An Activity-based Approach to the Learning and Teaching of Research Methods: Measuring Student Engagement and Learning

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Abstract

This paper discusses a research project carried out with 82 final and third year undergraduate students, learning Research Methods prior to undertaking an undergraduate thesis during the academic years 2010 and 2011. The research had two separate, linked objectives, (a) to develop a Research Methods module that embraces an activity-based approach to learning in a group environment, (b) to improve engagement by all students. The Research Methods module was previously taught through a traditional lecture-based format. Anecdotally, it was felt that student engagement was poor and learning was limited. It was believed that successful completion of the development of this Module would equip students with a deeply-learned battery of research skills to take into their further academic and professional careers. Student learning was achieved through completion of a series of activities based on different research methods. In order to encourage student engagement, a wide variety of activities were used. These activities included workshops, brainstorming, mind-mapping, presentations, written submissions, peer critiquing, lecture/seminar, and 'speed dating' with more senior students and self reflection. Student engagement was measured through a survey based on a U.S. National Survey of Student Engagement (2000). A questionnaire was devised to establish whether, and to what degree, students were engaged in the material that they were learning, while they were learning it. The results of the questionnaire were very encouraging with between 63% and 96% of students

answering positively to a range of questions concerning engagement. In terms of the two objectives set, these were satisfactorily met. The module was successfully developed and continues to be delivered, based upon this new and significant level of student engagement.

Keywords: Activity-Based, Research Methods, Engagement

Introduction and Context

Following many years of supervising undergraduate and post-graduate theses, and being involved in lecturing 'Research Methods', it became evident that some students were not equipped with the necessary research methods' skills to develop a robust research proposal and complete a satisfactory thesis.   It was believed that a number of factors militated against deep learning of 'Research Methods'. From a learning point of view, the subject matter was perceived as lacking context and being boring, attendance was poor, and there was little engagement with the material. From a teaching perspective, it was difficult to engage students and measure the extent to which the learning outcomes were achieved. It was believed that the absence of a context made the material in the lecture-based 'Research Methods' module too difficult for students to fully grasp and put into practice. In addition, the method of learning did not engage students. Following a review of different learning and teaching methodologies, an activity-based approach to learning research methods was considered to be a more effective learning methodology than the traditional lecture format for the delivery of this module. This study was devised to address these issues.

The research focused on curriculum development and specifically aimed to devise a new method through which students learn, what is often perceived by them to be a very 'dry' and unexciting set of skills i.e. Research Methods. A new module was designed to allow students to appreciate the value of research, the importance of undertaking it properly and the techniques necessary to achieve this.

It was believed that successful completion of the development of the module would equip students with a deeply-learned battery of research skills to take into their further academic and professional careers. It was envisaged that an outcome of the research was that it would have wide applicability and appeal across a number of schools in the Dublin Institute of Technology (DIT). The research had two objectives:

1. to develop a module in 'Research Methods' which embraces an activity-based approach to learning in a group environment; and
2. to improve engagement by students.

Literature Review

Research has shown that the traditional lecture based format, where the students sit passively (as notes are distributed) and the lecturer talks has dominated in higher education institutions up until relatively recently. As noted in Johnson, Johnson & Smith (1998) (cited in Ahlfeldt, Mehta & Sellnow, 2005, p.52) '*having the instructor provide all the materials to the passive student is the old paradigm. The new paradigm is to actively engage students with the material and one another.*' The DIT has supported a move toward more student-centred learning where lecturers are encouraged and facilitated in developing courses that move away from this format to those

formats that provide students with a more active and engaged learning environment which results in deeper learning. These ideas are reflected in the seven principles of good teaching practice in undergraduate education as described by Chickering & Gamson (1999 p.76) as follows:

1.   *Encourages student-faculty contact*

2.   *Encourages cooperation among students*

3.   *Encourages active learning*

4.   *Gives prompt feedback*

5.   *Emphasises time on task*

6.   *Communicates high expectations*

7.   *Respects diverse talents and ways of learning.*

As outlined by Chickering & Gamson (1987, p.78) cited in Bonwell & Eison (1991) '*students must do more than just listen. They must read write discuss, or be engaged in solving problems.'* Bonwell & Eison (1991, p.83) go on and succinctly define active learning as '*instructional activities involving students in doing things and thinking about what they are doing.'*   Fallows & Ahmet (1999, p.34) assert that '*learning is most effective when student involvement, participation and interaction is maximised.'*

Having attempted some of the more accepted non-traditional practices like *problem and project-based, collaborative learning*, the research focused on the benefits of *Activity-based Learning*. Whilst elements of problem, project and collaborative based learning are incorporated into activity-based learning, each are separate approaches in their own right. As explained in McGrath & MacEwan (2011, p.23) in activity-based education, the student becomes '*more*

actively involved in the learning process through acts of 'doing', 'being' and 'critically reflecting' than in traditional, didactic education that is more centred around the passive act of 'knowing'' Petress (2008) has identified typical characteristics of active learners: they ask questions for clarification, challenge ideas procedures and content, connect current learning to past learning, attach what is learned with skill development, discuss what is known with others and remain enthusiastic about learning.

Although the DIT actively encourages the development of non-traditional learning strategies there are invisible barriers as highlighted by Bonwell & Eison (1991). They discuss amongst other things, the limited incentives for change, limited class time, a possible increase in preparation time, the potential difficulty in using active learning in larger classes and the lack of equipment, and the risks that students will not participate. The risks discussed here about students not participating is evidenced in the study carried out by Benson & Blackman (2003, p.56) where they state that '*the hardest part is encouraging students to be able to learn via activity based learning when the majority of their studies are framed within a more traditional learning environment.'*

Gleason *et al.* (2011) outline the following strategies for active learning (selected list):
Think-pair-share: this activity was designed for pharmacology students. Students were given a problem and asked to think about it alone, then compare their thoughts with another student and then write up the report and share with the entire class.

Minute-writes: students are posed an open-ended question and asked to write a response in one to two minutes.

Student presentations: Students are given a topic that they must research and then present to the class. They can work in groups or as individuals. This is where the students become the lecturers. To increase the involvement of the class they can be asked to provide peer assessment.

Case Studies: students are required to apply their knowledge to a situation and solve a problem relating to the course material.

Socratic questioning: this activity is designed to test students learning by asking questions of them about the subject matter being examined.

Puzzles/paradoxes: An effective method of getting students to work out a solution. By forcing students to 'work it out' you increase the likelihood that they will be able to use the material effectively later on.

Much has also been written about the learning of Research Methods and as Benson & Blackman (2003, p.39) state: '*It became apparent that from both staff and student feedback, that the perceptual link between learning research methods as a subject and its use for future study was poor.*' The key issue in learning Research Methods appears to be the abstract nature of the subject matter and the disjoint between the theory and the practice.

Research Design

Theoretical Framework

As stated research methods can be a 'dry' subject to teach and learn in the absence of a context, it was agreed that this new approach would fit well with the nature of the content in a 'Research Methods' module. Once the learning and teaching approach had been decided upon, the next area of research was to find a way of establishing if, and how well, this new approach was working. As established in Hake (1998), the use of interactive strategies can increase course effectiveness.

It was decided that determining how *engaged* students are during the activities would be an appropriate way of establishing whether students were responding to the activity-based approach. This approach fits well to Level 1 of the Kirkpatrick evaluation model developed in the 1970s. (Forsyth *et al.*, 1999) Level 1 involves evaluating the learners' feelings and opinions about the materials they have been introduced to. The limitation of this approach taken on its own is that it does not measure what has been learned. Level 2 is concerned with estimating changes to knowledge attitudes and skills. Ideally the same measure should be used before and after the learning event. Level 3 measures the extent to which learners apply the knowledge and level 4 measures any changes in the organisation.

As noted in Ahlfeldt *et al.* (2005, p.6) '*engaging students in learning is one of the many goals that educators face.*' The U.S. has been leading the way in the measurement of student engagement. Through its student survey, the National Survey of Student Engagement annually collects information at hundreds of four-year colleges and universities about student participation in programmes and activities that institutions provide for their learning and personal

development. The results provide an estimate of how undergraduates spend their time and what they gain from attending college. The primary purpose of the survey is '*to query undergraduates directly about their educational experiences'* (National Survey of Student Engagement, 2011). The NSSE was designed to report on the frequency '*with which they engage in dozens of activities that represent good educational practice'* (Kuh, 2009, p.8). The survey used in this research was developed based on the NSSE (2000) and the survey developed in the work of Ahlfeldt *et al*. (2005).

Development of the Student Engagement Questionnaire

The purpose of the questionnaire was to try to establish whether, and to what degree, students were engaged in the material that they were learning, while they were learning it. Following on from an analysis of the literature, the objectives of the questionnaire focused on the students' *behaviour* in the class activity, *critical skills development and knowledge attainment*. In addition some of the questions were designed to obtain feedback from the students as to the learning environment that was created for them.

The questions were designed with these objectives in mind. It was also decided that the best way to determine whether or not students were 'engaged' in the material would be to use a Likert Scale as opposed to a 'yes/no' questionnaire (Oppenheim, 2000). The benefits of doing this are that the responses can be analysed separately. Arguably, this is one of the best ways to determine the *level* of engagement. As Likert Scales are arbitrary it was decided that best

practice would include no more than 7 intervals on the scale, and that the number of intervals would be 'odd'. Five intervals were chosen as follows:

5. Very characteristic of me

4. Characteristic of me

3. Moderately characteristic of me

2. Not really characteristic of me

1. Not at all characteristic of me

While aware of the limitations of using Likert Scaling with a relatively small sample (82 students), it was felt that the richness of the results outweighed the limitations. There is some cross-over in the objective of each of the questions, and listed below are those which were designed to characterize students' behaviour in class:

1. Contributed to a discussion and actively participated in the group
2. Explained something to one of your classmates
3. Asked a question either to the group/ lecturer when you don't understand something
4. Presented the group's material
5. Had fun
6. Was reluctant to share my ideas as others simply piggy-back on to them

The following questions were designed to characterize critical skills development and knowledge attainment:

1. Looked up information for further understanding during the activity
2. Thought about practical application (in your thesis say) of this activity
3. Felt like I made a meaningful contribution to activity
4. Felt challenged by the material
5. Felt interested in the material
6. Didn't see its immediate relevance to my work as a student
7. Didn't see its relevance to my future career

The following questions were designed to give lecturers some feedback on the learning

environment:

1. Found that group work is dominated by more vocal people which intimidated or put me off
2. Believed that the lecturers were motivated by the activities
3. My performance was directly related to the positive environment that the activity based learning provided
4. Was provided with all the materials/texts that I needed
5. Was unclear as to how my contribution is assessed

Development of the Module

Table 1 below provides examples of activities which were used to encourage student

participation and engagement with the subject matter of the module.

Table 1 Module Content and Principal Activity

Module Content	Principal Activity
Interview techniques/ Questionnaire survey design	Web-based workshop and development of interview/survey questions
Developing research themes	Mind mapping and poster presentations
Case Study	Quiz and brainstorming
Criteria-based analysis	Individual and group presentations
Research proposal development	Peer critiquing, self reflection and 'speed-dating'

There were a number of factors that informed the choice of activity namely, appropriateness to

the subject matter, need to ensure variety of tasks, timing, and innovativeness. Students,

working in small groups (4/5 students per group), were set a number of tasks and once completed

formative assessment took place and feedback was given.

Operation of Module

The module was run through a weekly two-hour activity-based session. Students worked in groups of four or five. As a general principle activities were completed within the two hour session. Each group initially devised a small number of research ideas and these were used to give a context for later activities. Group work was submitted to the lecturers at the end of each session and feedback given on this the following week.

Detailed Examples of Selected Activities

Questionnaire Surveys

This activity was placed in the context of one of the groups selected research ideas as referred to above. Initially each group was given time to conduct a short, web-based literature search on questionnaire survey design. This would inform their approach to the remainder of the activity. Each group was asked to devise broad areas that the questionnaire would address. This was done through small group workshops. Immediate feedback was given on this by the lecturers.

The groups then designed the full questionnaire. The required elements of this were:

- Subject/topic of the survey questionnaire
- Justification for undertaking the survey i.e. why is it necessary/desirable within the context of the overall research study
- Population to be surveyed
- Method of sample selection and target sample size
- Methodology for achieving satisfactory sample size
- Broad areas to be covered in questionnaire with rationale/justification for these
- An outline as to how each answer would relate to one or more of the research objectives

- Questionnaire (10 questions maximum). A key direction to students was to ensure that each question was relevant, contributes to the research aim and helps meet the objectives.

- A brief description how the information would be analysed.

At the end of the workshop, groups were randomly selected to present and a plenary discussion took place.

The Case Study

It was felt that students' understanding of case studies was particularly weak and tended to focus largely on descriptive 'stories'. Few students appreciated the value of a rich case study as an important component of many research projects. The subject matter of many of the students' theses, e.g. urban economics, planning, property development, lend themselves to the use of case studies. The activity was undertaken in three parts:

- Initial students' perceptions of case studies;

- Quiz-based activity to 'fill in the blanks' using Internet or other resources (see Appendix A);

- Preparation of outline of three possible case studies.

The second of the above, which was introduced simply to try a different approach to learning, proved challenging and received a mixed reaction from students. The session was conducted in three stages:

Activity 1:

Each group was asked to consider their pre-conceived understanding of what a case study was and what it should contain. The response confirmed that students had a limited understand of the

nature of the case study, and that they saw it as little more than a descriptive 'story'. This activity lasted about 15 minutes. A general class discussion was held to consider the students' views.

Activity 2:

This took the form of a quiz where students were asked to complete a series of statements from a given set of words. (See Appendix A)

Activity 3:

In the final part of the session, students were given the following research areas and asked to devise an appropriate case study**.** The objective (illustrate/explain/explore) and the structure of the case study was to be briefly outlined. If they thought that the subject matter did not lend itself to a case study, they had to explain why not. In answering this part, they were asked to draw on what they had learned in step 2 above.

- "The psychological impact on contestants of reality TV programmes"

- "Risk sharing in public-private partnerships"

- "The 'winner-takes-all' focus of professional sport"

- "Are Academy Awards (Oscars) evidence of artistic quality?"

- "The growth of international chains in the Irish retail sector"

Criteria-Based Analysis

As a way of getting students to quickly and intensively engage with the activity, we started with a simple example of a football team manager buying a new player and asked the students to devise a set of 10 criteria that would be appropriate. This generated an animated discussion in each group, and led to a very strong sense of engagement with the activity which set the students up for the subsequent research-based activity. The use of a 'novelty' item at the start of each class session is one that has proven successful as a means of "grabbing students' attention".

The research-based activity focused on firstly exposing students to a government report in which policy options were evaluated against a range of criteria, and secondly to an undergraduate thesis which used criteria-based analysis to evaluate different forms of urban regeneration. The activity was intended for the students to consider how the criteria were determined and in particular to make the connection between the review of the academic and professional literature and the derivation of the criteria. In addition, the students were asked to consider the different analytical challenges posed by a simple counting system (ticking boxes) versus a simple scoring system versus a weighted scoring system.This activity which was primarily of a workshop/brainstorming nature, proved very popular and one which many students have since embraced in their own thesis in final year.

Peer-critiquing of Draft Research Proposals

Each student's proposal was critiqued by their peers in small groups. Students were given criteria to assess each other's proposals, broadly similar to the actual criteria used by the academic staff to assess thesis proposals. Written feedback and critique was presented to each student by the

group. The functions of *Chair* and *Scribe* rotated amongst group members. An important learning aspect of this activity was that it allowed students to role-play as assessors which enhanced their understanding of what assessors look for. While the lecturers thought this was a very successful activity, there were some dissenting voices amongst the students. Many found it very useful but some students appeared reluctant to share ideas prematurely with their classmates.

Findings

Third and fourth year students (82 in total) of the Property Economics Degree at the DIT were involved in this research project. This is a level 8, 4-year full-time programme. Initially the module was run in the 4th year of the course and then following feedback from students was put into the final semester of the 3rd year of the programme where it is still being implemented. Students prepare a thesis in final year on an approved topic that accounts for about 17% of their final degree award. The Research Methods module, while stand-alone, feeds into the final year thesis module.

Engagement

This was measured through a student questionnaire survey as described above. Key results of this survey were that students:

- Felt that they had made a *meaningful contribution* to the group activities

- Considered that the approach adopted in the module created a *positive learning environment*

- Found the approach and activities set both *interesting and challenging*

- Had *fun* during the module and regarded it as the learning highlight of their week

Overall the results were very encouraging, with between 63% and 96% of students answering positively to a range of questions concerning engagement. In relation to specific survey questions:

- *78% of students said that it was very characteristic or characteristic of them to contribute in class discussions*

- *71% of students said that it was very characteristic or characteristic of them to ask a question of lecturers or class mates when they didn't understand something*

- *63% of students said that it was very characteristic or characteristic of them to have fun during this module*

- *96% of students said that it was very characteristic or characteristic of them to feel that lecturers created a positive environment for asking questions*

- *70% of students said that it was very characteristic or characteristic of them to feel that they made a meaningful contribution to the activities*

- *70% of students said that it was very characteristic or characteristic of them to feel that they were challenged by the material and were interested in the material*

In addition, qualitative feedback was sought on the operation of the module and on the specific activities and learning sessions.

Student Feedback on Module and Activities

Overall Operation of Module:

Overall this module was one of the highlights of my college week and a class I looked forward to.

I did learn a lot of useful information and techniques. I felt the time allotted was the right amount. It was a light and fun class which didn't impact on other time consuming modules and it provided another opportunity to bond with other classmates.

I think overall that this module will help us greatly with our thesis next year. I hope that it will have taught us to think outside the box. I hope to use some of the research methods also in my future work.

I am very happy the Property Economics Degree course has brought in this type of module as it's very different to the other modules undertaken in third year, which makes things interesting, different as it is also a different type of teaching and extremely helpful in the long term.

I found the group work could be both helpful as you listened to other people's ideas and opinions and therefore gave a fuller view on a topic but it could also cause a hindrance as if people did not participate.

I felt that working in groups really helped me to get different perspectives on all aspects of the thesis. I thought that the group size was perfect and the time allocation with the groups was just right too.

I enjoyed the group interaction in the classes. They were a welcome change of scene from the usual two hour, sit and listen lectures that the rest of the course consists of.

Individual Activities:

Interview Activity

I felt this was an excellent activity; we discussed how to conduct an interview and how to develop different types of questions. I had planned to undertake interviews (for my thesis) … and this will help me develop my questions for the interviews

Critiquing Proposals

I found the proposal writing and peer critiquing very useful. It allowed me to share my thesis ideas and aims which helped me focus more on what I actually wanted to achieve in my thesis.

The constructive criticism enabled me to change aspects of my thesis idea that were too broad and enabled me to create a more focussed idea with a clear aim.

Surveys and Questionnaires

> *This was one of my favourite activities of the module. It allowed us to take the idea which we were interested in and begin to understand the complexities of gathering data particularly through surveying. Before I had not realised the difference in question types and how to direct my questioning so as to acquire the information I need and now I feel I do.*
>
> Meet Final Years/Speed-dating
>
> *The general consensus has to be the best aspect of the thesis was definitely that it was your own piece of work that you could be independent with and design yourself to a certain extent. They (the final years) said the autonomy was quite enjoyable.*
>
> Generating Thesis Idea
>
> *I think the less useful activities were related to (generic) proposal generation. Although it was a good way of getting us to think about how to come up with a proposal I think it would have been more beneficial to focus it on areas people were actually considering.*

Discussion of Findings

The findings of this paper agreed with much of the research outlined in the literature review regarding the limitations of the lecture-based approach to learning as evidenced by this piece of student feedback: *I enjoyed the group interaction in the classes. They were a welcome change of scene from the usual two hour, sit and listen lectures that the rest of the course consists of.* It is particularly the case when learning the abstract tools of methods of research. As Benson & Blackman (2003, p.45) state '*Historically the way in which research methods were being taught … did not fully engage student interest.*'

The activity-based approach discussed in this paper appears to result in students who embody the characteristics of active learners outlined by Petress (2008). The results of the survey reveal that the majority of students (71%) said they would ask questions and were enthusiastic and challenged about the material (70%).

Although initially many of the activities were designed with the benefit of several years running projects/ workshops and student presentations, many of the activities in the Research Methods Module were developed and fine-tuned from some of the strategies developed in the Gleason *et al.* (2011) paper. Lecturers have found the most suitable learning strategy to engage students with the concepts in Research Methods are student presentations and case studies. It was felt that there were multiple benefits of getting students to research a topic and then present to the class. The case study activity embodied a mixture of the *minute writes* and the *think-pair-share* strategies. Once students had presented their views, staff then used the *Socratic Approach* to tease out some of the preconceived misconceptions students had and help them to develop some of the more challenging ideas in the subject matter. In addition to some of the strategies outlined in Gleason *et al.* (2011), staff relied on the well used ideas of workshops and mind mapping to help students get to grips with ideas and to develop concepts themselves in the context set out by the lecturers.

It is very evident that there is a number of obstacles associated with the use of activity-based learning strategies, both in the literature and in the operation and development of this module despite the evident and much researched benefits to students. In addition to those outlined by Bonwell & Eison (1991), it was found that the facilities available were not always suitable for this type of learning, with rooms being either too large or not suitable to small group interaction. It was also felt that the additional preparation time and resources required for the successful operation of such a module is something that has to be built into the overall management of an undergraduate degree programme.

The findings however do not concur with the literature (Bonwell & Eison, 1991; Benson & Blackman, 2003) regarding the risks that students will not participate in active learning. Over the years of this research, we have never found our students unwilling to take the risk and participate in active learning. This may be because the numbers in the class are small (comparatively speaking) and that this module is introduced in the third year of the programme when students have become very familiar with one another and therefore are not afraid to participate. In addition and as already stated, students at the DIT would be very familiar with non-traditional approaches to learning (problem-based learning, project-based learning, group and collaborative learning).

Conclusions Reflections and Recommendations

- This research continues to support the idea that students that are not actively involved in a learning environment do not engage with the material or experience a deeper learning experience.

- Using an activity-based learning approach to teaching Research Methods enhances student participation and makes learning and teaching more enjoyable and easier to understand and apply.

- There are obstacles and barriers to activity-based learning such as additional preparation and assessment; support of programme management is needed for lecturers to be incentivised to undertake such an approach.

- Students at the DIT did not experience any fear of engaging with an activity-based learning approach. In fact they appeared to find it a welcome relief from the more traditional approaches to learning.

Further Development of the Research

The research on student engagement has led on to a related area of self-reflection. We are now undertaking further research into this area with the intention of incorporating this more formally into the module in the near future. We believe that this would further enhance student learning and indeed engagement. Following this research study, a recommendation has been made to School Management that a student engagement survey be carried for all modules within the programme.

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Appendix A

The following sentences discuss case studies. Read them carefully and fill in the blanks.

Appropriate answers are given below. You have 25 minutes to complete this. The answers to

the above will be discussed after the activity.

- Case studies aim to illuminate the _____ by looking at the _____.
- Case Studies allow you to study things in _____ and helping to unravel the _____ of the issue.
- The real value of a case study is that it offers the opportunity to_____certain outcomes might happen- more than just finding out what those outcomes are.
- Normally a case study is not artificially generated specifically for the purposes of the research, it _____
- While _____may be a consideration in choosing a case study, it is way down the pecking order in terms of criteria
- Case studies focus on the _____of a subject rather than the _____of the subject.
- Cases should not be selected on a _____but rather on the basis of _____. Selection _____ should be established.
- Cases should not be chosen simply because they are _____, this is a bonus.
- In particular, cases should be chosen on the basis of their _____to the research topic.
- If the subject of a case study is a group of people and they know that they are being studied, the result may not be reliable. This is known as the _____.
- Some critics suggest that a case may not be_____, that the results may be_____ to that case and that the results should not be_____.
- Sometimes a case is chosen if it is a rarely occurring event and it offers a _____to study the effect, e.g. a strike in the electricity supplier companies.
- Key Words:

unique, complexities, relevance, known attributes, generalised, depth, intrinsically interesting, criteria, explain why, unique opportunity, particular, already exists, observer effect, representative, convenience, detail, general, random basis, breadth.