresher to HE.

Applied Technical course tensions between the tool, division of labour and the object

The peer assessment caused tensions between the tool and the division of labour. As stated above, the tool required the students to give each other feedback and grade each other's work. Peer assessment in principle can cause deep reflection into the way one goes about later assessment tasks. It can provide practice in self-monitoring and self-regulating one's learning, important high-order graduate skills. However, the effectiveness of peer assessment is much improved when the students can respond to their peers' comments. Without this social space the feedback is disregarded by students because it was not given by someone whose knowledge they respect. Furthermore, because the assessment criteria needed to be a checklist to ensure reliability in the grades, it focused students narrowly on assessment compliance.

Outcomes of the Applied Technical course activity system

The outcome of the activity system were students who had practised programming skills and gained experience using a specific software editing tool. The skills would be attractive to employers as the convenor had hoped.

The students also had practised critically reviewing their peers' work, but the reflections this exercise caused were not what was intended. The uninspiring design meant that the focus of the reflection was on the atomization of the task and the grades. Also, the fact that it contributed to the summative assessment undermined the overall course assessment validity, at least from the point of view of the students. The new division of labour imposed through the peer assessment was disliked and the feedback they gave each other was not valued (see Orpen 1982; Black and Wiliam 1998; Nicol and Macfarlane-Dick 2006; Daly et al. 2010).

Drawing conclusions

In this section I marry the findings from my research with the literature in the field to make claims to knowledge. The teaching and assessment experiences encountered in this research were influenced by external factors and to understand them it is necessary to understand how it was shaped by processes not identifiable solely from the accounts of the individuals (see Ashwin 2009). Bourdieu (1977 p.79) says:

> *It is because subjects do not, strictly speaking, know what they are doing that what they do has more meaning than they know.*

I have suggested that some tutors had challenged the cultural norms of teaching and assessment to a greater extent than others. In cases such as in the Soft Science courses, their efforts enabled students to make their learning more personal and in greater context whereas in others, such as in the Applied Technical courses, it made them question the validity of the assessment process.

The case studies provided evidence that students are motivated by assessment (Snyder 1971; Miller and Parlett 1974; McDowell 1995; Boud 2000; Boud and Falchikov 2006; Torrance 2012). The students engaged in teaching and learning activities that were either assessed themselves or reflected and supported the assessments. Furthermore evidence was obtained that students align their approach to learning with the demands of the assessments (Snyder 1971; McDowell 1995; Ramsden 2003; Pryor and Crossouard 2008; Sambell et al. 2013). Some encouraged students to form a sense of thinking and practising like a disciplinary expert (Meyer and Land 2005), whilst others expected to them to perform "tasks in an isolated, formulaic or unconnected way" (Sambell et al. 2013 p.12). The evidence supported the postulation by Sambell et al. (2013) that "assessment is at the core of learning" (p.150) and that teaching, learning and assessment are integrated "with no hard and fast lines between them" (p.150).

The case studies revealed mechanisms by which assessments supported learning. They indicated ways in which different formulations of activity systems result in different transformations/learning in students (Havnes 2004; Edwards 2005). The Hard Science and Soft Science courses used formative assessments to improve the students' curriculum coverage. Further to that, the Soft Science course used the tools to increase learning autonomy, responsibility and creativity. The Applied Technical course used formative assessments to acquire computer programming skills and engage in critical reflection through the peer assessment.

The Soft Science case study corroborated claims that formative assessments benefit from providing opportunities to perform the practices of the discipline under the supportive guidance of the experts and in collaboration with their peers (Topping 1996; Boud 2000; Yorke 2003; Havnes 2008; Black and Wiliam 2009; Boud 2009; Sadler 2010). It provided evidence that "a community focused on academic content [...] allows [students] to further develop their identity and discover their voice and to integrate what they are learning into their world view and other academic and social experiences" (Zhao and Kuh 2004 p.117). This is possible through stimulating discussion, argument and debate. It provided evidence that defending ideas, theories and facts in social settings requires many on-the-spot judgements, which enable students to reflect upon learning material in personal contexts, increasing student ownership of their learning as well as enthusiasm for learning more (Knight 2006; Sadler 2010). It supported claims from Sambell et al. (2013 p.16) that using peers as an audience for the student's work encouraged them to "develop a stance, communicate and explain ideas and genuinely master subject knowledge, rather than just produce work for someone to mark". Furthermore it provided evidence of students' learning outside formal teaching time with peers on and off the course, thus supporting claims that "peer-mediated learning can be a spin-off from peer learning activities organized by tutors" (Havnes 2008 p.196).

The evidence leads me to argue that peer interaction develops learning autonomy because through discussion and argumentation one takes a critical stance and personal perspective towards the knowledge. I agree with Boud (2009 p.42) who says:

> It is necessary that the skill of involving others is an intrinsic part of learning and assessment. Assessment with and for others needs far greater emphasis in courses.

It also provided evidence that there was great value to student learning in:

- Giving students the capacity to choose some elements of the topic (Sambell et al. 2013)
- Giving students flexibility in what gets assessed (Nicol 2009)
- Linking students' personal interests with the learning material (Davison 2011)
- Using peers as a 'real' audience for assessment tasks (Sambell et al. 2013)

The case studies provided evidence that the lack of intentional creation and support of communities within student cohorts, is discriminatory. In effect students with greater social capital are better supported in such cohorts than those who are not (Hughes 2011; Sambell et al. 2013). Often these communities favour dominant groups over minorities. They can also grow to be in contradiction to learning. For example, dominant individuals might stifle debate or encourage negative study habits. However, teaching tools such as formative assessments can positively influence the type of community that gets created in the student cohort (Havnes 2008).

The Soft Science and Applied Technical course case studies demonstrated how the division of labour in formal teaching can be altered through peer assessments (Topping 1997). They can give students an authentic contextual understanding of the assessment process while giving them responsibility. When a student passes judgement on the work of their peers, the rules and the division of labour of the assessment are altered.

The case studies offered evidence to support claims that critiquing the work of others gives students experience of judging quality, opportunities to reflect on their own work, and a new perspective on the learning material, and also draw attention to the objectives and assessment criteria (Topping 1998; Falchikov and Goldfinch 2000; Vickerman 2009; Daly et al 2010; Sadler 2010). The peer assessment process gives the reviewer and reviewee new roles in the educational process. The reviewer is invited into the community as a more senior peer and can practise their learning within new social settings. It requires the students to play at being experts and thus experience more central engagement with the disciplinary community with greater responsibility. The evidence leads me to argue that taking the role of the assessor requires a meta-contextual understanding of the material and encourages learning autonomy.

Furthermore the Soft Science case study corroborated claims that peer assessments benefit from being primarily social and used to subtly change the role of the students to mentors (Boud et al 1999; Nicol 2010). They can stimulate formative peer debate and conversation where students can take a personal perspective on the learning material and understand and act on their learning in ways that would not otherwise be possible

(Havnes 2008). The case study produced evidence which supported points made by Sambell et al. (2013 p.16) that social peer assessments often reposition "learners, so that they see themselves as experts in the making and people who get to grips with knowledge and use it".

However, the Applied Technical course case study provided evidence of peer assessments being implemented with the limited goal of familiarizing students with the assessment criteria. Such activities fail to inspire critical reflection or give practice at self-monitoring and self-reflection that more carefully considered peer assessments promise to do (see Sambell et al. 2013). Such tasks can simply reveal a culture of audit and measurement to arrive at grades. Furthermore, filling in a checklist to grade each other was procedural and failed to provoke deep reflection of the learning process as was seen in the Soft Science case study (Boud et al 1999; Boud 2007).

The Applied Technical course case study also provided evidence that unless peer assessments are applied carefully, they can shift the academic norms so far that the students become uncomfortable with it (Falchikov 2002). If peers, who are after all still apprentices in the community, are invited to give each other summative grades, the formative elements of the task can be lost because they break the confidence of the students in the assessment procedures (Vickerman 2009). Students without mastery in a subject benefit from engaging in expert practices such as peer review but this does not make them experts. The changes to the rules of the educational process are unacceptable to most students even if they only count for a tiny percentage of their overall grade. It thus makes sense that the tasks that they perform are done under apprenticeship conditions and do not directly affect the educational outcomes of other students.

The Hard Science and Applied Technical courses provided evidence that supported research indicating that convergent formative assessments can inhibit learning autonomy. A tutor must interrogate the underlying message that its application will convey to the student. Mid-term formative-summative assessments which help students memorize concrete facts and procedures weeks before the next assessment date may ensure that they remember them for longer, but the underlying messages that they risk giving students are that:

- They are not responsible enough to learn the material at their own pace (Gibbs et al. 2009; Sambell et al. 2013)
- Memorization will ensure they pass (Boud 2009; Gibbs et al. 2009; Sambell et al. 2013)
- Learning is answering other people's questions (Sadler 1989; Torrance 2007; Gibbs et al. 2009; Sambell et al. 2013)
- If they have tried hard and still do not do well in the questions they are not good at the subject (Tan 1992; Scouller 1998)
- Divergent learning is not valued (Sambell et al. 2013)
- All students should be able to answer the same material in the same way (Sambell et al. 2013)
- Their ability to answer questions based on short-term memory or the ability to collate abstract information qualifies them as expert academics in their field

(Gibbs et al. 2009)

Some argue that the benefits of assessments which solely evaluate the students' ability to rapidly cover the curriculum are outweighed by their harm (see Havnes 2004; Torrance 2007; Torrance 2012). The evidence leads me to argue that convergent assessments, taken alone, can lead to an impersonal, scattered and incohesive understanding of the learning material. Like Edwards (2005 p.61), I question:

> [...] whether educational assessment should limit learning outcomes to knowledge of a curriculum as attainment. Perhaps it should attempt to capture more broadly the ways in which a learner is able to make sense, which may not only reflect the designed curriculum. [...] Perhaps learning outcomes should be seen mainly in terms of how learners use concepts as they act on problems

I saw differences between disciplinary approaches to implementing formative assessments. Conforming to disciplinary norms, there was an expectation of the convergent acquisition of facts and skills in the Hard Science course, with little or no personalization expected and little group-work or formal opportunities for peer interaction (Neumann 2001; Neumann et al 2002). There were tutorials, but these were too marginalized and different from the rest of the course for the students to take much time over them. The divisions of labour were very traditional. Knowledge came from the tutor and was to be internalized by the students.

Conforming to disciplinary norms the Applied Technical course promoted the practice of skills. In line with trends common in scientific disciplines, peer engagement was not recognized as a necessary element for learning and even the peer assessments were anonymized. Consequently, it did not promote community engagement or the social construction of knowledge through dialogic processes. It did divide labour innovatively but unfortunately the formative effects were compromised as a result of the upset of rules the students were used to and genuine concerns over the validity of their assessment grades.

Whilst the Hard Science and Applied Technical course case studies provided evidence that there are institutional and departmental pressures to conform (Young 2010), the Soft Science case study provided evidence that tutors who design the academic courses can make their own local rules by setting different expectations/objects for the students to accomplish with different tools. The course model conferred more value to different personal attributes and learning goals than most academic courses do.

The Soft Science course supported claims such as those made by Sambell et al (2013 p.8):

> Lecturers can influence student learning by fostering physical, virtual and metaphoric [formative assessment] spaces that encourage active learning and the development of learning communities. [Formative assessment] approaches accompany a necessary shift in learning relationships, with students becoming part of effective learning communities, involved in co-construction of knowledge, rather than passive recipients of teachers' knowledge

Dr. Barelli set up conditions for students to recognize new educational objectives of their studies, such as negotiating their own identity with respect to the discipline (see Pryor an Crossouard 2010; Sambell et al. 2013). Through teaching activities and formative assessments, the students learnt to follow the new pedagogic rules. She understood, as Edwards (2005 p.62) does, that:

> If we want to encourage a disposition to seek increasing complexity and resourceful responses such as help-seeking, [...] we should be assessing these capacities.

The Soft Science course branched away from the teaching and assessment traditions in the discipline and HE. Within this course it was not the recital knowledge or procedural practice of skills that were valued, but the application of knowledge through judgement-making (Sadler 1989; Beckett and Hager 2000; Knight 2006; Boud 2009; Sadler 2009), contextualization and social discussion and defence of that knowledge (Edwards 2005; Sambell et al. 2013). A community of learners was built within the teaching time through seminar games. The division of labour was distributed through students giving presentations about their areas of expertise - their adopted word.

Crossouard and Pryor (2012 p.261) build on a statement from Osberg and Biesta (2007 p.326) to say:

> As educators we are responsible not only for the [divergent] unsettlement (violating, opening) of the [student], but also for their [convergent] framing [...] (which is a closure). In other words we are responsible, at the same time, for the opening and closing of subjectivity.

The Soft Science case study provided an example of how this can be achieved within HE. The course created a "space where students can narrate into being new identities through their collaborative production of different texts" (Pryor and Crossouard 2008 p.17) within a framework which provoked the acquisition of convergent discipline-specific facts. The students engaged with a personal search for meaning in relation to the knowledge presented through the course (Edwards 2005). I concur with Barrie (2007) and Sambell et al. (2013) that learning experiences should "include but also go beyond the disciplinary expertise, content or technical knowledge that has traditionally formed the core of most university courses" (p.14).

Pryor and Crossouard (2008 p.13) say "performances required in subjects such as mathematics and science should also be deconstructed with a critical eye, even if the convergent aspects of subject matters vary". Rapid curriculum development was only one of Dr. Kliver's aims on the Hard Science course. She also wanted the students to learn to "do" science and think about science in scientific ways. Her aspirations were one of a situated cognitivist. In the course handbook she spoke of the students achieving independence and joining the critical debates of the discipline. But the teaching and assessment methods worked against supporting such outcomes. As a consequence this case provided evidence to support claims from Gee (2003) and Pryor and Crossouard (2008 p.13) that suggest changes to teaching and assessment practices

"can be problematic, as subject experts as producers of social practices, are often so deeply embedded in these that the practices become taken for granted and invisible". Furthermore, the Hard Science case study provided evidence to support claims from Sambell et al. (2013 p.148) that "if we mistrust our students we may seek to use teacher feedback as a means of 'teaching to the test', so our feedback is actually designed to steer students clearly and unequivocally in particular directions". However, the Soft Science case study supported claims that formative assessments which trust the students can "open dialogue" and set tasks which are "genuinely challenging, thought-provoking and stimulating" (p.148).

There is nothing anything inherent in Soft Science which makes the CPR more appropriate in this subject to any other. Ashwin (2009 p.93) says:

> Differences in distribution rules can mean that in different institutions, the same disciplinary knowledge practices can be taught and studied under very different conditions and by students and academics with very different identities.

I can imagine similar assessment techniques being possible in almost all subjects, even the 'hard' and 'pure' sciences, if the focus is kept on learning goals which develop their learning autonomy within disciplinary boundaries. For example, in the Hard Science courses, the students could have been given specialist areas to which the concepts introduced in lectures could be applied, just as the Soft Science students adopted a word. More space for peer interactions could have been created moving the learning practices witnessed in the tutorials to the core of the learning experience. They could keep a participation record in tutorials where their contributions could be recorded. They could have engaged in peer review activities. It would not be traditional science teaching but it may be more effective in giving graduates long lasting, transferable skills which they can take into their lives after their studies (Boud 2000; Yorke 2003; Boud and Falchikov 2006; Nicol and MacFarlane-Dick 2006; Sambell et al. 2013). The problem would be getting other faculty members and the students on board with the new educational rules such assessments set up (Young 2010). It would require a tutor with charisma to break disciplinary teaching and assessment norms which Foucault (1977) considers "a force and practice that brings about docile bodies, constrained discourses and compliant minds" (Trowler 2012 p.7).

Despite the success of the Soft Science courses in the case study and courses like it, the teaching and assessment practices they employed have not been widely adopted. This can be explained through self-replicating mechanisms, cultural norms and the rigidity of densely packed activity systems next to each other (Ashwin 2009; Torrance 2012). Banking models of learning still dominate mainstream discourse. Knowledge to most is like building blocks that can be constructed in individuals' heads. This understanding of knowledge is difficult to change. It is structurally embedded into our core language for understanding the world (Sfard 1998). We "acquire" and "have" knowledge. Our understanding of knowledge as a possession rather than an experience we can draw upon is passed from generation to generation through language and educational practices.

Even for those who break the mould, see outside the box, methods of teaching and assessment are not easily changed. It is easy to follow set procedures, we know how to do it from experience and we have support structures to help us. But changing teaching and assessment is hard. We have not done it before, we may never have seen it and we do not have the support structures in place or experience of others to help us. Sambell et al. (2013 p.151) say:

> Teaching-learning-assessment is widely embedded into various institutional practices such as the structure of the academic year ('exam weeks'); the descriptions of modules; the nature of spaces provided for 'teaching' and 'learning'; and the analysis of staff workloads - often based on 'teaching hours' with a separate set of hours for assessment

That is why our teaching and assessment process are the way they are. It is important to note that the even the expectations of the students have been affected by their educational experiences before starting a particular course. As a result it is common for students themselves to subvert the intentions of the tutor, often preferring traditional assessments to formative ones (Boud 1995; Yorke 2003). This was particularly evident in the Applied Technical course case study. However, when tutors do break away from local and disciplinary norms and implement effective formative assessments, they can influence the local disciplinary and departmental structures.

Chapter 9: Conclusion

This thesis has offered a conception of higher education learning that fits with our common understanding of the skills we expect our graduates to have: a solid basis in the curriculum that they have been studying and strong autonomy in their learning. It has explored ways in which specific courses, across three different disciplines, have used teaching and assessments to develop these skills. It has researched the deployment of "formative assessments" within the course introduced in order to improve students' study habits and abilities in their discipline.

The thesis has found evidence of tutors implementing educational practices that supported their primary aim of covering the curriculum and developing graduate skills. It uncovered transferable formative assessment practices which encouraged the students' independence and built the students' curiosity about the discipline. The practices gave the students opportunities to discuss and argue over curriculum-related content and experiences within the first year of their degree of being experts within a niche area of the subject. The thesis proposes that independent of how the knowledge was produced within the disciplinary research, the same pedagogic tools would be useful for developing curriculum learning and learning autonomy in any knowledge domain.

The research also found evidence of tutors that had deployed teaching and assessment practices with good intention, but which had had a side effect of encouraging instrumental approaches to learning and narrow and conformist thinking. The thesis uses these cases to describe how and why such teaching and assessment strategies are frequently deployed in educational environments. It finds commonly-held models of learning that have informed our educational practices, but which are incomplete and can undermine student autonomy.

The thesis argues in order for higher education to develop graduates with high-level transferable skills we need to reassess what are truly significant experiences in our students' educational journeys. We should then provide opportunities for them to have these experiences regularly and ensure that we value the skills which are important for these tasks to succeed. We all forget facts and procedures over time, and so it is our students' capacity to know that we must develop within education.

This research provided a window into how formative assessments are being accomplished in three courses at a research intensive university, originally chosen because of their use of the VLE. It has given me an opportunity to compare the effects of formative assessments at this level in practice with all that has been written in the literature.

I chose three courses with convenors committed to improving their teaching. With good intentions, they implemented innovative methods of teaching and assessment in order to meet the students' changing needs. All three understand the overarching goal of university education as creating independent, resourceful and inquisitive learners. Each introduced mid-term formative-summative assessments to improve student study habits.

The tutors' attempts have been commendable. It would have been easier for them to perpetuate the same teaching and assessment methods that they had experienced, that the students were used to and for which they had institutional and collegial support. Reproduction is the norm particularly where there is as much administrative infrastructure and expectation as there is around HE.

I employed analytic frameworks to help me explain how the formative assessment efforts were influenced by the UK HE environment, the university and departmental structures and the habitus and capital of the tutors themselves. The response to the assessments by the students was structured by their expectations of education as well as their own habitus and capital in their own disciplinary fields as students.

In the following section I will respond to my research questions.

How is formative assessment being practised at UK a research intensive university?

The research saw a difference in the aims and approaches to formative assessments. I researched implementations of assessments that included formative gateway questions to more information, weekly multiple choice questioning, mid-term essays with feedback and sometimes peer review, online journals, discussion, online discussion, practicals, practical write-ups, student presentations and peer assessments.

The formative assessment tasks have different goals and different formative effects. In some they encourage students to acquire concrete facts and in others procedural skills. In some they are expected to discuss and critique the curriculum topic in detail and in others to reflect upon the learning material and develop a personal relationship with it. In others still they are expected to acquire metacontextual understanding of their learning skills and develop responsibility and learning autonomy.

In some cases formative assessments are designed to encourage students to cover the curriculum through divergent tasks. These divergent tasks allow students to build a specialism within the discipline area on to which they can relate the theoretical concepts being taught in the course. This can give the students confidence to share with the rest of the cohort and to have something different to say. They provide space so that feedback given to the students in relation to their work can be responded to. Such formative assessment tasks support the overall aims of the tutor to build students with graduate skills.

This was evident through the Soft Science course. For example in one task the students were expected to do a presentation on the course material in relation to a word they had selected. This required them to explain and defend their knowledge in relation to an area in which they had gained a personal expertise. Contradictions between the bottom line of the activity system and the desired outcome are addressed through new divisions of labour and seminar rules that support the development of learning autonomy in the presenter and the students listening and discussing afterwards.

In some formative assessment tasks students are encouraged to learn from each other. Teaching through peer-to-peer interactions emerges as a strong method of encouraging students to develop learning autonomy. Peer interactions enable more flexibility within

the bottom line of the activity system triangle alternating the division of labour, engaging in new communities and developing new rules to suit the learning objectives of the system. In such interactions, students are challenged to think for themselves. The hierarchical knowledge relations between tutor and student are diminished.

This was evident to a degree in both the Hard Science course and the Soft Science course. The former used tutorials where the students discussed additional reading topics, and the Soft Science course used peer review activities which required students to comment on one of their peers' draft essays.

Many of formative assessments are also summative, contributing to the course grades. Tutors often feel a summative element is important in order to encourage the students to engage. Unfortunately grading students' work can narrow their focus and they often only do what they think will be graded at the expense of wider learning. The division of labour is such that the tutor holds the power. This can lead to student disengagement and circumvention of the learning process in pursuit of easier grade-seeking strategies. Students' learning autonomy can then remain undeveloped and even be jeopardized. However, there are ways to assess which do not constrict the students' personal motivations as much as others. Focusing assessed work on personal accounts of the curriculum is one such way in which summative assessments can award grades for their own knowledge construction. The Soft Science course managed its assessments through a portfolio into which the students could optionally submit their course participation record. This is an innovative way to motivate and value participation in all course activities whilst evaluating the student performance and maintaining their learning autonomy.

Some tasks are designed with the intention of being formative but have a negative effect on the long term aspirations tutors have for their students. The bottom line of the activity system remains in contradiction to the desired outcome.

In some assessments students are required to practise procedural disciplinary skills. Such tasks include abstracting key points from analytic texts, referencing, laboratory techniques and even grading each other's work through following set criteria. These are often authentic skills required by disciplinary experts. However, the procedural, dry nature of the task limits the students' inquisitiveness about the subject and learning. The rules they set up within the activity system do not support the students' intrinsic motivations for study. Such tasks are improved if incorporated with exercises that challenge their analytical and critical skills.

Some formative assessments aim to encourage students to focus on the assessment deliverables in order to make sure they meet them. However, such tasks alone however can negatively impact the students learning autonomy and encourage student convergence on what the tutor will grade.

In some assessments students are expected to practice reciting disciplinary knowledge through convergent tasks. For example, weekly summatively-assessed multiple choice questions encourage students to stick to the course curriculum during the term time. However, tutors deploying such formative assessment risk their students' suffering

from the "backwash" effect and encourage narrow, convergent thinking. The rules set in such assessment activity systems are in tension with the overall goal of developing learning autonomy.

How do disciplinary influences affect the implementation of formative assessments?

In my research the formative assessments were implemented in different ways by different tutors. Some use formative assessments to reward learning autonomy and to work around obstructive disciplinary norms which limit it. Others use formative assessments to reinforce disciplinary expectations even when these are narrow, convergent reproduction of knowledge.

All the case studies in this research were of courses in hard or applied disciplines. Such disciplines traditionally use objective testing as a result of translations from the kind of research they engage in. Such epistemologies are far more conducive to the implementation of convergent formative assessments.

However, some tutors alter their teaching and assessment styles from traditional norms to improve student learning and incorporate their aims of developing analytical, critical, independent and resourceful learners. The Soft Science case study provided evidence of this. The discipline in question is often considered more of a science than a humanity, but this tutor had set up social and discursive teaching and assessment spaces. Participation in discussions and formative seminar games were valued and even optionally contributed to their summative assessment in the form of submissions to the course participation records (CPRs). Students were expected to peer review each other's essays and present academic theories in relation to their adopted word. The Soft Science case study provided evidence of a tutor who had circumvented the teaching norms within the institution and the discipline to encourage students to meet learning goals, which included having a critical perspective on the subject material, having used it to analyse their chosen word.

In other cases, the research provides evidence that disciplinary norms about the nature of knowledge can override what the teachers say about the kind of learning they value. This can shape their approach to formative assessment even when the norms support naive conceptions of learning (Young 2010). As a result some formative assessment activities introduced as a means to enrich the students' learning do little more than provide opportunities for students to reproduce disciplinary knowledge rather than learning it.

The Hard Science case study provides evidence of tutors introducing assessments and following disciplinary norms. There was a predominance of objective testing with little room for discursive spaces to emerge or reflection on the subject matter. Equally the Applied Technical course case study shows a trust in technology to grade students' work that would not be acceptable in any other discipline. The anonymity of the assessment is also characteristic of the sciences where discussion and social engagement are not as valued as in softer disciplines. It means there are no opportunities for students to respond to their peers' feedback, therefore devaluing the effectiveness of the exercise.

In these cases the habitus of the lecturers may have structured the disciplinary fields. Their cultural capital was based on the discipline as they understood it and as they had been inducted into it. Their conservative approach to formative assessment activities maintained the value of this capital within the field.

When are formative assessments most effective?

The research provided evidence that the effectiveness of formative assessments depends upon their acceptance by students. The formative assessments in the Hard Science course were in line with the students' expectations and therefore largely accepted by students. They largely tested and reinforced the students' ability to recite concrete facts and follow procedural tasks. This type of learning was also the norm at secondary school and in their further education so was not surprising to them. This meant that the formative assessments were effective in their aim of encouraging students to become familiar with the curriculum during the term time and to practise procedural skills that the discipline required of them. The formative assessments of the Soft Science course were also accepted by the students. The reason however was different from that on the Hard Science course. They were very different to the type of teaching and assessment activity that they were used to from their schooling or HE, so this might have worked against the students taking to them. However, the strengths of the activities were that they were well embedded within the structure of the course, they were valued through summative assessments, they built the students' learning autonomy and this was what HE was known for doing, and they were fun and personally rewarding. On the other hand, the formative assessments of the Applied Technical course were not accepted by the students. The activity was not similar to what the students had experienced before, the skills it required did not appear to be valued as the tutor was not involved in the assessment (assessment was by student peers and a computer system), but did contribute to the students overall course grade. These differences in acceptance ultimately determined their effectiveness in meeting their goals.

However the goals of the formative assessments differed. The Hard Science formative assessments encouraged the students to cover as much of the curriculum as they could whilst the Soft Science course formative assessments encouraged the students to cover the curriculum with as much personal, critical and analytic perspective as they could.

In terms of effectiveness at producing students with graduate skills, the Soft Science course formative assessments were more effective. They were continuous, reflective and discursive and stimulated critical and analytical perspectives (Sadler 2010). They engaged students in the construction of their own identity in relationship with the discipline and course learning goals (Boud 2000; Sambell et al. 2013). They helped to create a community within the cohort with students at times having elevated status - such as during presentations - could provide a hub for deep and context-rich learning (Boud 1999; Falchikov 2002; Havnes 2008; Black and Wiliam 2009). Giving the students areas of specialization within the course material provided a way in which concepts could be reflected upon and contextualized, and provided a basis for peer discussion. Divergent and social formative assessments provided motivation for the students to rigorously examine the material, gain a personal understanding of it and meet convergent learning goals in line with the course objectives. Their engagement in

discursive and reflective practices could make existential changes to them which they could bring into their personal lives and make them feel like they belonged to the discipline (Pryor and Crossouard 2010).

To what extent have the theoretical frameworks been useful in identifying the structural and agentic forces at work in the formative assessment endeavours?

In this discussion I have analysed the external factors that have contributed to the students' and academics' perception of their teaching and assessment experiences as well as the experiences themselves. I have given a sense of their structural and dynamic nature, and considered the interaction between the teaching and assessment methods, tutors, peers and their own circumstances and histories. I have foregrounded the relations between the teaching and assessment environment, the teaching and assessment practices and the student experience.

I have analysed three case studies of formative-summative assessments using primarily cultural historic activity theory (CHAT). I used it because it took into account the lengthy period over which the teaching and assessments were shaped by cultural and agentic forces and incorporated the dynamic interaction between the individuals' perceptions and their situated actions. It emphasized the changing nature of teaching and assessment environments as a result of the relationships within an activity system.

The analytic framework gave me metacontextual views of the research participants' accounts of their experience of teaching and assessments. It gave me two ways of characterising sets of social processes, "one that foregrounds the ways in which individual actors shape the world and the other that foregrounds the ways in which the world shapes different actors" (Ashwin 2009 p.9).

It was particularly useful when decoding the elements that affected the teaching and assessment practices. I used this theory to structure my discussion. By separating the elements of an activity system, I could describe how tensions within them contributed to the educational experience. The student activity systems were affected by the assessment tool but also the disciplinary and student community, cultural teaching assessment rules and the divisions of labour within HE teaching spaces. It was seen that tensions within or between any of these areas could provoke learning through challenging the students' understanding, but if the tensions were not well supported they could provoke learning that was not intended by the tutor. For example the learning resulting from the Applied Technical course peer assessment focused the students on their assessment skills rather than reflection on the subject material.

Ashwin (2009) points out that the weakness of the framework is that if it focuses on the activity system of individuals, it loses its sense of community engagement and its potential to account for external influences on the activity system, and if it focuses on collective groups, such as a student cohort, it is not clear that they all have the same object or are engaged in the same communities and so on. These weaknesses were experienced in my use of the framework. There were differences in the course activity systems experienced by different actors in same student cohort - such as between Mark

and Rosalind and Deepti. Furthermore, many researchers using this framework consider the identities in the activity system as a stable node within the system. However, my understanding is in line with Pryor and Crossouard (2008) who point out the identities of students shift/develop as they learn and, therefore, are dynamic.

I also drew upon Bourdieusian theory. Bourdieusian theory was used to explain how regularities were reproduced in some teaching and assessment setups with the unknown 'complicity' of agents through their social practices. It helped map the objective structures and the different agents' relationship to them. It gave terminology to think about how the agents contribute to the reproduction or transformation of these fields. It helped me think about research participants' habitus as well as their accounts of their experiences. Bourdieu's concept of field of "HE" offered insight into institutional culture and a language to describe the reproductive forces which keep HE systems the same, as well as ways in which agency could slowly shift disciplinary practices.

Self-reflexivity

Like all social research projects, the data was messy, problematic and required interpretation. I question whether my claims have been sufficiently modest, acknowledging its incompleteness and exposing contingent and uncertain elements. Despite this, the findings in this research are significant.

I came into the research project interested in the effects of technology in the teaching and learning process. However as a result of taking a systems view to the research I understood that such research would be hampered by the enormous differences in teaching and assessment and that of far more significance were the teaching approaches to both endeavours. I also realized this was a relatively under-researched area in HE. Consequently my research focus radically changed. I have learnt a great deal regarding the messages and nuances contained within teaching and assessment practices and the impact they have on student epistemologies and students' understanding of themselves.

I have compared formative assessments in practice with what has been written about it in the literature. Through this process I have provided evidence of implementations of formative assessments that can enhance students' learning. In particular the linguistic case study has given me a good model of how traditional teaching and assessment practices can be improved. Consequently I feel I made the right decision to use case study research.

I have structuralist/realist leanings. I see the reproducing nature of our humanity and power. However, my research has led me to think that predictions are only predictions and that the present is complex, emergent and contingent. Like Latour (2005), I have come to view everything that is in the present as subjective and I can only be objective about what is in the past.

The next step of this research is to investigate the extent to which the methods applied in the Soft Science course case study are transferable to other disciplines. Can the linguistic case study be an example as a wider model of reform for all HE teaching?

I have started action research projects within my work where I am involved in the teaching and assessment design before implementation. These are collaborative exercises in which we will be in a position to tweak our approach and reiterate. I will use alternative research methods such as more observations of student engagement in formative assessment activities and immediate student and academic reflections on activities in which they were involved.

References

Abercrombie, N., Hill, S. & Turner, B.S., 1988. *The Penguin dictionary of sociology*, London: Penguin Books.

Anderson, C. & Hounsell, D., 2007. Knowledge practices: "doing the subject" in undergraduate courses. *Curriculum Journal*, 18(4), pp.463–478.

Archer, M.S., 1995. *Realist Social Theory: The Morphogenetic Approach*, Cambridge: Cambridge University Press.

Arora, Bela., 2010. From Feedback to Feed-Forward: Please Come to the Big Brother Diary Room... In *PSA Annual Conference*. Edinburgh.

Arora, B, 2010. From Feedback to Feed-Forward: Please Come to the Big Brother Diary Room... In *PSA Annual Conference*. Edinburgh.

Ashwin, P., 2009. *Analysing Teaching-Learning Interactions in Higher Education: Accounting for Structure and Agency*, London: Continuum.

Bain, J.D., McNaught, C., Mills, C. & Lueckenhausen, G.1998. Describing Computer-facilitated Learning Environments in Higher Education. *Learning Environments Research*, 1(2), pp.163–180.

Ballantyne, R., Hughes, K. & Mylonas, A., 2002. Developing Procedures for Implementing Peer Assessment in Large Classes Using an Action Research Process. *Assessment & Evaluation in Higher Education*, 27(5), pp.427–441.

Barab, S.A. Barnett, M., Yamagata-Lynch, L., Squire & K., Keating, T. 2002. Using Activity Theory to Understand the Systemic Tensions Characterizing a Technology-Rich Introductory Astronomy Course. *Mind, Culture, and Activity*, 9(2), pp.76–107.

Barnett, R., 1999. The Coming of the Global Village: A tale of two inquiries. *Oxford Review of Education*, 25(3), pp.293–306.

Barrie, S.C., 2007. A conceptual framework for the teaching and learning of generic graduate attributes. *Studies in Higher Education*, 32(4), pp.439–458.

Beausaert, S.A.J., Segers, M.S. & Wiltink, D.P.A., 2013. The influence of teachers' teaching approaches on students' learning approaches: the student perspective. *Educational Research*, 55(1), pp.1–15.

Becher, T., 1989. *Academic tribes and territories: Intellectual inquiry and the cultures of disciplines.*, Milton Keynes: OUP.

Becher, T. & Trowler, P., 2001. *Academic tribes and territories: intellectual enquiry and the culture of disciplines*, Milton Keynes: Society for Research into Higher Education & OUP.

Beckett, D. & Hager, P., 2000. Making judgments as the basis for workplace learning: towards an epistemology of practice. *International Journal of Lifelong Education*, 19(4), pp.300–311.

Bennett, R.E., 2011. Formative assessment: a critical review. *Assessment in Education: Principles, Policy & Practice*, 18(1), pp.5–25.

Bergenhenegouwen, G., 1987. Hidden curriculum in the university. *Higher Education*, 16(5), pp.535–543.

Berglund, A., 2004. A framework to study learning in a complex learning environment. *Association for Learning Technology Journal*. 12(1), pp.66-79

Bernstein, B.B., 2000. *Pedagogy, Symbolic Control, and Identity: Theory, Research, Critique*, Oxford: Rowman & Littlefield.

Bichelmeyer, B.A. & Hsu, Y., 1999. Individually-Guided Education and Problem-Based Learning: A Comparison of Pedagogical Approaches from Different Epistemological Views.

Biesta, G., 2011. From Learning Cultures to Educational Cultures: Values and Judgements in Educational Research and Educational Improvement. *International Journal of Early Childhood*, 43(3), pp.199–210.

Biggs, J., 1996. *Testing: To Educate or to Select? Education in Hong Kong at the Crossroads*, Hong Kong: Hong Kong Educational Publishing Co.

Biggs, J., 1999. What the Student Does: teaching for enhanced learning. *Higher Education Research & Development*, 18, pp.57–75.

Biggs, J. & Tang, C., 2011. *Teaching for Quality Learning at University: What the Student does*, Milton Keynes: OUP.

Black, P., Harrison, C., Hodgen, J., Marshall, B. & Serret, N. 2011. Can teachers' summative assessments produce dependable results and also enhance classroom learning? *Assessment in Education: Principles, Policy & Practice*, 18(4), pp.451–469.

Black, P., 2005. Formative assessment: views through different lenses. *Curriculum Journal*, 16(2), pp.133–135.

Black, P., McCormick, R., James, M., Pedder, D. 2006. Learning How to Learn and Assessment for Learning: a theoretical inquiry. *Research Papers in Education*, 21(2), pp.119–132.

Black, P. & McCormick, R., 2010. Reflections and new directions. *Assessment & Evaluation in Higher Education*, 35(5), pp.493–499.

Black, P. & Wiliam, D., 1998a. Assessment and Classroom Learning. *Assessment in Education: Principles, Policy & Practice*, 5(1), pp.7–74.

Black, P. & Wiliam, D., 2009. Developing the theory of formative assessment. *Educational Assessment, Evaluation and Accountability*, 21(1), pp.5–31.

Black, P. & Wiliam, D., 2003. "In praise of educational research": formative assessment. *British Educational Research Journal*, 29(5), pp.623–637.

Black, P. & Wiliam, D., 1998b. *Inside the Black Box : Raising Standards Through Classroom Assessment*, London: Kings College London

Black, P. & Wiliam, D., 2005. Lessons from around the world: how policies, politics and cultures constrain and afford assessment practices. *Curriculum Journal*, 16(2), pp.249–261.

Bloom, B.S., 1969. *Taxonomy of educational objectives: the classification of educational goals, Volume 1*, New York: D. McKay.

Bloxham, S. & Boyd, P. (2013) A Situative Metaphor for Teacher Learning: the case of university teachers learning to grade student coursework. *British Educational Research Journal*, 40(2) pp.337-357

Boghossian, P., 2006. Behaviorism, Constructivism, and Socratic Pedagogy. *Educational Philosophy and Theory*, 38(6), pp.713–722

Boud, D., 1990. Assessment and the promotion of academic values. *Studies in Higher Education*, 15(1), pp.101–111.

Boud, D., 2009. How Can Practice Reshape Assessment? In G. Joughin, ed. *Assessment, learning and judgement in higher education*. Springer, pp. 29–44.

Boud, D., 2007. Reframing assessment as if learning were important. In D. Boud & N. Falchikov, eds. *Rethinking Assessment in Higher Education: Learning for the Longer Term*. Abingdon: Routledge,

Boud, D., 2000. Sustainable assessment: rethinking assessment for the learning society. *Studies in Continuing Education*, 22(2), pp.151–167.

Boud, D., Cohen, R. & Sampson, J., 1999. Peer Learning and Assessment. *Assessment & Evaluation in Higher Education*, 24(4), pp.413–426.

Boud, D. & Falchikov, N., 2006. Aligning assessment with long‑term learning. *Assessment & Evaluation in Higher Education*, 31(4), pp.399–413.

Boud, D. & Hicks, J., 1993. Bringing self-directed learning into the mainstream of tertiary education. In N. Graves, ed. *Learner Managed Learning: practice, theory and policy*. Leeds: HEC, pp. 159–173.

Bourdieu, P., 1977. *Outline of a Theory of Practice*, Nice: Cambridge University Press.

Bourdieu, P., 1993. *The Field of Cultural Production*, Columbia: Columbia University Press.

Brennan, M.J., 1995. Essay writing in nursing: alerting students and teachers to the educational benefits. *Nurse Education Today*, 15(5), pp.351–356.

Brew, A., 2003. Teaching and Research: New relationships and their implications for inquiry-based teaching and learning in higher education. *Higher Education Research & Development*, 22(1), pp.3–18.

Bromham, L. & Oprandi, P., 2006. Evolution online: using a virtual learning environment to develop active learning in undergraduates. *Journal of Biological Education*, 41(1), pp.21–25.

Brown, J.S. & Adler, R.P., 2008. Open education, the long tail, and learning 2.0. *Educause review*, 43(1), pp.16–20.

Brown, J.S., Collins, A. & Duguid, P., 1989. Situated Cognition and the Culture of Learning. *Educational Researcher*, 18(1), pp.32–42.

Brown, S., Rust, C. & Gibbs, G., 1994. Involving students in the assessment process. In *Strategies for diversifying assessments in Higher Education*. Oxford: Oxford Centre for Staff Development Oxford.

Brown, S.A. & Glasner, A., 1999. *Assessment matters in higher education: choosing and using diverse approaches*, Buckingham: Society for Research into Higher Education & OUP.

Bryman, A. 2004, Social research methods. Oxford: Oxford University Press.

Butler, D.L., 1998. The strategic content learning approach to promoting self-regulated learning: A report of three studies. *Journal of Educational Psychology*, 90(4), pp.682–697.

Callaghan, L., Lea, SJ., Mutton & L., Whittlesea, E. 2011. Enhancing health students' understanding of generic research concepts using a web-based video resource. *Nurse Education in Practice*, 11(6), pp.375–379.

Carless, D., 2006. Differing perceptions in the feedback process. *Studies in Higher Education*, 31(2), pp.219–233.

Carless, D., 2007. Learning‑oriented assessment: conceptual bases and practical implications. *Innovations in Education and Teaching International*, 44(1), pp.57–66.

Cartney, P., 2010. Exploring the use of peer assessment as a vehicle for closing the gap between feedback given and feedback used. *Assessment & Evaluation in Higher Education*, 35(5), pp.551–564.

Chickering, A.W. & Gamson, Z.F., 1987. Seven Principles For Good Practice In Undergraduate Education. *The American Association for Higher Education Bulletin*.

Chickering, A.W. & Reisser, L., 1993. *Education and Identity*, San Fransico: Jossey-Bass Publishers.

Crisp, B.R., 2007. Is it worth the effort? How feedback influences students' subsequent submission of assessable work. *Assessment & Evaluation in Higher Education*, 32(5), pp.571–581.

Crooks, T.J., 1988. The Impact of Classroom Evaluation Practices on Students. *Review of Educational Research*, 58(4), pp.438–481.

Crossouard, B. & Pryor, J., 2008. Becoming researchers: a sociocultural perspective on assessment, learning and the construction of identity in a professional doctorate. *Pedagogy, Culture & Society*, 16(3), pp.221–237.

Crossouard, B. & Pryor, J., 2012. How Theory Matters: Formative Assessment Theory and Practices and Their Different Relations to Education. *Studies in Philosophy and Education*, 31(3), pp.251–263.

Crozier, G., Reay, D., Clayton, J., Colliander, L. & Grinstead, J. 2008. Different strokes for different folks: diverse students in diverse institutions – experiences of higher education. *Research Papers in Education*, 23(2), pp.167–177.

Curcio, A.A., Jones, G.T. & Washington, T., 2008. Does Practice Make Perfect? An Empirical Examination of the Impact of Practice Essays on Essay Exam Performance, *Florida State University Law Review*, 35(2), pp.272-310

Daly, C., Pachler, N., Mor, Mellar, H., 2010. Exploring formative e-assessment: using case stories and design patterns. *Assessment & Evaluation in Higher Education*, 35(5), pp.619–636.

Daniels, H., 2008. *Vygotsky and Research (Google eBook)*, Abingdon, UK: Routledge.

Davies, J. & Ecclestone, K., 2008. "Straitjacket" or "springboard for sustainable learning"? The implications of formative assessment practices in vocational learning cultures. *Curriculum Journal*, 19(2), pp.71–86.

Davison, G., 2011. *Investigating the relationships between authentic assessment and the development of learner autonomy*. Northumbria University.

Duit, R. & Treagust, T.F., 1998. From Behaviourism Towards Social Constructivism and Beyond. In B. J. Fraser & K. G. Tobins, eds. *International Handbook of Science Education*. GB: Kluwer Academic Publishers, pp.3–25.

Dunne, M., Pryor J. & Yates, P. 2005. *Becoming A Researcher: A Research Companion For The Social Sciences: A Companion to the Research Process*, Maidenhead: McGraw-Hill International.

Dutton, W., Cheong, P.H. & Park, A., 2004. An Ecology of Constraints on e-Learning in Higher Education: The Case of a Virtual Learning Environment 1. *Prometheus*, 22(2), pp.131–149.

Dweck, C.S., 2000. *Self-theories: Their Role in Motivation, Personality, and Development*, Lillington NC: Psychology Press.

Eagleton, T. & Bourdieu, P., 1992. Doxa and Common Life. *New Left Review*, (191), pp.111–121.

Ecclestone, K., 2007. Commitment, compliance and comfort zones: the effects of formative assessment on vocational education students' learning careers. *Assessment in Education: Principles, Policy & Practice*, 14(3), pp.315–333.

Ecclestone, K., 1999. Empowering or Ensnaring?: The Implications of Outcome-based Assessment in Higher Education. *Higher Education Quarterly*, 53(1), pp.29–48

Ecclestone, K., 2001. "I know a 2:1 when I see it": Understanding criteria for degree classifications in franchised university programmes. *Journal of Further and Higher Education*, 25(3), pp.301–313.

Ecclestone, K. & Pryor, J., 2003. "Learning Careers" or "Assessment Careers"? The Impact of Assessment Systems on Learning. *British Educational Research Journal*, 29(4), pp.471–488.

Edwards, A., 2005. Let's get beyond community and practice: the many meanings of learning by participating. *Curriculum Journal*, 16(1), pp.49–65.

Edwards, A., 2001. Researching pedagogy: a sociocultural agenda. *Pedagogy, Culture & Society*, 9(2), pp.161–186.

Ellery, K., 2008. Assessment for learning: a case study using feedback effectively in an essay‑style test. *Assessment & Evaluation in Higher Education*, 33(4), pp.421–429.

Elliott, N. & Higgins, A., 2005. Self and peer assessment – does it make a difference to student group work? *Nurse Education in Practice*, 5(1), pp.40–48.

Engeström, Y., 2001. Expansive Learning at Work: toward an activity theoretical reconceptualization. *Journal of Education and Work*, 14(1), pp.133–156.

Engeström, Y., 1987. *Learning by expanding: An activity-theoretical approach to developmental research*, Helsinki: Orienta-Konsultit.

Entwistle, N., 2007. Research into student learning and university teaching. In N. Entwistle & P. Tomlinson, eds. *Student learning and University teaching*. Leicester: British Psychological Society.

Falchikov, N., 2013. *Improving Assessment Through Student Involvement: Practical Solutions for Aiding Learning in Higher and Further Education*, London: Routledge.

Falchikov, N., 2002. *Learning Together: Peer Tutoring in Higher Education*, London: Routledge.

Falchikov, N., 1995. Peer Feedback Marking: Developing Peer Assessment. *Innovations in Education & Training International*, 32(2), pp.175–187.

Falchikov, N. & Goldfinch, J., 2000. Student Peer Assessment in Higher Education: A Meta-Analysis Comparing Peer and Teacher Marks. *Review of Educational Research*, 70(3), pp.287–322.

Flyvbjerg, B., 2006. Five Misunderstandings About Case-Study Research. *Qualitative Inquiry*, 12(2), pp.219–245.

Fook, C.Y. & Sidhu, G.K., 2010. Authentic Assessment and Pedagogical Strategies in Higher Education. *Journal of Social Sciences*, 6(2), pp.153–161.

Freire, P., 2000. *Pedagogy of the Oppressed: 30th Anniversary Edition*, Oxford: Continuum.

Gee, J.P., 2003. Opportunity to Learn: A language-based perspective on assessment. *Assessment in Education: Principles, Policy & Practice*, 10(1), pp.27–46.

Gibbs, G., 2006. How assessment frames student learning. In C. Bryan & K. Clegg, eds. *Innovative Assessment in Higher Education*. Abingdon: Routledge, p. 256-270.

Gibbs, G., Simpson, C., James, D., & Fleming, S. 2009. Learning and teaching in higher education: The reflective professional. London: Sage.

Gibbs, G. & Coffey, M., 2004. The Impact Of Training Of University Teachers on their Teaching Skills, their Approach to Teaching and the Approach to Learning of their Students. *Active Learning in Higher Education*, 5(1), pp.87–100.

Gibbs, G. & Dunbar‐Goddet, H., 2009. Characterising programme‐level assessment environments that support learning. *Assessment & Evaluation in Higher Education*, 34(4), pp.481–489.

Gibbs, G., Lucas, L. & Simonite, V., 1996. Class size and student performance: 1984–94. *Studies in Higher Education*, 21(3), pp.261–273.

Gibbs, G. & Simpson, C., 2004. Conditions Under Which Assessment Supports Students' Learning. *Learning and Teaching in Higher Education*, (1). Available from: http://www2.glos.ac.uk/offload/tli/lets/lathe/issue1/issue1.pdf (Accessed 14th December 2012)

Gow, L. & Kember, D., 1990. Does higher education promote independent learning? *Higher Education*, 19(3), pp.307–322.

Greeno, J.G., Collins, A.M. & Resnick, L., 1996. Cognition and Learning. In D. C. Berliner & R. C. Calfee, eds. *Handbook of Educational Psychology*. New York: Simon & Schuster Macmillan.

Grenfell, D.M., Grenfell, M. & James, D., 2004. *Bourdieu and Education: Acts of Practical Theory*, London: Falmer Press.

Grenfell, M., 2008. *Pierre Bourdieu: key concepts*. M. Grenfell, ed., Stocksfield: Acumen.

Grieves, J., McMillan, J. & Wilding, P., 2006. Barriers to learning: conflicts that occur between and within organisational systems. *International Journal of Learning and Intellectual Capital*, 3(1), pp.86–103.

Haggis, T., 2003. Constructing Images of Ourselves? A Critical Investigation into "Approaches to Learning" Research in Higher Education. *British Educational Research Journal*, 29(1), pp.89–104.

Hanrahan, S.J. & Isaacs, G., 2001. Assessing Self- and Peer-assessment: The students' views. *Higher Education Research & Development*, 20(1), pp.53–70.

Hargreaves, E., 2005. Assessment for learning? Thinking outside the (black) box. *Cambridge Journal of Education*, 35(2), pp.213–224.

Harlen, W. & James, M., 1997. Assessment and Learning: differences and relationships between formative and summative assessment. *Assessment in Education: Principles, Policy & Practice*, 4(3), pp.365–379.

Hativa, N. & Goodyear, P., 2002. *Teacher Thinking, Beliefs and Knowledge in Higher Education*, Dordrecht: Springer.

Havnes, A., 2004. Examination and learning: an activity‑theoretical analysis of the relationship between assessment and educational practice. *Assessment & Evaluation in Higher Education*, 29(2), pp.159–176.

Havnes, A., 2008. Peer‑mediated learning beyond the curriculum. *Studies in Higher Education*, 33(2), pp.193–204.

Hernández, R., 2012. Does continuous assessment in higher education support student learning? *Higher Education*, 64(4), pp.489–502.

Hounsell, D., 2003. Student feedback, learning and development. In M. Slowey, ed. *Higher Education and the Lifecourse*. Maidenhead: McGraw-Hill International.

Hounsell, D., McCune, V., Hounsell, J., Litjens, J. 2008. The quality of guidance and feedback to students. *Higher Education Research & Development*, 27(1), pp.55–67.

Hughes, G., 2011. Towards a personal best: a case for introducing ipsative assessment in higher education. *Studies in Higher Education*, 36(3), pp.353–367.

Ivic, I., 1994. Lev S. Vygotsky. *Prospects: the quarterly review of comparative education*, 24(3/4), pp.471–485.

James, D. & Biesta, G., 2007. *Improving Learning Cultures in Further Education*, London: Routledge.

James, M., McCormick, R., Black, P., Carmichael, P., Drummond, MJ., Fox, A., MacBeath, J., Marshall, B., Pedder, D., Procter, R., Swaffield, S. & Swann, J., Wiliam, D. 2009. *Improving Learning How to Learn: Classrooms, Schools and Networks*, London: Routledge.

Jenkins, J., 2010. A multi-faceted formative assessment approach: better recognising the learning needs of students. *Assessment & Evaluation in Higher Education*, 35(5), pp.565–576.

Joughin, G., 2007. Student conceptions of oral presentations. *Studies in Higher Education*, 32(3), pp.323–336.

Joughin, G., 2010. The hidden curriculum revisited: a critical review of research into the influence of summative assessment on learning. *Assessment & Evaluation in Higher Education*, 35(3), pp.335–345.

Kember, D. & Leung, D.Y.P., 2010. Disciplinary Differences in Student Ratings of Teaching Quality. *Research in Higher Education*, 52(3), pp.278–299.

Kemmis, S., 1992. *Postmodernism and Educational Research*, Liverpool: University of Plymouth.

King, A., 1993. From Sage on the Stage to Guide on the Side. *College Teaching*, 41(1), pp.30–35.

King, A., 2002. Structuring Peer Interaction to Promote High-Level Cognitive Processing. *Theory Into Practice*, 41(1), pp.33–39.

Knight, P., 2002. A systemic approach to professional development: learning as practice. *Teaching and Teacher Education*, 18(3), pp.229–241.

Knight, P., 2006. The local practices of assessment. *Assessment & Evaluation in Higher Education*, 31(4), pp.435–452.

Knight, P., Tait, J. & Yorke, M., 2006. The professional learning of teachers in higher education. *Studies in Higher Education*, 31(3), pp.319–339.

Knight, P.T. & Yorke, M., 2003. Employability and Good Learning in Higher Education. *Teaching in Higher Education*, 8(1), pp.3–16.

Kuutti, K., 1996. Activity theory as a potential framework for human-computer interaction research. In A. Nardi, ed. *Context and Consciousness: Activity Theory and Human-computer Interaction*. MIT Press.

Kvale, S., 1996. *InterViews: An Introduction to Qualitative Research Interviewing*, London: Sage.

Law, J., 2004. *After Method: Mess in Social Science Research*, Oxford: Routledge.

Latour, B., 2005. *Reassembling the Social: An Introduction to Actor-Network-Theory*, Oxford: OUP.

Laurillard, D., 2001. *Rethinking University Teaching: A Conversational Framework for the Effective Use of Learning Technologies*, London: Routledge.

Lave, J. & Wenger, E., 1991. *Situated learning: legitimate peripheral participation*, Cambridge: Cambridge University Press.

Leont'ev, A., 1978. *Activity, Consciousness, and Personality*, Englewood Cliffs, NJ: Prentice Hall.

Lindlof, T.R. & Taylor, B.C., 2002. *Qualitative communication research method* 2nd ed., Thousand Oaks , CA: Sage.

Lonka, K. & Lindblom-Ylänne, S., 1996. Epistemologies, conceptions of learning, and study practices in medicine and psychology. *Higher Education*, 31(1), pp.5–24.

Luckett, K., 2009. The relationship between knowledge structure and curriculum: a case study in sociology. *Studies in Higher Education*, 34(4), pp.441–453.

Lueddeke, G.R., 2003. Professionalising Teaching Practice in Higher Education: A study of disciplinary variation and "teaching-scholarship." *Studies in Higher Education*, 28(2), pp.213–228.

Lundstrom, K. & Baker, W., 2009. To give is better than to receive: The benefits of peer review to the reviewer's own writing. *Journal of Second Language Writing*, 18(1), pp.30–43.

Marshall, B. & Jane Drummond, M., 2006. How teachers engage with Assessment for Learning: lessons from the classroom. *Research Papers in Education*, 21(2), pp.133–149.

Marton, F. & Saljo, R., 1976. On Qualitative Differences in Learning: Outcome and Process. *British Journal of Educational Psychology*, 46(1), pp.4–11.

Mason, J., 2002. *Qualitative Researching* 2nd ed. London: Sage.

Maton, K., 2009. Cumulative and segmented learning: exploring the role of curriculum structures in knowledge‑building. *British Journal of Sociology of Education*, 30(1), pp.43–57.

Maton, K. & Muller, J., 2007. A sociology for the transmission of knowledges. In *Language, Knowledge and Pedagogy: Functional Linguistic and Sociological Perspectives*. London: Continuum, pp. 14–33.

McDowell, L., Wakelin, D., Montgomery, C. & King, S. 2011. Does assessment for learning make a difference? The development of a questionnaire to explore the student response. *Assessment & Evaluation in Higher Education*, 36(7), pp.749–765.

McDowell, L., 1995. The Impact of Innovative Assessment on Student Learning. *Innovations in Education & Training International*, 32(4), pp.302–313.

Meyer, J.H.F. & Land, R., 2005. Threshold concepts and troublesome knowledge (2): Epistemological considerations and a conceptual framework for teaching and learning. *Higher Education*, 49(3), pp.373–388.

Miller, C.M.L. & Parlett, M., 1974. Up to the Mark: A Study of the Examination Game. Society for Research into Higher Education, p.128

Mwanza, D. & Engeström, Y., 2005. Managing content in e-learning environments. *British Journal of Educational Technology*, 36(3), pp.453–463.

Neumann, R., 2001. Disciplinary Differences and University Teaching. *Studies in Higher Education*, 26(2), pp.135–146.

Neumann, R., Parry, S. & Becher, T., 2002. Teaching and Learning in their Disciplinary Contexts: A conceptual analysis. *Studies in Higher Education*, 27(4), pp.405–417.

Nicholls, J., 2009. *Young people, alcohol and the news:preliminary findings*, Available at: http://webcache.googleusercontent.com/search?q=cache:http://pdf.thepdfportal.com/PDFFiles/1491 0.pdf. (Accessed 12th December 2012)

Nicol, D., 2009. Assessment for learner self‑regulation: enhancing achievement in the first year using learning technologies. *Assessment & Evaluation in Higher Education*, 34(3), pp.335–352.

Nicol, D., 2007. E‑assessment by design: using multiple‑choice tests to good effect. *Journal of Further and Higher Education*, 31(1), pp.53–64.

Nicol, D., 2010. From monologue to dialogue: improving written feedback processes in mass higher education. *Assessment & Evaluation in Higher Education*, 35(5), pp.501–517.

Nicol, D.J. & Macfarlane‑Dick, D., 2006. Formative assessment and self-regulated learning: a model and seven principles of good feedback practice. *Studies in Higher Education*, 31(2), pp.199–218.

O'Donovan, B., Price, M. & Rust, C., 2008. Developing student understanding of assessment standards: a nested hierarchy of approaches. *Teaching in Higher Education*, 13(2), pp.205–217.

O'Siochru, C. & Norton, L., 2013. Epistemic match: a pedagogical concept for understanding how students fit into the chosen subject. *Innovations in Education and Teaching International*, pp.1–12.

Ojalvo, H.E. & Doyne, S., 2011. Five Ways to Flip Your Classroom. *The Learning Network Blog - NYTimes.com*. Available at: http://learning.blogs.nytimes.com/ [Accessed September 27, 2013].

Orpen, C., 1982. Student versus lecturer assessment of learning: A research note. *Higher Education*, 11(5), pp.567–572.

Orsmond, P., Merry, S. & Reiling, K., 1996. The Importance of Marking Criteria in the Use of Peer Assessment. *Assessment & Evaluation in Higher Education*, 21(3), pp.239–250.

Osberg, D. & Biesta, G.J.J., 2007. Beyond Presence: Epistemological and Pedagogical Implications of "Strong" Emergence. *Interchange*, 38(1), pp.31–51.

Parpala, A., Lindblom-Ylänne, S., Komulainen, E.,Litmanen, T. & Hirsto, L. 2010. Students' approaches to learning and their experiences of the teaching-learning environment in different disciplines. *The British journal of educational psychology*, 80(Pt 2), pp.269–282.

Paxton, J.H. & Rubinfeld, I.S., 2010. Medical errors education: A prospective study of a new educational tool. *American journal of medical quality : the official journal of the American College of Medical Quality*, 25(2), pp.135–142.

Pintrich, P.R., 1995. Understanding self-regulated learning. *New Directions for Teaching and Learning*, 1995(63), pp.3–12.

Popham, W.J., 2008. *Transformative Assessment*, Alexandria, VA: ASCD.

Price, M., Carroll, J., O'Donovan, B., Rust, C. 2011. If I was going there I wouldn't start from here: a critical commentary on current assessment practice. *Assessment & Evaluation in Higher Education*, 36(4), pp.479–492.

Prosser, M. & Trigwell, K., 1999. *Understanding Learning and Teaching: The Experience in Higher Education (Society for Research into Higher Education)*, OUP.

Pryor, J. & Crossouard, B., 2008. A socio-cultural theorisation of formative assessment. *Oxford Review of Education*, 34(1), pp.1–20.

Pryor, J. & Crossouard, B., 2010. Challenging formative assessment: disciplinary spaces and identities. *Assessment & Evaluation in Higher Education*, 35(3), pp.265–276

Ramaprasad, A., 1983. On the definition of feedback. *Behavioral Science*, 28(1), pp.4–13.

Ramsden, P., 2003. *Learning to Teach in Higher Education*, London: Routledge.

Reay, D., David, M. & Ball, S.J., 2005. *Degrees of Choice: Class, Race, Gender and Higher Education*, Oxford: Trentham Books.

Resnick, L.B., 1991. Shared cognition: Thinking as social practice. In L. B. Resnick, J. M. Levine, & S. D. Teasley, eds. *Perspectives on socially shared cognition*. Washington, DC, US: American Psychological Association, pp. 1–20.

Richardson, J.T.E., 2005. Students' Approaches to Learning and Teachers' Approaches to Teaching in Higher Education. *Educational Psychology*, 25(6), pp.673–680.

Roth, W., Lee, Y. & Hsu, P., 2009. A tool for changing the world: possibilities of cultural‑historical activity theory to reinvigorate science education. *Studies in Science Education*, 45(2), pp.131–167.

Sadler, D.R., 2010. Beyond feedback: developing student capability in complex appraisal. *Assessment & Evaluation in Higher Education*, 35(5), pp.535–550.

Sadler, D.R., 1989. Formative assessment and the design of instructional systems. *Instructional Science*, 18(2), pp.119–144.

Sadler, D.R., 1998. Formative Assessment: revisiting the territory. *Assessment in Education: Principles, Policy & Practice*, 5(1), pp.77–84.

Sadler, D.R., 2009. Indeterminacy in the use of preset criteria for assessment and grading. *Assessment & Evaluation in Higher Education*, 34(2), pp.159–179.

Sambell, K. & McDowell, L., 1998. The values of self and peer assessment to the developing lifelong learner. In C. Rust, ed. *Improving Student Learning - Improving Students as Learners*. Oxford, UK: Oxford Center for Staff and Learning Development, pp. 56–66.

Sambell, K., McDowell, L. & Montgomery, C., 2013. *Assessment for Learning in Higher Education*, London: Routledge.

Sayer, A., 1992. *Method in Social Science: A Realist Approach*, London: Routledge.

Schostak, J.F., 2005. *Interviewing and Representation in Qualitative Research Projects (Conducting Educational Research)*, Milton Keynes: OUP.

Scriven, M., 1967. The methodology of evaluation. In R. W. Tyler, R. M. Gagne, & M. Scriven, eds. *Perspectives of curriculum evaluation*. Chicago, IL: Rand McNally, pp. 39–83.

Sfard, A., 1998. On Two Metaphors for Learning and the Dangers of Choosing Just One. *Educational researcher*, 27(2), p.4.

Shulman, L.S., 2005. Signature pedagogies in the professions. *Daedalus*, 134(3), pp.52–59.

Smith, S.N. & Miller, R.J., 2005. Learning approaches: examination type, discipline of study, and gender. *Educational Psychology*, 25(1), pp.43–53.

Snowball, J.D. & Mostert, M., 2013. Dancing with the devil: formative peer assessment and academic performance. *Higher Education Research & Development*, 32(4), pp.646–659.

Snyder, B.R., 1971. *The hidden curriculum*, New York: Knopf.

Suchman, L.A., 1987. *Plans and Situated Actions: The Problem of Human-Machine Communication (Learning in Doing: Social, Cognitive and Computational Perspectives)*, Cambridge: Cambridge University Press.

Swaffield, S., 2011. Getting to the heart of authentic Assessment for Learning. *Assessment in Education: Principles, Policy & Practice*, 18(4), pp.433–449.

Tan, C.M., 1992. An evaluation of the use of continuous assessment in the teaching of physiology. *Higher Education*, 23(3), pp.255–272.

Taras, M., 2005. Assessment - Summative and Formative - Some Theoretical Reflections. *British Journal of Educational Studies*, 53(4), pp.466–478.

Taras, M., 2003. To Feedback or Not to Feedback in Student Self-assessment. *Assessment & Evaluation in Higher Education*, 28(5), pp.549–565.

Tellis, W., 1997. Introduction to Case Study. *The Qualitative Report,* 3(2), Available from http://www.nova.edu/ssss/QR/QR3-2/tellis1.html. (Accessed December 22nd 2012)

Tinto, V., 1997. Classrooms as communities: Exploring the educational character of student persistence. *Journal of higher education*, 68(6), pp.599–623.

Tinto, V., 2005. Taking student success seriously: Rethinking the first year of college. In *Ninth Annual Intersession Academic Affairs Forum, California State University, Fullerton*. pp. 1–5.

Topping, K., 1998. Peer Assessment Between Students in Colleges and Universities. *Review of Educational Research*, 68(3), pp.249–276.

Topping, K.J., 1996. The effectiveness of peer tutoring in further and higher education: A typology and review of the literature. *Higher Education*, 32(3), pp.321–345.

Torrance, H., 2007. Assessment as learning? How the use of explicit learning objectives, assessment criteria and feedback in post‑secondary education and training can come to dominate learning. 1. *Assessment in Education: Principles, Policy & Practice*, 14(3), pp.281–294.

Torrance, H., 2012. Formative assessment at the crossroads: conformative, deformative and transformative assessment. *Oxford Review of Education*, 38(3), pp.323–342.

Torrance, H. & Pryor, J., 2001. Developing Formative Assessment in the Classroom: Using action research to explore and modify theory. *British Educational Research Journal*, 27(5), pp.615–631.

Torrance, H. & Pryor, J., 1997. *Investigating Formative Assessment: Teaching, Learning and Assessment in the Classroom*. Maidenhead: OUP

Toulmin, S., 1992. *Cosmopolis: The Hidden Agenda of Modernity*. Chicago: University of Chicago Press.

Trigwell, K., 2002. Approaches to Teaching Design Subjects: a quantitative analysis. *Art, Design and Communication in Higher Education*, 1(2), pp.69–80.

Trowler, P., 2012. Disciplines and Interdisciplinarity: Conceptual groundwork. In P. Trowler (ed.) *Tribes and Territories in the 21st Century: Rethinking the Significance of Disciplines in Higher Education*. London: Routledge.

Vianna, E. & Stetsenko, A., 2006. Embracing History through Transforming It: Contrasting Piagetian versus Vygotskian (Activity) Theories of Learning and Development to Expand Constructivism within a Dialectical View of History. *Theory & Psychology*, 16(1), pp.81–108.

Vickerman, P., 2009. Student perspectives on formative peer assessment: an attempt to deepen learning? *Assessment & Evaluation in Higher Education*, 34(2), pp.221–230.

Vygotsky, L., 1978. *Mind in Society: Development of Higher Psychological Processes*, Cambridge MA: Harvard University Press.

Webb, G., 1997. Deconstructing Deep and Surface: Towards a Critique of Phenomenography. *Higher Education*, 33(2), pp.195–122.

Wen, M.L. & Tsai, C.-C., 2006. University Students' Perceptions of and Attitudes Toward (Online) Peer Assessment. *Higher Education*, 51(1), pp.27–44.

Wiliam, D., 2011. What is assessment for learning? *Studies in Educational Evaluation*, 37(1), pp.3–14.

Wingate, U., 2010. The impact of formative feedback on the development of academic writing. *Assessment & Evaluation in Higher Education*, 35(5), pp.519–533.

Wyse, D. & Torrance, H., 2009. The development and consequences of national curriculum assessment for primary education in England. *Educational Research*, 51(2), pp.213–228.

Yin, R.K., 2009. *Case Study Research: Design and Methods*, London: Sage

Yorke, M., 2003. Formative assessment in higher education: Moves towards theory and the enhancement of pedagogic practice. *Higher Education*, 45(4), pp.477–501.

Young, P., 2010. Generic or discipline-specific? An exploration of the significance of discipline-specific issues in researching and developing teaching and learning in higher education. *Innovations in Education and Teaching International*, 47(1), pp.115–124.

Zhao, C.M. & Kuh, G.D., 2004. Adding Value: Learning Communities and Student Engagement. *Research in Higher Education*, 45(2), pp.115–138.

Appendix A: Hard Science tutor interview schedule

As a teacher in HE, what is important to you when you engage with a cohort of students?

Can you talk me through your course and what you try to do with your students?

When do you think your students are active in their learning and how does this influence how you engage students in learning your course material?

How do you clarify your intentions for what you hope your students might be learning?

How do they communicate / negotiate ideas about educational quality, standards and the meaning of the work?

How do students develop an ability to assess and analyse their own biological work and that of others?

What is the significance for the students that they are at the beginning of a programme of study to become graduate biologists (medics/psychologists)? Do you believe it is important to engage with this in your teaching?

Is there room for divergent learning (allowing students to explore areas of interest/off syllabus/self -directed) in undergraduate Hard Science teaching and if so when does it happen? Do you think that is important when becoming a graduate biologist and if so why?

Can you talk in detail about how you use Study Direct and your reasons for doing so? How does it articulate with the rest of the course?

Can you talk me through the technical decisions about the lesson?

Can you talk me through the technical decisions about the quiz?
> Students are penalized when they get a wrong answer and they have a second attempt. After attempting a quiz a student sees the right answer and they have another attempt available to them. The students need to complete the quiz within a two-week period

How do you aim to respond to students? Do you change your teaching in response to the results of the continuous assessments?

What do you like about using Study Direct?

What are the challenges of using Study Direct?

Appendix B: Hard Science student interview schedule

What are you studying and why?

What have you learnt within this course? Has this met with your initial desires to learn the subject?

Were there any really important moments in your learning on this course? And what were the things that made these moments important to you?

How is your learning on the course making you feel generally?
> Motivated / Inspired / Wiser / Critical of course of readings, of language, of life / Ignorant

Do you feel you could better self-assess your human physiology ability by the end of the course?

I believe the course used continuous assessment throughout the course. Does that contribute to you learning?
- How do you feel about the lesson activities?
- How do you feel about the quizzes?
- Does it encourage you to study through the term and if so how did you feel about this?

How do you feel about this form of assessment?
- Do you feel you are getting marked fairly?

How do you feel about the feedback that you get through the site after completing a SyD activity?

How do you think the continuous assessment in SyD affected your engagement with others?

What difference would it have made if you hadn't used continuous assessment?

What did you like about and what could be better in the way the course was run?

What did you like about and what could be better in the way the course used Study Direct?

Any more comments?

Appendix C: Soft Science course tutor interview schedule

As a teacher in HE what is important to you when you engage with a cohort of students?

Can you talk me through your course and what you try to do with your students?

When do you think your students are active in their learning and how does this influence how you engage students in learning your course material?

How do you clarify your intentions for what you hope your students might be learning? How do they communicate / negotiate ideas about educational quality and the meaning of the work?

How do you aim to respond to students? And how do you balance explanations of theory with response?

What is the significance for the students that they are at the beginning of a programme of study to become an English graduate? How is their learning with this discipline affecting self-belief and self-understanding? Do you believe it is important to engage with this in your teaching?

Is there room for divergent learning (allowing students to explore areas of interest/off syllabus/self directed) in undergraduate English teaching and if so when does it happen? Do you think that is important when becoming an English graduate and if so why?

When are formative assessments procedural, discursive/reflexive and when are they discursive existential?

Can you talk in detail about how you use Study Direct and your reasons for doing so? How does it articulate with the rest of the course?

> What kind of learning are you trying to provoke with this Discussion?
> *Print out example*

> What do you hope your students to learn from the Diaries? Will you offer any commentary on the Diaries?
> *Print out example*

What do you like about using Study Direct?

What are the challenges of using Study Direct?

Appendix D: Soft Science course student interview schedule

What are you studying and why?

What are you learning within this course? Has this met with your initial desires to learn the subject?

Were there any really important moments in your learning on this course? And what were the things that made these moments important to you?

How generally is your learning on the course making you feel?
> Critical of course, of readings, of language, of life / Motivated / Inspired / Wiser / Ignorant

How do you think your learning affects your engagement with others?

Do you feel you could better self-assess your linguistic ability by the end of the course?

I believe you are building up a portfolio of work. Does that contribute to your learning?

How did you feel about the adopt-a-word presentation?

How do you feel about the word journal? Is this an activity which you will continue after the course is over?

Does it encourage you to study through the term and if so how did you feel about this?

What difference would it have made if you hadn't had to develop a portfolio?

Were there any difficulties that continuous assessment caused for you?

How have you found the use of Study Direct?

Did you engage with the online discussions? Did you get anything out of them?

What did you like about and what could be better in the way the course was run?

What did you like about and what could be better in the way the course used Study Direct?

Any more comments?

Appendix E: Applied Technical course tutor interview schedule

What is the most important aspect of teaching for you?

When do you think your students are active in their learning?

How do you try to engage students in learning your material?

How do you clarify your intentions for what should be learnt?

Is it important that students understand the criteria by which they are being assessed and if so why?

How much control have the students in setting their own learning intentions?

What is your conception of feedback and how can it help student learning?

Apart from the technologies which your students are studying, which technologies do you use to supplement your teaching and what part do they play in learning?

How do you use Study Direct to supplement you teaching?

You have used peer assessment. How and why have you used this?

Peer assessment differs from group-work. Have you thought about the strengths and weaknesses of both and did you make a conscious decision to use one rather than the other?

How does the assessment affect how they work together and learn from each other?

Has Study Direct caused any difficulties for you?

How could Study Direct be improved?

What else could improve the learning experience of you students?

Appendix F: Applied Technical course focus group schedule

So, if you don't mind, could you tell me your name, what you are studying and anything you can think to say about the reason for your choice of study?

What have you leant within this course? Has this met with your initial desires to learn the subject?

Were there any really important moments in your learning on this course? And what were the things that made these moments important to you?

Were any technologies in the broadest sense used in these moments or your learning at other times?

I have heard that you used peer assessment in this course. How was this organised – how did it work?

What was your role?

What was the tutor's role?

How did Study Direct work to support the peer assessment? Or didn't it work?

Did the peer assessment affect your engagement with others?

How did you feel about the marking?

Did you feel you got a fair mark?

Were the assessment criteria such that you could award a mark that felt fair?

How generally did it make you feel?
> Understand assessments that may be made on your work / Motivational / Self appraise more as a result / Wider context of your learning

Were the task objectives and quality criteria clearer than other assignments and what effect did this have on the course outcomes for you?

How do you think doing the peer assessment will affect your approach to later assignments?

How did you feel the use of peer assessment contributed to your learning?

What difference would it have made if you hadn't used peer assessment?

Were there any difficulties that used peer assessment caused for you?

What could be better in the way the course was run/used Study Direct?

Having considered all this, do you have any more comments about Study Direct?

Appendix G: Research consent form

Explanatory statement:

> The {name} course is going to be used as part of a case study for a doctoral thesis in Education. Student contributions to the learning support web site, Study Direct, will only be used with the consent of the student.
> The information will be treated with confidentiality, and steps will be taken to disguise the identity of any individual in the reports on the project.
> If you are happy with this please sign the following confidentiality agreement.

I agree to take part in the research project. I have had the project explained to me and I have read and understood the above Explanatory Statement, which I may request from the researcher at any point.

I am aware that excerpts of my contributions may be used in reports and other outputs of the project, and that they will be anonymoed

I understand that any identifying details in any text will be altered in any reports or outputs that are made available to protect my anonymity.

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.