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The dissertation as an effective learning experience for undergraduate students and faculty in a Construction Management Program; a reflection

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The dissertation has been regarded as an important feature of undergraduate education. This paper reports on findings from a research project that reflected upon the effectiveness of the undergraduate dissertation process of final-year Construction Management undergraduates, enrolled in the academic year 2009-2010 in the Dublin Institute of Technology (DIT) Construction Management Program. The project was undertaken to reflect upon the dissertation process from inception to completion in order to determine the effectiveness following the first year of implementation. The Kolb Learning Styles Model was applied to capture the student experiences and to provide a basis for observation and reflection. The research adopted a qualitative methodology and gathered the perspectives of students and supervisors (faculty) involved in the undergraduate dissertation process. Interviews and questionnaires were used to collect the data, which were assessed against the learning outcomes and the Construction Management Program structure. The outcomes of the reflection provide a reference for ongoing research with the aim to ensure an effective undergraduate dissertation process and a student centred learning experience in the DIT Construction Management Program.

Keywords: Undergraduate Dissertation Process, Effectiveness, Student Learning, Learning Outcomes

Introduction

"Education is an admirable thing but it is well to remember from time to time that nothing that is worth knowing can be taught." Oscar Wilde

The value of the dissertation to the student is the learning experience itself, which integrates all of the knowledge that the student has acquired on the program and enables the student to develop and demonstrate analytical, judgmental, presentation and communication skills. The dissertation process provides the student with an experiential learning experience as a direct result of the students' active participation in the process, as described by Kolb (1984). Furthermore, as part of the dissertation process the student develops the ability to analyse, evaluate, reflect and resolve a range of issues that occur during the management of the construction lifecycle.

The expression "hindsight is a wonderful thing" is often applicable for the initial implementation of a process in general and for the first year implementation of the DIT Undergraduate Construction Management Program in particular. The experience and reflection of students and supervisors (faculty) contains valuable tacit knowledge that the Program Team believes should be captured and utilised to assess the effectiveness of the learning experience and aid continuous improvement. It is for this reason that the department has undertaken a project to reflect upon the dissertation process from inception to completion, to ensure an effective reference point and a high quality for the further enhancement of this particular process within the DIT Undergraduate Construction Management Program.

The purpose of this paper is to reflect and evaluate on the dissertation as an effective learning experience for students and faculty in the DIT Construction Management Program. It aims to contribute to a discussion in published literature and attempt to identify recommendations that can help to further develop this relatively under-explored area (Todd et al, 2004).The paper is divided into three main sections, firstly a review of the available literature specifically relating to the undergraduate dissertation process. The following section provides an assessment of the relationships between the dissertation processes, the learning outcomes and the student and faculty learning experiences in the DIT Department of Construction Management and Technology. The final section of this paper sets out a discussion, recommendations and suggestions for further improvement.

Undergraduate dissertation

The dissertation provides an opportunity to student to research and produce a substantial piece of original work. It is designed to draw together all of the knowledge that the student has acquired on the program and will enable them to develop and demonstrate analytical, judgmental and communication skills. On successfully completing the dissertation the student will be able to demonstrate skills in researching primary literature, critically evaluating published information and marshalling arguments to produce a structured critical assessment of a chosen topic. According to Hemmings (2001) the dissertation is seen as the mechanism through which students construct a synthesis of theory, published studies, methodological understanding and the selection and application of appropriate research methods, analysis and discussion. The Department of Construction Management in DIT supports this view and argues that the dissertation process facilitates a student centred learning experience and encourages continuous learning. Also Ramsden (1992) argues that the undergraduate dissertation encourages a deep and vast learning experience as it expects the students to make responsible choices in the method and content of their research.

It is widely acknowledged that the undergraduate dissertation is special to both the students and supervisors. From the students' point of view, a significant component of their final-year study is an independent learning project through a dissertation. In fact, the dissertation is a substantial and the most independently worked upon a piece of work they will undertake while at the university (Webster, 2000). They are typically expected to select an appropriate topic for the dissertation and to research the topic on an individual basis, seeking advice from the faculty supervisor where necessary. Through the collection and analysis of primary and secondary data the students are expected to research and produce a substantial piece of original work. The learning outcomes of the dissertation process create and develop a valuable learning experience for students through their active participation and production of this extensive piece of work.

Despite the dissertation's status within degree courses and its perceived educational value and challenges, the reflection of the student's learning experience of the undergraduate dissertation appears to be relatively under-explored within the published research literature in the UK (Todd, 2004). In contrast, considerably more attention has been paid to student experience and tutor practices in relation to the master's dissertation and the doctoral thesis (examples of recent studies being Wright & Cochrane, 2000; Jackson & Tinkler, 2001; and Woolhouse, 2002). What does exist in the undergraduate dissertation literature appears to focus primarily on staff marking practices (Webster, 2000) rather than on the student experience of this learning activity, although an aspect of this (student perceptions of the role of the supervisor) is considered by Stefani et al. (1997). According to Gerrevall, the dissertation process in itself can be viewed in several ways; as a step in the process of change, a method of pedagogy and a preparation for continuous learning (Gerrevall, 1992).

To capture the valuable knowledge and experience of both students and supervisors (faculty) and to ensure an effective learning experience the department has undertaken a research project to evaluate and reflect upon the dissertation as an effective learning experience for students within the DIT Undergraduate Construction Management Program.

The case study

Case study research excels at bringing us to an understanding of a complex issue or object and can extend experience or add strength to what is already known through previous research. Yin defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context (Yin, 1984).

The Bachelor of Science in Construction (Management) undergraduate dissertation, which is the case study presented as the subject of reflection in this paper, took place in the 2009-2010 academic year in the Dublin Institute of Technology, Ireland. The BSc (Hons) dissertation is a 25 ECTS-credit compulsory final-year module, studied over two semesters, where candidates have a 10,000 word limit dissertation. The Final year of the BSc in Construction Management is broken down in the table 1.1 below.

Table 1.1 ECTS Credits - Bachelor of Science in Construction (Management)

Bachelor of Science in Construction (Management)	ECTS Credits
Construction Technology 4A - Sustainable Design and Build	5
Construction Technology 4B - Advanced Construction Techniques	5

Construction Management 4	5
Construction Project Finance	5
Construction Safety Management 2	5
Commercial Management	5
Construction Planning	5
Final Project	25
Total ECTS	60

Weighting for Final Project is therefore 41.66%
All other modules are weighted at 8.33%
The European Grade Transfer System (ECTS) grading scale is a grading system defined in the ECTS framework by the European Commission. Since many different grading systems co-exist in Europe.
1 ECTS credit = 20 learning hours (Total Learning Hours)
5 ECTS credits = 100 Learning Hours
Learning Hours covers all aspects of learning

The underpinning philosophy of the module is to provide students with an opportunity to take responsibility for their own learning, demonstrated through the use of the higher order learning outcomes of analytical judgemental presentation and communication skills. The total nominal learning hours expected is in excess of 500 hours. The theme of the dissertation is chosen by the student but must fall within the disciplinary framework/s of the Module Aims and the Construction Management discipline.

In the 2009/10 cohort there where 36 students in the final year programme .Each student was assigned a supervisor who had the function of providing the necessary support and direction for that student. The meeting arrangements were a matter of agreement between the supervisor and the student.
The dissertation is subject to continuous assessment through the deliverables listed in Table 1.2 below:

Table 1.2 Dissertation Project deliverables and Marks Allocation

Time line	Action	Allocation of Marks (%)
Week 1 Semester 1	Project Workshop	
Week 4 Semester 1	Student choice of project	
Week 5 Semester 1	Assignment of supervisor	
Week 8 Semester 1	Research Proposal (max 1000 words)	10
End of Semester 1	Interim report (max 2,500 words)	20
Week 10 Semester 2	Final project submission	60
Week 12 Semester 2	Presentation to Internal Examiners	10
During External Examiner visit	Presentation to External Examiners	

The assessment strategy for the dissertation was arranged into four stages:

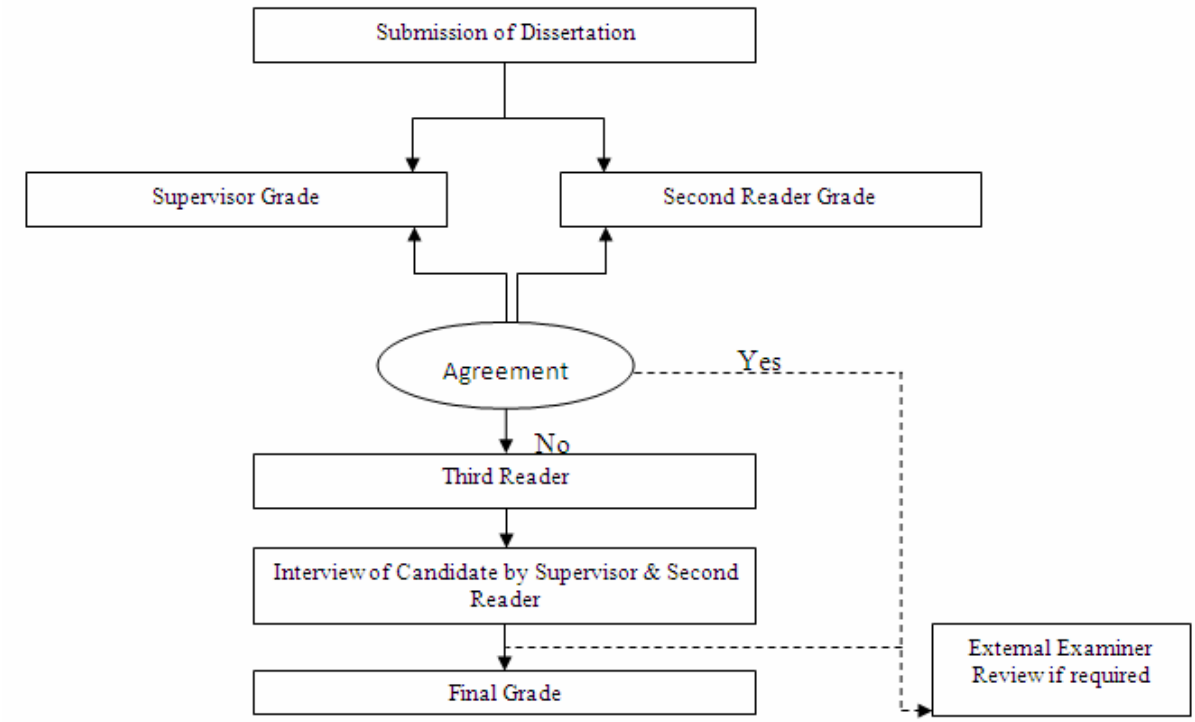
1) A research proposal, clearly identifying the topic, the relevance of its investigation, the specific objectives of the research, and the means by which the work will be investigated and presented; weighted at 10%
2) 'Interim Report' (1200 words) (on progress to date, methodology to be employed, ethical concerns for the study, literature sources, etc.) weighted at 20% both submitted during the first semester,
3) Final dissertation (10,000 words), weighted at 60% and handed in early in semester two,
4) Presentation by the student to the Internal Examiners weighted at 10%.

In preparation for roll out of this important aspect of the Construction Management learning experience the supervisory team of 10 engaged in a number of workshops in relation to undergraduate dissertation supervision. Also a detailed assessment strategy for each aspect of the assessment process was developed. (Ref Figure 1.2)

The Modular Descriptor provides the module aims, objectives, learning outcomes and provides guidelines for the students and supervisors to complete the dissertation successfully. It clearly sets out the roles of the student, the supervisor as well as timelines, content and learning and teaching methods and project deliverables.
The modular descriptor plays a central role in providing the student with a platform for further academic development in the DIT Construction Management Program. In recent years the DIT has facilitated and

resourced a number of initiatives in learning, teaching and assessment in order to move the program towards this student-centred environment and a more aligned educational process (Scott, Fortune 2008).

Figure 1.2 Construction Management Assessment Process



According to Adams the 'learning outcomes are statements of what a learner is expected to know, understand and be able to demonstrate at the end of a learning experience' (Adams, 2002). On successfully completing the dissertation module within the DIT Undergraduate Construction Management Program, the student is expect to be capable of demonstrating the ability to integrate the knowledge and skills gained on the programme for the previous three years. With this in mind the student can analyse, evaluate and resolve a range of issues that occur during the management of the construction lifecycle.

The role of the student begins with the student choosing a topic appropriate to the aims of the module and to research the topic, seeking advice when necessary. The student is then expected to prepare a plan of work and to endeavour to comply with the plan and complete each of the assessment stages on time.

The supervisor shall act as a guide to the student in the choice of topic and to provide advice on the sources of relevant research material and to advise the student on the work involved in each of the stages of the project. The supervisor will also endeavour to help the student prepare a plan of work for carrying out the research project and to meet regularly with the student to monitor progress and to review the plan of work.

The supervisors assess the students work through all stages of the process and refer to the Assessment Matrix for clear, detailed and acceptable grading guidelines. The Assessment Matrix also ensures consistency and quality of the dissertation module assessment and that all supervising staff are "singing from the same hymn sheet" within the Department.

The module will begin in September with a seminar / workshop designed to fully brief the student and to impart an understanding of the objectives of the unit and the method of assessment. A detailed presentation will be given on 1) the process of supervisor selection, 2) the role of the supervisor, 3) the relationship between student and supervisor, 4) submission requirements and regulations.

Study design

The purpose of this research was to evaluate and reflect upon the effectiveness of the undergraduate dissertation process in the DIT Construction Management Program. To do this it is important to capture the experiences of the students, supervisors (faculty) involved in the undergraduate dissertation module for the academic year 2009–2010. The criteria applied to measure the effectiveness of the DIT undergraduate dissertation process were related to the Kolb Learning Styles framework in order to capture the student experiences and to provide a basis for observation and reflection. The effectiveness and quality were assessed against the learning outcomes which are set out in the Modular Descriptor for the undergraduate dissertation module with code CONS4008.

The effectiveness in the context of this research project is defined as the ability of the undergraduate dissertation process to accomplish its purpose and learning outcomes. Kolb states that ideally this process represents a learning cycle where the learner 'touches all the bases'; a cycle of experiencing, reflecting, thinking, and acting. Immediate or concrete experiences lead to observations and reflections. These reflections are then assimilated (absorbed and translated) into abstract concepts with implications for action, which the person can actively test and experiment with, which in turn enable the creation of new experiences (Kolb, 1984).

The research study undertaken was small in scale and exploratory in nature. The project involved two main points of data collection:
1. Self-completion postal questionnaire to students
A self-completion questionnaire was designed and administered to all 36 of the students taking the dissertation module, with responses received from 27 of the 36 students (75% of the complete sample). The questionnaire consisted of 5open questions covering a range of topics related to the dissertation.
2. Staff interviews
A semi-structured interview was conducted with six members of staff who were all dissertation supervisors within the DIT Construction Management Program. The interview questions for the supervisors reflected the questions in the student's questionnaire in order to compare and contrast and to "unveil both sides of the coin". The length of the staff teaching experience in higher education ranged from 5 to 20 years, with specific experience supervising undergraduate dissertations ranging from 1 to 20 years.

The data from the interviews and questionnaire were analysed by the authors. The aim of the analysis was to identify themes and clusters within the student experiences and compare them to the expectations and experiences of staff. From the analysis of the data a picture emerged about the students' experiences of the dissertation process.

Analysis and Findings

The aim of the undergraduate dissertation process is for the student to have acquired the necessary skills to:
1) Integrate the knowledge and skills gained from the Construction Management Program in its totality to date
2) Analyse, evaluate and resolve construction related issues that occur during the management of the construction lifecycle.

The majority of the students identified that they expanded their knowledge through the dissertation process. They felt they gained a better understanding of the chosen topics which would be beneficial for employment in the industry. Some went on to say that they were interested to study their chosen topic further in the future. The responsibility of the students is to research a topic in the manner required and to seek advice where necessary. A large number of students reported that they had enhanced their analysing and researching skills. Furthermore, the students highlighted that the dissertation process assisted them with improving their ability and skills to review and summarize the available literature and information.

> *The thesis was a very good way of expanding knowledge and how to manage time and information* - D06770479
> *I have improved my skills of summarising and critically analysing somebody else's work* - D06110562

The role of the students is to prepare a plan of work and to endeavour to comply with that plan. The students commented on improvements of their time management and organisational skills. Due to the individual nature of the dissertation assignment and the relative complexity compared to other modules in the programme the students were dependent on their own abilities to manage their time and work load. Also, many students identified additional benefits of the dissertation module such as report writing skills and a great sense of attainment.

Very good way to expanding knowledge and how to manage both time and information, which are probably the two most important aspects - D06370281
A great feel of achievement in completing a thesis and the research was very interesting - D06379953

The role of the supervisor was primarily to guide the students in their choice of topic, provide advice in each of the stages of the project and help the students prepare a plan of work for carrying out the research project. The student feedback was very positive about the supervisor assistance and guidance provided. In addition, the project proposal and interim report were considered to be reminders to keep the students on track. The student satisfaction was also high in relation to the preparation seminar/workshop provided by the head of the department at the start of the dissertation module. The workshop and additional tutorials provided by supervisors and lectures were also perceived to be helpful.

The Thesis tutorial lectures throughout the year were very helpful as they kept me focused. . - D06349911
The fact that I had a tutor to guide me in the right direction, when I was going off track. - D06479934

The primary learning method of the dissertation module is the research carried out by the students themselves as part of the compilation of the project. Although most students reported challenges at some point during the dissertation process the feedback was mainly positive and referred in various ways to a great sense of personal achievement. The majority of the students found the dissertation process a very worthwhile learning experience that would be very useful to them in the future. In addition, the students believed the process was a real opportunity to learn.

A great feel of personal achievement - D06543991
Very worth while project. Gives you a chance to study and learn. It has helped me focus my mind on what I would like to do after I graduate. - D06559958

The supervisors identified the dissertation project as a tremendous learning experience for the students. The project offers the students an opportunity to consolidate the program and put their learning into an academic context. All the supervisors believe that the dissertation project is a valuable contribution to the overall student learning experience and that a wide range of sources of research available to the students, including web courses and the teaching and learning centre was very helpful to the students.

Valuable contribution to the overall student learning experience - Supervisor

The supervisors realize that the project is a first attempt for the students to undertake research. Most students do not understand the amount of work or size of their project at the start, which causes challenges for the students in planning their project workload. The supervisors highlight in particular the second semester where another 'big' project is taught in tandem with the dissertation project. The supervisors indicate that they continuously advice their students that 'organisation is the key'. Overall they believe that the increased workload offers the students an opportunity to learn to cope with setbacks and developing alternative strategies.

Most students do not realise the importance of the thesis no matter how many times they are told - Supervisor

The supervisors believe that although the dissertation process is a new process for the DIT Construction Management Program, it is considered a well structured process. They emphasised that the dissertation process steps are logical and the deliverables are spread evenly within the project. Also, the supervisors highlighted that the workshops for them in relation to the undergraduate supervision was beneficial and in particular the supervisors' log book was mentioned to be very helpful. However for some supervisors the preparations for the new dissertation process could have started earlier.

Documentation was relevant and detailed - Supervisor

The supervisors indicated that some of the students were (much) more dependent on the supervisor guidance than others. The students would request more help with the choice of their dissertation topic, the sources of the relevant research materials, their project planning and a lot of advice during the dissertation project. The students' dependence on the supervisor guidance requires a lot of commitment and involvement from the supervisors, especially in the students' final year.

Some students are more demanding of lecturers time than others (and not always the weaker student) - Supervisor

Reflection and Recommendations

"What we have to learn to do, we learn by doing" - Aristotle

The key findings of the research suggest that the students belief that the overall dissertation process was indeed a very worthwhile learning experience and an excellent way of expanding their knowledge in their chosen subject area. The feedback, comments and recommendations reflect the students' satisfaction with the process, and their overall learning experience throughout the module. However, the research also highlighted a number of challenges for students. The main issues that some of the students experienced were in relation to the students' inability to assess and determine their research topic at the first stage of the dissertation process. The challenge to generate a research question can be a problematic area of the dissertation process for the students. This phenomenon has been described by Meyer and Land (2003) as liminality. Also Silén (2003) identified issues for students with the process of coming to terms with new ideas.

One of the proposed ideas to address the challenges is to enable students to gain experience with the research process earlier in their degree course in the form of projects, which in turn could help to increase their understanding and even self-confidence to reduce the challenges during the dissertation in the final year (Hemmings, 2001). Although this is a reasonable and valid suggestion, it may actually be more useful to the students to present the dissertations in its current format in the final year. The learning outcomes of the dissertation are outlined for the students as the ability to integrate the knowledge and skills gained on the program and analyse and evaluate a range of issues. It could therefore be argued that this type of learning experience could actually only be achieved at the final stage of the students' course program. Furthermore, Kolb (1984) states that an effective learning process for students should follow an experiential learning cycle that includes experiencing, reflecting, thinking, and acting. The nature and size of the dissertation provides the student with that complete and individual experiential learning experience. The actual value of the dissertation to the student is that learning experience itself, through their active participation during the dissertation process to develop and demonstrate analytical, judgmental, presentation and communication skills. Also Ramsden (1992) argues that the undergraduate dissertation encourages a deep learning experience as it expects the students to make responsible choices in the method and content of their research.

The significance of the dissertation project also posed problems for students, in particular in relation to time management and organisation skills. The dissertation is the most substantial piece of work that the student independently works on during their final academic year at the university (Webster, 2000). The difficulties experienced by many undergraduate dissertation students in managing their time effectively are due to the relatively unstructured format of the dissertation and constitutes a major challenge for students at this level (Todd, 2004). The learning outcomes of the dissertation set out for the students to be able to integrate the knowledge and skills which they gained on the program to date in order to research, evaluate and resolve a range of issues that typically occur during the management of the construction lifecycle. Furthermore, the student is required to plan and execute the research, the analysis and the presentation of their report on successful completion, according to this plan. Therefore it is an inherent part of the students' learning experience to bring structure in the unstructured research materials and sources and to determine its relevance to their chosen research topic.

The key issue for the supervisors is to develop a balance between student freedom, to engage with all the stages of the experiential learning cycle and the program structure to provide guidance, support and training to the students (Hughes, 2002). It can be argued that it would potentially be counterproductive to over-emphasize the teaching and learning strategies employed by supervisors, as it could reduce the student centred learning experience, the student's independence and might also curb the originality of the research undertaken (Todd, 2004). The supervisors (faculty) believe that the dissertation project is a valuable contribution to the overall student learning experience and the belief is that a well structured process facilitates the dissertation for the students, especially when the project deliverables are spread evenly within the project. Although the faculty realize that the project is a first attempt for the students to undertake research, overall the findings support the belief that the significant workload offers the students an opportunity to learn to cope with setbacks and developing alternative strategies. The supervisors (faculty) also commented on the assessment of the dissertation project being based on a marking scheme whereby available marks are awarded following specified assessment criteria that result in a final grade. Although the supervisors agreed that much work was originally put into

getting a high level of consistency in the marking scheme, some suggested to change the assessment strategy from a grade based system to a more formative assessment system.

The key issue for practice is developing a balance between freedom and structure, enabling student autonomy while also providing contact, support and training (Hughes, 2002). This paper is based on the early findings of a research project that is attempting to reflect upon dissertation practice on an undergraduate programme and evaluate if the learning experience has been effective for both student and faculty. Albeit that evidence is based on only one cohort so far, there is encouraging evidence that all participants believe the dissertation learning experience to be effective. Going forward the Program Team need to reflect on the overall experience and refined certain areas within the process in order to develop and enhance the dissertation learning experience to full potential for both student and faculty. Some recommendations put forward for consideration are to remove or amend the interim report, appointment of supervisors at a much earlier stage of the process and address good academic writing much earlier in the overall program as good academic writing is the key. Finally it was noted upon reflection on the feedback that the number of assignments to be submitted at the same stage as the thesis was too large and recommend a more staggered system.

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