Innovation: Can it be an on-the-spot idea or must it be pre-planned?

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Abstract

This research investigates the importance of innovation; why we do it and, most significantly, how we do it. Research and teaching practice would inevitably suggest that a lesson must be planned – and this is not something with which we disagree. However, what this research aims to discover is whether we can be innovative within a session without it having being fully pre-planned. Can an 'on the spot' idea be as successful as something which is planned days or weeks before the session?

Our research was carried out within UCLan. The pre-planned innovation was utilised in the Lancashire Law School (LLS) where students were required to 'peer mark' for a mock assignment at foundation level. This innovation asked students to engage with the marking criteria and apply it effectively to their colleague's presentations. The results of this 'experiment' were encouraging. Feedback suggested that the students had a better understanding of the assessment criteria and, perhaps more importantly, although unintentional, an increased level of trust between student and tutor.

We used what we shall term an 'on the spot' innovation in the Lancashire Business School (LBS). This asked students of systems' development to engage with the diagramming techniques often used by systems' analysts. This took place on the whiteboard at the front of the room and students were invited to add one relationship (connection) at a time. The tutor photographed each step and a PowerPoint presentation was made using each relationship to build the finished diagram. This was annotated and circulated to all students.

Both innovative teaching techniques were effective in terms of the outcomes experienced by all participants. This research will identify that innovative teaching techniques do not need to be a wholly and succinctly pre-planned activity. Innovation within teaching strategies can be both a thought out process, and a more ad-hoc idea.

Introduction

This article addresses the importance of innovation within Higher Education and importantly how one can utilise this most effectively. Innovation is supported throughout the pedagogic literature.

There is a plethora of authors who could be cited here; however Hattie (1999) is one who probably captures our own thoughts most adeptly. He states that 'the implementation of innovations probably captures the enthusiasm of the teacher implementing the innovation and the excitement of the students attempting something innovative'. Thus, if innovation is as important as research would suggest, which we would undoubtedly agree with, we must be able to use it effectively.

In order to stimulate interest, ensure that practice is current and that students are attentive, one must diverge, at least sometimes, away from traditional methods of teaching such as tutor-led lecture and student note-taking. This article will identify what innovation is, why it is so important and how we can do it effectively. The conclusions in this article are based on the results of some experimentation within the classroom.

What is innovation?

Notwithstanding the fact that innovation is the undertaking of something new or different, it is an area of educational research; that is the evaluation of practises within a training setting. The American Educational Research Association defines educational research as:

> '*the scientific field of study that examines education and learning processes and the human attributes, interactions, organizations, and institutions that shape educational outcomes. Scholarship in the field seeks to describe, understand, and explain how learning takes place throughout a person's life and how formal and informal contexts of education affect all forms of learning. Education research embraces the full spectrum of rigorous methods appropriate to the questions being asked and also drives the development of new tools and methods.'* [1]

From this definition, undoubtedly the introduction of innovative teaching methods would certainly form part of the learning process for students, in that whichever teaching method one adopts, it is hoped that is leads to some amount of learning taking place. Nevertheless there are different understandings about the word 'innovation'. Innovation in its simplest form is the use of something *new*. But how *new* must it be? It would seem unlikely that each time a tutor undertook some innovation within their practice they developed something completely new that no one had ever done previously. Therefore, as Claxton (2002) asserts, innovation is 'seeking to engage students more deeply, to stimulate their interest in a topic or reinvigorate a tired notion'. Obviously there is the implementation of something that is wholly new to any given situation: perhaps the use of peer marking that has never been done before with a particular set of students. However, it can also

[1] http://www.aera.net/EducationResearch/WhatisEducationResearch/tabid/13453/Default.aspx. Accessed 21st July 2015.

mean adapting an older idea. A simple idea here could be students answering questions via a 'mini - whiteboard'[2] instead of the traditional 'hands-up' approach. Therefore innovation can vary in what it describes and its breadth. It can be a small change or the opposite; the key then is some amount of 'change'.

Why is it important?

In discussing teaching to develop learning power, Claxton (2002) claims teachers should 'keep the message fresh'. What better way to do this than by trying something new? Indeed, in their 10 principles of evidence-informed pedagogy the TLRP[3] include that 'effective pedagogy depends on the learning of *all* those who support the learning of others'. It is our contention that this teacher learning is best facilitated by the introduction of innovation into teaching practice.

Innovation in Higher Education, as suggested by Eraut (1975) is 'a process of change' rather than the 'dissemination of novel ideas'. This implies that the new practice should lead to a change in future delivery. Michael Eraut goes on to define HE innovation as a 'planned change in response to perceived problems'. The innovative techniques described below were developed to respond to previously identified shortfalls in student engagement and understanding. They were both planned to a degree; however, the first experiment with innovative teaching methods followed a formal lesson plan, whereas the second was almost developed 'on-the-spot'.

Pre-planned innovation

The use of a pre-planned innovation was tested with a group of foundation level students studying a PDP (personal development planning) module. The aim of the module is to equip foundation students with the skills they need to be successful as an undergraduate. The module covers issues such as time management, learning styles and techniques, presentation skills, library resources, punctuation, grammar and how to research. These skills the students claim they already have, yet year on year when marking assessments the same problems arise. Therefore it is essential for students to see the benefit of this module.

One element of assessment for this module is a summative presentation that is worth 25% of the overall grade. However, in order to prepare for this assessment the students are requested to perform a mock presentation, which could be termed formative assessment. Black and Wiliam 2009 describe formative assessment as:

[2] A mini-whiteboard is a small hand-held whiteboard that each individual student would have in their possession. These can be bought as an item but also easily made by placing a plastic pocket over a small hard white surface.
[3] Teaching, Learning and Research Programme

> *'practice in a classroom is formative to the extent that evidence about students achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited.'*

In this sense the activity was an opportunity for the students to gain feedback on their presentation skills and carry this forward. It is assumed by giving the students an opportunity to practice, they will be better informed for the 'real' presentation.

The innovation carried out was a method of peer review and marking for formative assessment. The students on the module were asked to work in groups to give a presentation that would be 'marked' primarily by peers. The students were given a copy of the standard presentation marking criteria to consider for around 15 minutes before the presentations started. This ensured that the students knew the content that was required at each grade boundary. The students were guided in studying the marking criteria so that they could apply it to a factual scenario. The peer markers were instructed to concentrate more on giving feedback with a grade being secondary in nature. This would ensure that the students could be competent in applying the marking criteria as opposed to just 'guessing' at a grade. The tutor would only contribute to the marking exercise at the end if the students had neglected to mention something important, or were particularly inaccurate at the level of the presentation. As stated by Black and Wiliam (2009) 'giving marks or grades, or otherwise focusing on judgment or competition, as part of feedback can inhibit the learner's attention to any substantive advice on improvement', so the focus here was to concentrate on more subjective encouragement.

The feedback in this session to each presenting group was the key, as this would inform the way in which they presented for the summative assessment. Hattie (1999) discusses the importance of feedback and goals and in this innovation the two ideas can be interlinked. The formative assessment from the tutor and peers informs the students of their current performance and thus can set 'challenging' goals for the student to gain the next grade boundary. The feedback is started by the presenting group, and thus exemplifies what the student understood of the assessment. Feedback both positive and constructive is then provided by firstly peers and secondly by the tutor. An important element of scholarly research has shown that feedback is most effective when it is received immediately. This is something that can also be achieved here (Gibbs and Simpson 2004: 19). Black and Wiliam (2009) briefly touch on the concept of feedback in peer assessment and suggest that 'the teacher in classroom interaction can model for learners the way they should

interact with one another'. This idea is particularly important for foundation level students and this module in particular, as it is much more skills, rather than academic content, based.

Results in Lancashire Law School

Hattie (2003) in his lecture paper discusses the benefit of more rigorous formative assessment; hence the decision to base this innovation on an exercise that would be described as formative in nature. It is 'the timing of the interpretation and the purpose to which the informative is used' (Hattie: 2003: 4) which makes an assessment formative. Therefore, because the feedback is to be used to enhance a second assessment, it is formative in nature. In agreement, Stobart (2006) identifies that formative assessment must enable further learning to take place, and thus the idea of this innovation was to use the benefits of formative assessment to better equip students for a summative assessment of the same kind; to use Stobart's wording 'how to get there'. Furthermore, as discussed in Black & Wiliam (2009) research shows that students perform better when they 'receive information about the task and how to perform it more effectively.' This is precisely what this innovation set out to achieve, and the results would suggest it was effective it its aims.

This was a new experience for both the students and the tutor, it was felt by all that a much greater enthusiasm for the session as a whole and the formative part of assessment had been gained.[4] After the innovative teaching session the students were questioned in an informal and unstructured way. The direct feedback from the students was encouraging, albeit in hindsight an anonymous questionnaire may have produced more reliable results. Nevertheless, the students commented that they enjoyed having the opportunity to peer mark as they gained an enhanced sense of trust from the tutor through the marking process. They also suggested (and this was definitely seen in the follow-on summative assessment) that the opportunity enhanced their knowledge of marking criteria and what was expected of them. This was precisely what Black *et al* (2003) had suggested in their work on improving classroom practice when they asked teachers to judge effective measures of helping students gain more understanding of what was required of them. The sharing and discussion of marking or assessment criteria is clearly of benefit to the students and can lead to improved levels of engagement.

Students were engaged with the material and saw a real application of it. O'Donovan et al (2004) discuss at length the difficulties with having a 'single' way of delivering assessment criteria. Therefore, this innovation set out to try and relieve some of the problems with only an articulation of assessment criteria. Through the process of peer marking the students were able to visually see what the criterion meant. Thus they had a much clearer idea of what was required, evidenced

[4] This links perfectly to our earlier quote in the introduction from Hattie (1999) who comments on enthusiasm and excitement.

through student feedback and results. This is linked to Claxton's (2002) idea that innovation is important as it challenges daily practices and maintains interest from both tutor and student. These act as motivational factors for students'. This was expressed by Linnenbrink and Pintrich (2003) who summarised several texts (Brophy: 1996, Pintrich and Schunk: 1996 and Stipek: 1998) in saying the various models for motivation have shown different relationships between engagement and motivation. They also assert that this 'hands on' approach aids students' cognitive engagement.

In addition to increasing students' perceptions of what was required of them the exercise also garnered a sense of trust, in that students realised that nothing was hidden from them in terms of how their 'real' presentations would be marked. This is something that had not been considered as an outcome when deciding to undertake this activity but is picked up by Hattie (2009) as something that is highly appreciated by students and a driver to their engagement and success.

'On the spot' innovation

This innovation was undertaken in a level five module offered to part-time students on the BA Business Studies programme at UCLan. This year was the fourth year of teaching this module in which the content and delivery had remained largely the same with only a few adjustments each year based on the feedback from each previous cohort. The module has enjoyed consistently excellent marks. Perhaps this has been due to these part-time, mature students taking their studies a bit more seriously than their younger, full-time counterparts, or it may be that the results are due the small class size[5] in some years. That said, in each delivery the students often struggled to grasp one of the key topics.

Every year, one component of the module has proved quite difficult for a significant proportion of the students. The diagramming methods used in systems development can seem baffling to some students as there are many different development methodologies and each has its own variations of these techniques. This is further compounded by a lack of full information (see below).

The approach on this module has been to introduce the 'traditional' Data Flow Diagram[6] (DFD: see appendix one) as a method for identifying which items (entities) are to have data stored about them when designing an information system. This leads to the next set of diagrams, Entity Relationship Diagrams (ERDs: see appendix two), where the relationships between these entities are formalised. One of the main problems with this use of these particular methods is that deliberately incomplete information (a procedure narrative) is given at the start of the diagramming exercise, as this reflects

[5] Over the past 4 years the class size has been 9, 26, 6 and 18.

[6] DFD; a map of what data are being used in individual processes, by whom and where any subsequent data are going (Store, Process or Entity).

what often happens in the 'real world' when developing a system. The gaps in the information have to be filled by the students who are forced to make assumptions about various situations. Hattie (2012) summarises Bransford, Brown and Cocking (2000) when he states 'learning is premised on understanding what the students begin with'. These students' life and work experiences vary considerably and so their understanding and interpretation of the scenarios also tends to differ. The larger the cohort, the more varied the students' experiences are and so this highlights the truism that there is never one exact answer to the problem of missing information. This would fit very much with the findings of many researchers (such as Rogoff et al: 1996, Bruner: 1977, or Dewey: 1997) who all describe that learning can depend on the interactions with more 'expert' others, whether these be the tutors or more learned peers, and that knowledge is both socially and culturally constructed. As Friedrich Nietzsche (1886-7) wrote 'it is precisely facts that do not exist, only interpretations'. Odd though it may seem, there could be as many correct solutions as there are students, and they could all be different! It was felt that this apparent contradiction might have been at the root of this particular problem.

In previous deliveries, in attempts to ameliorate this process, students were asked to list the entities from their DFDs and then these were rationalised into an amalgamation of everyone's lists. This was done in collaboration with the cohort, but was mainly led by the tutor rather than the students having the main input. It is this part of the module that was experimented with, based on a thought that arose from discussions in an unrelated seminar the day before. Learning activities had been examined and, in particular, their respective merit and benefit to students, as discussed by Hattie (1999, 2009 and 2012). Among the more powerful activities that were talked about were simulations and exercises, where students are encouraged to participate in a task, along with the value of peer contribution (Black *et al:* 2003). The thought or idea was to combine these to try something new in the delivery as well as introducing some formative assessment that might help with the subsequent coursework (as discussed in the first case study, above).

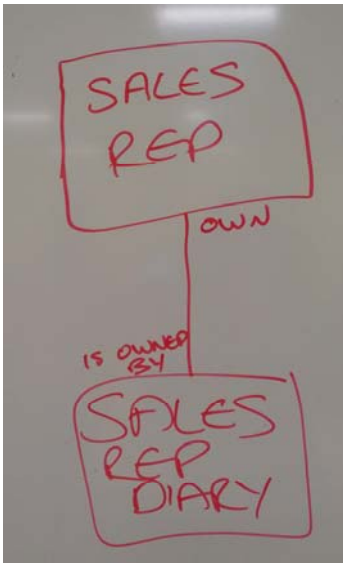
The students had been given a task to produce an ERD based on a previously completed DFD. As alreadymentioned, most had developed slightly different DFDs and so a set of entities that everyone's diagram had in common was decided upon. The session in question was the night after the 'Eureka' moment and so the innovation had been 'planned' in the spare two minutes that the tutor had on the day of the class.

Volunteers were asked to step up to the whiteboard and draw one part of the diagram each. After each student had completed his or her section time was allowed for the group to discuss it, in case anyone would have done anything differently. As previously mentioned, this is a particularly difficult

stage as the incomplete information leads each student to create his or her own set of assumptions to make sense of the first diagram. In previous deliveries, it was felt that the mere fact of the tutor drawing the diagram had stifled any discussion or questioning of the results. In this case there was a great deal of discussion at each of these steps and the students, rather than the tutor, gradually developed a compromise solution that was based around their discussion of any assumptions that had been made.

As seems to be common practice amongst students in recent years, each step of the construction of the diagram was photographed, rather than noted down. It was at this moment that the 'on the spot' part of this innovation was developed. The tutor realised that these photographs could be shared with all of the students[7] and any discussion could also be shared. Sometimes there would be two or three possible relationships, as demonstrated below.

The students had devised DFDs based on a scenario in which a Sales Representative would be associated with an Appointments Diary. Therefore, they had identified two entities and had to describe their relationship with one another



This first ERD of that relationship states that:
a) A Sales Rep must own one (and only one) Diary
b) A Diary must be owned by one (and only one) Rep

This would work if an assumption were made that each Rep had their own Diary and that this relationship was formalised as soon as the Rep was employed.

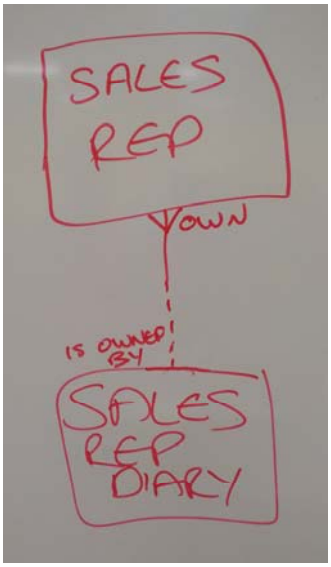
A system based on these premises would only allow one Rep to be associated with a diary and no-one else.

After discussion, some alternative assumptions were arrived at that allowed for the Diary to exist without having a Rep associated with it and that more than one Rep could manage the same Diary.

[7] As this was an evening class and most of the students had full-time jobs, attendance was rarely above 75%.

The reading of this variation of the diagram is that:

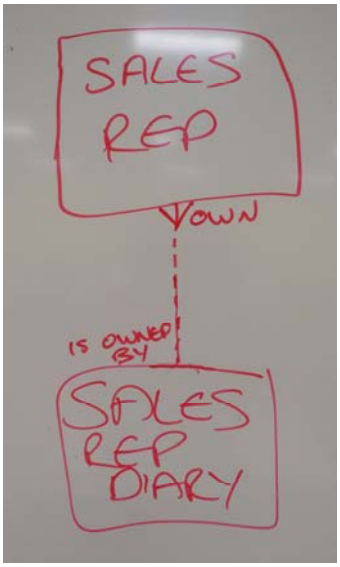
a) A Sales Rep owns a single Diary
b) A Diary is owned by none, one or more Reps



This still meant that a Rep would be forced to have an entry in the Diary. A new employee would need to have appointments in the Diary. This could potentially cause a new employee to be in a 'Catch 22' situation of having to create an appointment with a client before having any clients. Some felt this situation could work whilst others disagreed.

So, a third diagram was developed. This states that:

a) A Sales Rep may own a Diary (or not)
b) A Diary is owned by none, one or more Reps



This solution allows for trainee reps that may not have clients and multiple reps having access to a central diary. Not all of the students felt this made perfect sense but this, as discussed above, was based on their own interpretations of similar situations.

Each possibility was photographed by the tutor to show any changes that had followed from the group discussion. These photos were then made into a PowerPoint presentation that was annotated and circulated to all the students. Any assumptions that accompanied the diagram were deliberately left out to encourage the students to think of their own in order to make sense of their own diagram.

Results in Lancashire Business School

Having distributed the PowerPoint presentation, feedback was sought concerning the process of the group activity and how it might have helped in any way with the formal assessment (30% of the module's assessment is a DFD and the resultant ERD). With hindsight, this feedback could have been submitted in writing to enable its inclusion here, but, anecdotally, all of the students who participated in the class activity found that it had 'helped their understanding' of the diagramming techniques. Even those who were not present that day said that the PowerPoint summary was

'useful'. In particular, the students all said that the task had helped them make sense of the assumptions that they had made in order to complete the first diagram and what assumptions they now had to make with regard to the ERD.

Although not specifically set up to include any level of measurability, there is some comparable data concerning this innovation. When comparing the grades of the first assessment of this cohort (see appendix three) with that of two years ago (a similar class size), there has been an improvement in the grades given to the coursework that is built upon this session. The 2012 students' mean average was 61% whereas this year's was 64%. This is down on last year's class (71%) but there were only six students last year and it is thought that the extra time afforded for deeper, more meaningful discussions might have accounted for the difference. There was also a lot of close peer collaboration in last year's small group. These factors, smaller groups and close collaboration, coupled with the general demeanour of these students, have all been noted by Hattie (1999) as being above average influences on student learning.

It is possible to run statistical analyses using these data but the proportional differences in class sizes might compromise any conclusions based on the results following the innovation. Although it would be satisfying to attribute a novel teaching approach to an increase in overall grades, in this case the thought is, as mentioned above, that the classes' sizes and makeup may well have played a bigger part in the students' performance.

Discussion of the combined results

In 2010 Sir Ken Robinson (although talking more about education in general) said:

> *One of the real challenges is to innovate fundamentally in education. Innovation is hard, because it means doing something that people don't find very easy, for the most part. It means challenging what we take for granted, things that we think are obvious.*

This summarises what we feel are the benefits of innovating in our teaching practice. As well as us being aware that we were operating 'outside of our comfort zone', in using the innovative techniques described above, we had wanted to create meaningful experiences for the students that would guide them, formatively, with their associated coursework. It is all too easy to become blasé about content and delivery if the same or similar material is delivered each year with no or little change in delivery. Yet this is what happens time and time again. We agree that trying something different in our teaching practice is probably better suited to formative assessment.

Dylan Wiliam (2010) summarised a series of studies and listed three key points that define formative assessment. Namely, where the learners are, where they are going and how to get there. The teacher, the learners as well as their peers can all influence this. Stobart (2006) claims that for any 'formative assessment to be valid it must lead to further learning'. As both of these innovations included the use of formative assessment (albeit, not graded) to increase student understanding of the subsequent assessment, it therefore seems obvious to us that feedback from (and of) formative assessment (even where not made explicit or formal) helps students learn.

However, this is not always the case as Stobart (2006) points out when discussing the findings of Kluger and DeNisi (1996) who reported that over a third of feedback 'reduced performance'. We feel this might be explained partly by how the teacher may give the feedback and how the student might take it. We are firm believers that class size has an important role to play in the delivery of feedback. As demonstrated in previous deliveries of one of these modules, small cohorts seem to perform better than the larger ones. Our experiences of this are that the smaller groups are afforded more time to discuss feedback and so are more able to learn from it. They also seem to form closer bonds with their peers in these smaller groups. The feedback is a key part of formative assessment, as it should provide the direction for where the student needs to be and what needs to be done in order to get there. Wiliam (2011) also cited Kluger and DeNisi's 1996 review of more than 3000 articles and stated that, on average, 'feedback increases achievement' and this is echoed by Hattie (2009) where he states that feedback is 'the most powerful single moderator that enhances achievement'.

Clearly, we believe that innovation in teaching is a useful resource for both students and teachers. Students may not appreciate that something new is being undertaken but teachers are forced to take a new look at their practice when trying an activity for the first time. As Kathryn Ecclestone *et al* (2010) put it, we (as educators) need to:

> *'make students engage at a higher level cognitively than they either want to, or would chose to. This means capitalizing on… 'moments of contingency', where learning might go one way or the other. This is… a way of finding new ways to break down complex learning activities into small steps'.*

Both case studies used these 'moments of contingency' where it became possible to try something different. One had identified this opportunity in advance and had planned the process around this, whereas the other had made use of the chance as it arose.

Conclusion

As educators, it is generally assumed that all of our teaching activities should be planned in advance. At UCLan, as at most other universities, new members of teaching staff undertake formal courses, such as the Teaching Toolkit and the Post-Graduate Certificate in Teaching and Learning, to aid our teaching practice. In both of these we find out the importance of rigorous lesson planning. There can be a tendency, therefore, to think that anything not planned has no place in the teaching environment. In attempt to clean up a well-worn military adage (The 6P's: Proper Prior Planning Prevents Poor Performance) it follows that some form of planning ought to take place when undertaking an innovation in teaching. Whether that is via the formal process of a strict lesson plan (as detailed in the first case study) or in a more informal manner, as in the second. Nevertheless, the results of our 'experiments' quite clearly show that innovation can be more spontaneous and does not always require detailed planning.

What has become obvious to us, in undertaking these innovations, is that both students and tutors need to be invigorated and revitalisation of teaching and learning techniques is key. Students may, or may not, know that something new or different is being undertaken in any given session but the tutors certainly would. It is this part that we feel is most advantageous to us as educators. By its nature, it forces us to look again at the content and delivery of our teaching sessions.

Aldous Huxley (1956) observed that 'familiarity breeds indifference'. If we continue to do the same things, in the same way, there is the potential for us to lose sight of how difficult some topics can be for students. Equally, students need to be engaged and us doing something new or different presents opportunities to engage students in different ways.

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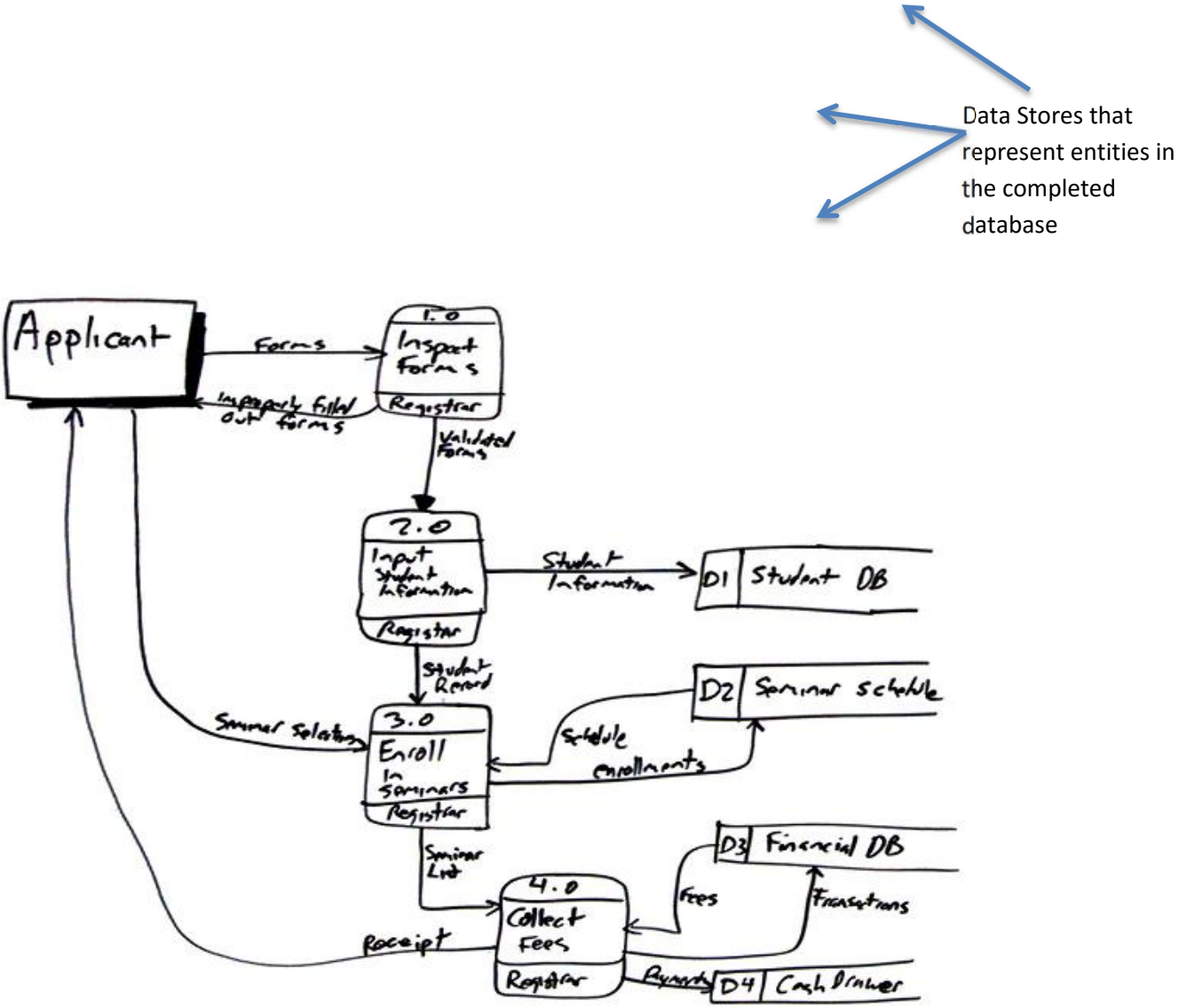
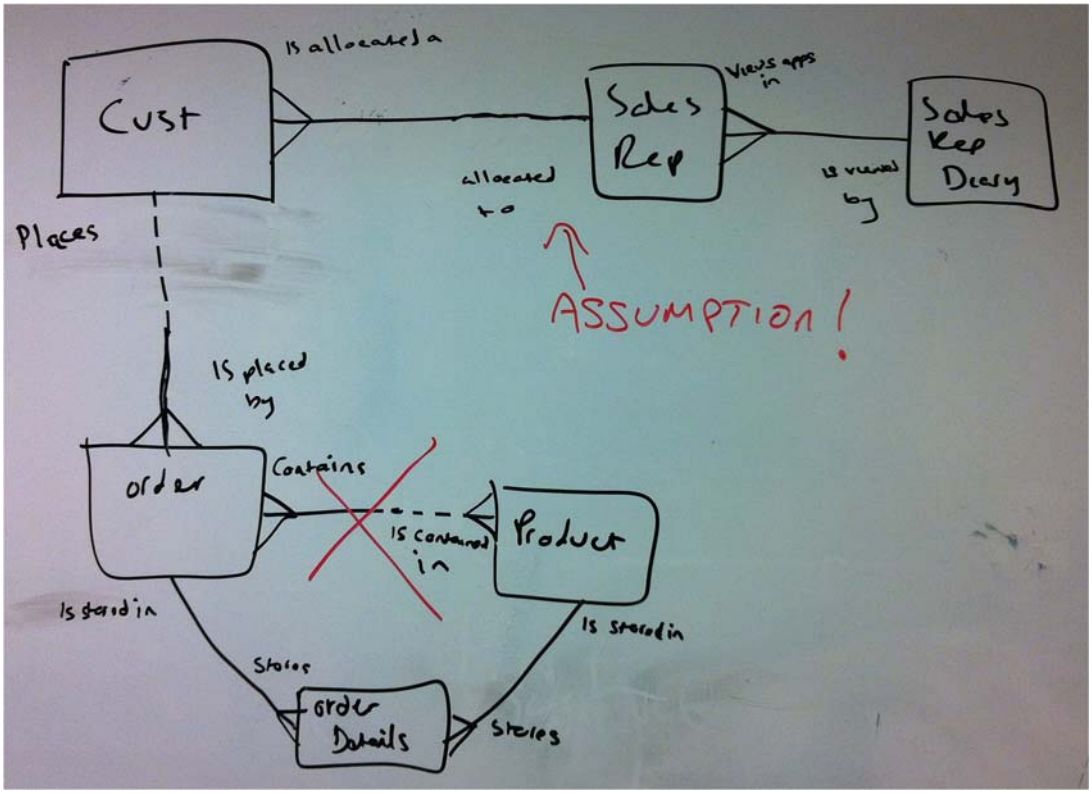
Appendices

Appendix one: example of a Data Flow Diagram (DFD)



Appendix two: example of an Entity Relationship Diagram (ERD)



Appendix three: grade data from BT2103

Comparison of mean grades for coursework one

Year	Cohort size	Mean grade	Range of marks
2011	9	64	56-70
2012	26	61	48-7
2013	6	71	65-74
2014	18	64	50-73