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An evaluation of how academic student engagement can be enhanced in agricultural education

A Thesis submitted to the National University of Ireland for the Degree of Doctor in Philosophy

By

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Table of Contents

Table of Contents	1
Declaration.....	3
Acknowledgements	4
List of Tables	6
Thesis Abstract.....	7
Chapter 1: Introduction.....	9
1.1 Introduction	10
1.2 The evolution of vocational agricultural education in Ireland.....	10
1.3 A paradigm shift towards the use of student centred learning approaches	14
1.4 The learning needs of young farmers are changing	16
1.5 Rationale for research	18
1.6 Research questions & Research Objectives	20
1.7 Study Methodology	21
1.8 Reflexivity Statement.....	22
1.9 Utility of the study.....	24
1.10 Thesis Structure.....	25
Chapter 2: Literature Review	27
2.1 Introduction	28
2.2 Agricultural education in Ireland.....	28
2.3 History of agricultural education in Ireland	28
2.4 Formal Agricultural Education in Ireland	30
2.5 Vocational education – Teagasc.....	31
2.6 The economic returns of formal agricultural education	32
2.7 Approaches to agricultural education.....	34
2.8 Theories of learning	36
2.9 The cycle of experiential learning	37
2.10 Learning styles.....	38
2.11 Learning space	39
2.12 Creating space for learning and development.....	40
2.13 Student Centred Learning approaches	43
2.14 How Universal Design for Learning can be integrated.....	45
2.15 Chapter Summary	47
Chapter 3: Methodology	48
3.1 Introduction	49
3.2 Methodology – Action Research Project	49
3.3 Philosophy of social research.....	50

3.4 Ethics in social science research	52
3.5 Research methods & Organisation of the study	52
3.6 Phase 1 – Exploratory phase.....	52
3.7 Phase 2 – Action phase	56
3.8 Phase 3 – Evaluation and reflection phase	57
3.9 Data analysis	58
3.10 Ethical considerations and approval	59
3.11 Summary of chapter	60
Chapter 4: Results	61
Enhancing academic student engagement in vocational agricultural education; Why Course Design matters.....	62
Chapter 5: Results	83
The value of using classroom observations as part of a multi-methodological approach to evaluate student engagement in vocational agricultural education	84
Chapter 6: Results	112
Examining course design barriers to implementing student centred learning approaches to enhance academic student engagement	113
Chapter 7: Discussion	138
7.1 Introduction	139
7.2 Objectives of the study	139
7.3 Summary of methodology.....	140
7.4 Summary of key findings pertaining to each objective	144
7.5 Discussion of research findings and implications	145
7.6 Recommendations	149
7.7 Chapter Summary	151
References.....	152
Appendix 1: Classroom Observation Schedule Phase 1 & 2	162
Appendix 2: Phase 1 – Teacher Focus Group Guide	169
Appendix 3: Interview Guide for Educational Specialists - Phase 1	180
Appendix 4: Student Focus Group Guide - Phase 1.....	186
Appendix 5: Teacher Interview Guide – Post Pilot Module - Phase 2	194
Appendix 6: Student Focus Group Guide – Post Pilot Module - Phase 2.....	197
Appendix 7: Student Survey – Post Pilot Module - Phase 2	205
Appendix 8: College Management Interview Guide - Phase 3.....	208
Appendix 9: Teacher Survey - Phase 3	218
Appendix 10: Desk Analysis and Documents.....	227
Appendix 11: Information Leaflet for participants - Phase 1, 2 & 3	232
Appendix 12: Participant Consent form - Phase 1, 2 & 3.....	235

Declaration

I hereby certify that the submitted work is my own work, was completed while registered as a candidate for the Degree of Doctor of Philosophy, and I have not obtained a degree elsewhere on the basis of the research presented in this submitted work.

Kevin Cunningham

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List of Figures

Figure 1.1: The cognitive domain of Bloom's Taxonomy.	5
Figure 2.1: Timeline of the agricultural colleges formed from 1900-1988	18
Figure 2.2: Schlecty's Levels of Student Engagement	23
Figure 2.3: The four modes of experiential learning	26
Figure 2.4: The nine learning style typologies	27
Figure 2.5: The five dimensions of learning space	28
Figure 3.1: Conceptual framework for this study	39
Chapter 4 - Figure 1: Schlecty's Levels of Student Engagement	52
Chapter 5 - Figure 1: Conceptual framework for this study	74
Chapter 5 - Figure 2: A description of the four types of modules observed	78
Chapter 5 - Figure 3: General information gathered on observation schedule	79
Chapter 5 - Figure 4: Observation schedule ratings: Course Design - Module content	82
Chapter 5 - Figure 5: Observation schedule ratings: Teacher	82
Chapter 5 - Figure 6: Observation schedule ratings: Environment	83
Chapter 5 - Figure 7: Observation schedule rating: Behavioural student engagement	83
Chapter 5 - Figure 8: Transformation of conceptual framework post phase 2	85
Chapter 6 - Figure 1: Schlecty's Levels of Student Engagement	103
Figure 7.1: A description of the four types of modules observed	132

List of Tables

Chapter 4 - Table 1: A description of the four module types	54
Chapter 4 - Table 2: Phase 1 - Classroom observation results	58
Chapter 4 - Table 3: Phase 2 - Classroom observation results	58
Chapter 4 - Table 4: Results of ratings in student survey	58
Chapter 4 - Table 5: Results of qualitative answers from student survey	59
Chapter 5 - Table 1: Phase 1 - Classroom observation results	84
Chapter 5 - Table 2: Phase 2 - Classroom observation results	86
Chapter 5 - Table 3: Results of ratings from student survey	87
Chapter 5 - Table 4: Results of qualitative answers from student survey	87
Chapter 6 - Table 1: Course Aims & Outcomes of Level 5 Certificate in Agriculture	107
Chapter 6 - Table 2: Ratings of Course Aims & Outcomes from staff	108
Chapter 6 - Table 3: A breakdown of learning outcomes on the Level 5 Certificate in Agriculture	110
Chapter 6 - Table 4: A breakdown of the assessment strategies and marks associated with each strategy on the Level 5 Certificate in Agriculture	110
Chapter 6 - Table 5: Results of the analysis of Theory Examinations based on the Cognitive domain of Bloom's Taxonomy	111
Chapter 6 - Table 6: Course Structure - Modules on the Level 5 Certificate in Agriculture	113

Thesis Abstract

The purpose of this study has been to evaluate how academic student engagement could be enhanced within vocational agricultural education in Ireland. This was identified as an issue that needed to be addressed by the Department of Education and Skills as part of whole college evaluations of vocational agricultural courses where Teagasc fund the delivery. This study was a response to this issue and has led to several key findings that education providers, including Teagasc, need to consider when attempting to enhance academic student engagement. A critical finding from this study has been the importance of 'Course Design' in creating an authentically engaging learning experience for students. The 'Course Design' is especially important when considering implementing an engaging teaching approach such as a student centred learning approach.

In 'Course Design', being able to constructively align learning outcomes, activities and assessments with a student centred learning approach is vital for creating an authentically engaging learning experience for students. Findings from this study have shown that currently, in Teagasc, the 'Course Design' does not constructively align with student centred learning. This study adopted an action research design and in phase 1, investigated why academic student engagement was low with the conventional teaching approach being evaluated. Based on a combination of classroom observations, a focus group with teachers and a focus group with students, the key finding was that students struggled to engage with one type of module i.e. 'Core Modules', the most. This suggested that 'Course Design' was playing a critical role as all students undertook these modules and these modules also had the largest size classes with 50-70 students. Classroom observations on this type of module found no observed class categorised as 'High Engagement' (0/16 of the 'Core Module' classes observed). In addition, data gathered from focus groups with teachers highlighted the lack of flexibility in the design of modules, with teachers citing learning outcomes, assessment strategies and the quality assurance process as constraints. The student focus group highlighted that students lacked an intrinsic motivation to be interested in 'Core Modules', combined with the lack of interest in being 'lectured to' excessively as part of these modules.

Phase 2 involved taking action on these findings and the design of an intervention through a pilot module attempting to use a student centred learning (SCL) approach. Problem Based Learning was identified as a suitable SCL approach that could be implemented in an attempt to enhance academic student engagement compared to phase 1. A course redesign was used to develop the pilot module to attempt to align with PBL. For this, two types of modules were combined together to integrate two key areas of the course; a 'Transferable Skills Module' with a 'Core Module' in an attempt to encourage students to link aspects of the

course together i.e. using their problem solving skills within a problem based on the 'Core Module' content. This pilot module resulted in a substantial increase in the number of classes categorised as 'High Engagement' with 88% rated as high (21/24 classes observed categorised as 'High Engagement'). Despite this positive result from phase 2, there were still a number of issues and conflicts with the 'Course Design' that arose during the pilot module. The researcher adapted to a number of obstacles presented to this pilot module and both the teachers and students highlighted how this impacted them in interviews with teaching staff on the module, a student survey and two student focus groups. It was important to reflect on this and phase 3 represented an investigation into these issues and conflicts.

Phase 3 represented the evaluation phase of this action research project. This aimed to evaluate why the current course design creates barriers to using student centred learning approaches. Three key research methods were used to evaluate the current course design; interviews with college management (n=12 – 100% response rate), a survey with teaching staff (n=31 – 45% response rate) and a desk analysis of the current course design (carried out by the author). Four key aspects of 'Course Design' were analysed and compared against a student centred design; 1) Course Aims and Outcomes 2) Module Design 3) Course Structure 4) Course Organisation. The key findings from this phase highlighted that the course structure and module design need to be redesigned to align with a student centred learning approach. These are two aspects of 'Course Design' that are more complex to change which means they will also take longer to make changes to. In addition, it also does not mean that the 'Course Aims and Outcomes' and 'Course Organisation' are not important, they still play a vital role. They do however, need the course structure and module design to support the use of student centred learning. This highlights not the importance of any individual aspect of 'Course Design' rather how these four key aspects work together. These could be considered key implications for not only Teagasc Education but also any education provider in the vocational sector (further education). The principles of 'Course Design' outlined in this study, teaching approaches and constructive alignment are transferable to those delivering courses in vocational (further) education and could also be considered by those delivering courses in higher education.

Chapter 1: Introduction

1.1 Introduction

The purpose of this research is to evaluate what actions could be taken to enhance academic student engagement in vocational agricultural education in Ireland, specifically within Teagasc. Teagasc is a semi state national body providing integrated agricultural research, advisory and training services such as further education in agriculture, food, horticulture, forestry and equine studies in Ireland (Teagasc, 2017). From 2013 to 2016 the Irish Government's Department of Education and Skills (2020) carried out whole college evaluations of both the state owned and state aided agricultural courses funded by Teagasc. These "whole college evaluations" were carried out over 4 days and sought to understand a student's overall experience in colleges delivering Teagasc courses. These evaluations looked at three key areas in each college: (1) the quality of management and leadership, (2) teaching and learning including the quality of care and support for students, and (3) the self-evaluation process. Based on these evaluations, several strengths, areas for improvement, and main recommendations were made for each college. One common theme amongst all colleges was that student engagement in classroom settings was an area that could be enhanced through discussion, sharing of practices (within and between colleges), and action research. Practical aspects of the course were also evaluated but were not identified as an area where engagement was an issue. Several research topics were formed as a result of these reports: teacher training, student supports, work placement, and this research project was developed as a result of these evaluations. The focus of this study was the issue of engagement in classrooms to evaluate if and how engagement could be enhanced.

In Ireland, agriculture contributes 7.7% of the total working population which represents about 173,000 people (DAFM, 2019). While not the largest sector within Ireland its importance cannot be underestimated in providing valuable food sources and being an important aspect of the country's exports. A critical part of providing workers for this sector is the vocational and higher education courses which prepares graduates to work in a variety of areas in the agricultural industry. The provision of agricultural education and specifically vocational has evolved since the early 1800's into what it is today. Ireland has invested in the provision of agricultural education and this has seen the sector repay this with increased levels of production that farmers are now able to produce.

1.2 The evolution of vocational agricultural education in Ireland

Vocational training for agriculture in Ireland can be traced back to the early 1800's where a local rector in Bannow, County Wexford established a model farm and agricultural school. This was seen as an efficient way to illustrate the advantages of farming innovations (Banks et al., 2007). This principle of a model farm and agricultural school stands true today within

vocational education delivered by Teagasc, although a number of changes have occurred since its inception. The history of vocational agriculture education has been influenced by the state and its policies which have enabled enhanced agricultural production in Ireland. As part of these initiatives state agencies have been formed over the years to assist farmers adopting best practices by funding agricultural research, advisory and education over this time. Today, advisory, research and education are the three main agricultural services provided under the umbrella of Teagasc (Teagasc, 2019).

Significant investment by the state to modernise vocational agricultural education was seen throughout the early and mid-1900's by investing in state owned and state aided agricultural colleges. Today there are a total of six agricultural colleges delivering agriculture courses and a further college which specialises in horticulture and sports turf courses. When Ireland joined the EEC (now known as the EU) in 1973 there was shift in policy towards the open market in the EEC. This resulted in Irish farms, mainly in the east of the country moving away from the traditional mixed systems towards large commercial farms focusing on more specialised aspects of farming (Banks et al., 2007).

In support of this desire to increase production levels by specialising in a particular farming system, the education and extension systems played very important short and long term roles. During this period Ireland began to reform agricultural education. In 1964, the Farm Apprenticeship Scheme was created which later reformed in 1984 after joining the EEC when the 'Certificate in Farming' also known as the 'Green Cert' was established (Banks et al., 2007). This was perhaps one of the most significant reforms as it represented the standardising of agricultural qualifications which could be gained in any state owned/ state aided agricultural colleges or regional centres. Vocational colleges established in the early 1900's saw further investment in the late 1900's (Banks et al., 2007). The uptake of the Certificate in Farming course (Green Cert) was high due its accessibility to farmers and the incentive of concessions on stamp duty and inheritance tax on completion of the course (Banks et al., 2007). For students attending an agriculture college full time there was accommodation available on site if required. The course included work placements on a farm in Ireland or any European country, followed by part time course work and a period of part-time work on a farm over a three year period. The format of this course has been reviewed, reformed and has evolved but the principle of vocational agricultural education still holds true within Teagasc today.

Traditionally over this period of time education was regarded as a process of transferring knowledge from a teacher to the students. This was due to the fact that the level of farmers' technical knowledge was low at the time and required improvement through education,

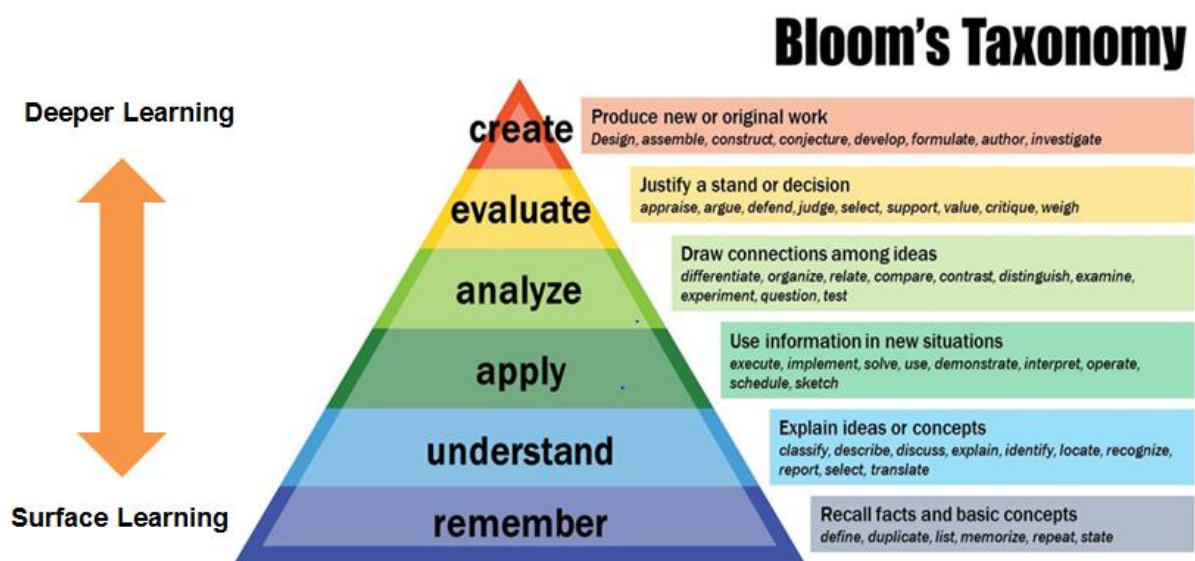
advisory and research to support this. Since the 1980's and to the present day there is the use of; demonstrations utilising the on farm facilities, livestock and up to date machinery, the farming systems on the college farm, science based farming practices, laboratories, classrooms and on site accommodation. These were utilised to transfer knowledge and skills of best practices to students which relates to a behaviourist theory of learning. This has been described from the literature as an authoritarian, teacher-centred and outcome-based form of learning. Within a teacher centred approach the teacher is seen as the holder of knowledge and controller of the learning environment, with students as passive recipients i.e. empty vessels to be filled with knowledge (Ertmer & Newby, 2013; Stewart, 2012). An issue with this approach is the retention of learning as there is an emphasis on short term attainment of the learning outcomes covered by the teacher in order for it to be regurgitated in an exam with less consideration for long term learning (Biggs, 1999; Boyer, 1990; Crosby, 2000). This teacher centred approach to education whereby the teacher is in control of the learning and the student is more passive in their learning limits the learning and potential for a student to develop from their education. Previously, the approach enabled the upskilling of current and emerging farmers about the best farming practices. However, the demand of education has shifted again to a stage where students not only need to understand information and skills, they now need to know how to interpret, evaluate and take action based on reliable sources of information. If a teacher centred approach continues to be used there is an increasing suggestion from the literature that this would lead to disengagement whereby students may become uninterested, rebellious or just generally not motivated to learn the material presented to them (Schlechty, 2001). Facilitating the student to become more actively involved in their learning has a strong correlation with a deeper learning, more authentic engagement and higher academic achievement (Groccia, 2018; Huff et al., 2016; Saeed & Zyngier, 2012; Wijnia et al., 2011).

In addition to the whole college evaluations of Teagasc agricultural courses that identified engagement as an issue, the Irish Department of Education and Skills emphasised this in a review of third level education in 2011; the need '*... to stimulate active, not passive learning, and to encourage students to be critical, creative thinkers, with the capacity to go on learning after their college days are over.*' (Department of Education, 2011). This highlights that the role of the student needs to change and become more active in their learning. This means an emphasis on the development of a student's ability to become self-directed, independent and autonomous learners (Deci & Ryan, 2008; Lea et al., 2003).

This shift in thinking on approaches come from the cognitivist, constructivist and social learning theories, where when combined together, form the basis of a student centred learning approach. Cognitivist revolves around the theory of how humans process

information and what type of approaches can be used to optimise processing. This research found that humans develop the ability to deal with more complex information, skills and competencies as we mature and get older. How information is processed by students at vocational level is critical in triggering how students think and process information. It was shown by Piaget that the process of learning should be active, as active construction correlates with higher retention and understanding of a subject or a topic being studied, compared to the learn and reproduce method of a behaviourist approach (Stewart, 2012). The taxonomy of educational objectives developed by Bloom (1956) provides practical value to teachers in understanding the structure of cognitive skills (See Figure 1.1), development and in formulating learning objectives in course design (Stewart, 2012). In addition to the cognitivist theory, there is a link to constructivism whereby learning is enhanced when a person or student is asked to actively construct their own understanding of knowledge. With this shift in understanding of learning, the teaching approach and a teacher's role needs to align with this. A teacher changes to a facilitator of learning by; guiding, providing scaffolding to learning i.e. the skills and competencies and repeating the process to allow for practice and improvement. Finally, the understanding of social learning theory helped to understand how this dimension not only influences our learning, but also how to incorporate it into a teaching approach (Ertmer & Newby, 2013). This learning process involves engaging with 'communities of practice' which refers to differing situated contexts in which individuals experience learning. This refers to community formation, creating a collaborative learning environment and space to share actively constructed understanding. These three theories underpin a student centred learning approach and represents a paradigm shift that has occurred in education.

Figure 1.1: Below is an infographic explaining the cognitive domain of Bloom's Taxonomy.



1.3 A paradigm shift towards the use of student centred learning approaches

A student centred learning approach gives the student more responsibility, accountability, choice, autonomy and an opportunity to work with their peers with the teacher changing their role to act as a facilitator (Lea et al., 2003; O'Neill & McMahon, 2005). A prime example of the use of student centred learning can be traced back to McMaster Medical University Canada in 1960 (Masek & Yamin, 2011). Here the Medical education course implemented a Problem Based Learning (PBL) approach (a student centred learning approach) whereby students would be given the scenario of a patient's case and asked to investigate the case from diagnosis to treatment plan using best medical practice. So instead of students learning this material in theory they were asked to apply theory in practice by evaluating a case (problem) presented to them and creating a solution for the patient. This is representative of a real life task for medical students in their future career which is a key characteristic of 'the problems' used in PBL. Problem based learning (PBL) as defined by Merritt et al. (2017) is:

...a teaching/ learning experience that provides students with problems before they receive any instruction.

Four key characteristics of PBL are; 1) The problem 2) The PBL tutorial 3) The PBL process 4) Learning (Barrett, 2017). From here, students follow the key steps associated with PBL to enable them to learn the process to completing these tasks or finding a solution to the problem. In short, a problem does not necessarily mean there is one particular solution or a right answer and as important as the task or problem is the process students follow to come up with a solution or complete the task they are assigned is just as important. This relates to the process and product model of education (Knight, 2001; Neary, 2002) and in PBL there should be an equal weighting of assessment marks for both the process and product. This targets a student's extrinsic motivation to learn as students are commonly known to chase the marks in education (Hussey & Smith, 2003, 2008; Maher, 2004). By designing assessments to reward students for the process (tasks they do in order to learn) as much as the product (what they learn) helps students to see the reward and value in following the process to complete a relevant and real life task (Knight, 2001; Neary, 2002). Another key concept which plays a critical role is a student's motivation to learn; intrinsic and extrinsic motivations. Students who are intrinsically motivated to learn are genuinely interested in learning about the subject so will want to study it and work on skills in relation to it. Extrinsically motivated students are those who learn out of necessity i.e. to satisfy parent's expectations, to pass a module, acquire a degree or certificate, for a reward for doing well etc. (Huff et al., 2016; Saeed & Zyngier, 2012). Extrinsic motivation can be used and balanced with intrinsic motivations in the design of a course. Critical to this is how

assessments are designed as they need to try to intrinsically motivate students through the task they are assigned.

It is understandable to see how this can be beneficial for medical education as students are presented with a patient's case and asked to follow the PBL process to come up with an evidence based treatment for that patient. This is something which they will face most likely on a daily basis in their profession but this can and has been transferred to a number of other professions. Student centred learning has been adapted into a variety of areas in third level education nationally and internationally; Nursing, occupational therapy, a variety of engineering degrees, law and a variety sciences including agriculture. The benefit is that students can be authentically engaged in all 3 dimensions of student engagement; Cognitive, behavioural and affective (Groccia, 2018). A variety of studies have shown the benefits of various aspects of student centred learning, such as; A more active learning style which has shown a strong correlation to higher academic achievement and student retention rates (Freeman et al., 2014), a PBL approach which led to deeper learning for students (Wijnia et al., 2011) and in vocational and further education in Ireland, the increased level of engagement in educational tasks students were assigned (McCabe & O'Connor, 2014; Monks, 2010). A common thread with employers and industries which have grown significantly is that students need to have skills and competencies beyond the technical skills necessary for particular jobs of which the agriculture sector is no different. Students are increasingly being asked to develop their transferable skills and competencies. Their education can enhance the development of these through student centred learning with tasks designed to help students develop relevant skills and competencies. Agriculture is seeing a shift in the skills and competencies required for farmers with innovation, strengthening the economical standing of a farm, sustainability and environmental considerations featuring prominently.

For this study on classroom engagement in vocational agricultural education, the literature on Universal Design for Learning (UDL) was also considered. UDL is a principle based approach to designing teaching and learning to meet the learning needs of all students (Ref – UCD book on UDL). 'All students' is an inclusive term recognising students with different learning styles, different levels of competence in the area being studied, from various backgrounds and includes how the content within a course can be effective at providing supports for those who require learning supports in a variety of ways (McGuire & Scott, 2006). Now more than ever, further and higher education has a growing diversity within its students population and the principle of UDL is to support this diversity through course design; including content, activities and assessments. McGuire & Scott (2006) outline nine

principles of universal design for instruction which offers guidance on strategies which can be adopted which will benefit a variety of learning styles, students from a variety of backgrounds and if students have any learning supports. To adopt these principles requires more than just effort on part of the teacher or lecturer, it requires a college, programme/course management, teaching staff and support staff to work together to implement these principles and create a UDL environment. This type of strategy is recommended within any college setting including within the realm of agricultural education provided by Teagasc.

While UDL is critical in creating a well-designed learning environment to support a diverse student population it doesn't necessarily align to any particular teaching approach. This is not a shortcoming of UDL, it is a positive and flexible principle which can be adopted regardless of whether a more teacher-centred or student-centred learning approach is being used. UDL is a principle aimed at providing a more inclusive learning environment which should enhance student engagement but this would be an indirect consequence of its true purpose: recognising the needs of the diverse learner population in a given context (McGuire & Scott, 2006). This clear distinction led to the decision in this study to focus on SCL teaching approaches and evaluate whether these are capable of enhancing academic student engagement within this context.

In tandem with this study, a separate postgraduate study was conducted around student supports which included a focus on UDL. This also influenced the decision in this study to focus on testing a SCL approach within this context and allow the other postgraduate study explore the topic of UDL for Teagasc.

1.4 The learning needs of young farmers are changing

A growing global population approaching nine billion globally has not only led to the increasing demand on agriculture to meet these requirements but also the need to become more sustainable; socially, environmentally and economically (Brennan et al., 2016). This represents a major challenge as the quantity of land globally is limited and the negative impacts on agricultural land need to be considered to meet this demand. Agricultural practices going forward need to consider the negative impacts which it has or can have on biodiversity, flora and fauna, air quality, water quality and climatic factors rather than the main focus being on optimising production levels or yields (Brennan et al., 2016). These environmental factors can be impacted negatively when expansion occurs as there can be an absence of knowledge, best practice and innovation. Going forward the presence of educational courses which teach students best practice and develop their ability to comprehend the impact of changes or expansion on their farm are essential (Brennan et al.,

2016). It is critical that Agri-food systems are positioned within sustainable farming practices (Herrera-Reyes et al., 2018). Agricultural education, extension and research do and will play key roles in achieving this. The importance of these findings, in relation to this study, is that education can influence how it prepares the future and current workers within the agriculture sector with full-time, part-time and short education courses.

As important as it is to provide agricultural education regarding sustainable agricultural practices, it is of equal importance as to how this is carried out. Deci and Ryan (2012) describe self-determination theory as requiring three basic human needs in order to satisfy the psychological needs of humans; 1) Autonomy 2) Competence 3) Relatedness. Autonomy satisfies the control of the learner as they become more responsible for their learning by choosing the best way they feel will help them achieve a goal (competence). This is done with a task which is relevant to them and this meets a human's psychological need. Student engagement is another theory embedded in psychology and self-determination theory (SDT) forms the foundation of providing an authentically engaging learning experience (Groccia, 2018). SDT is prominent within the realm of agricultural extension work to encourage clients to actively learn with guidance not only from their advisor but also their peers. In Ireland, this is used in discussion groups where farmers with similar farming systems come together to learn from their advisor and peers so that each person in attendance can relate to that farm in some way. SDT can be utilised within education and could start students on the path to being conducive to these environments rather than meeting them for the first time when farming. Traditionally vocational agricultural education has focused on both theory and skills with plenty of hands-on agricultural practices with students learning a variety of skills. With regards to theory work however, a more teacher centred approach is commonly taken. This means that the teacher is in control of delivering the material and while they may try to interact with the students this can be limited by their ability to do so, the design of the course they are teaching on or both. In addition there is a government policy influence that acts as an extrinsic motivation for some students to 'pass the course' as graduating provides entitlement for students to receive tax and stamp duty exemptions. This can act as a motivation for students to just get through the course rather than making the most of what they can learn from the course. As a result the level of student engagement in these situations can be reduced significantly as the student can become passive in the learning process and in turn disengaged (Schlechty, 2001).

One of the first objectives of this research was to establish the teaching approach currently taken to deliver the Level 5 'Certificate in Agriculture' course based on literature. A review of the literature would also be used to evaluate if there were any approaches which could enhance academic student engagement and how they could be incorporated into courses.

From the literature there is a body of work as far back as Brandes and Ginnis (1986) which advocated that a student centred learning approach is effective for enhancing engagement and student learning in relation to PBL. In order to implement a student centred learning approach such as PBL, understanding the philosophy and practical implications required to implement it is critical. Studies by Bouhuijs (2011) and Schweisfurth (2011) have highlighted a number of factors that need to be considered before implementing PBL; whether the organisation is ready to align its culture with the approach, has there been sufficient resources committed to making a change to a student centred learning approach and have teaching staff been prepared as anxiety can exist amongst staff with such changes. This especially needs consideration within Teagasc where the level of pedagogical training teachers have is either non-existent or limited (Flannery et al., 2020). One fundamental aspect of the consideration to implement PBL is whether a course design is able to support this type of approach. Course design refers to the collection of modules, resources, organisation and evaluation strategies which make up an education programme. This includes the course; aims, outcomes, structure, organisation, module specifications (learning outcomes, assessment strategies) and mode of delivery within the course (O'Neill, 2015). Course design is a large and complex area but it plays a critical role in supporting the type of delivery on any course (Bouhuijs, 2011; Fink, 2003, 2007).

As such, considering the current course design of the Level 5 'Certificate in Agriculture' aligns with a teacher centred approach, changes are required in order for student centred learning to be integrated. Constructive alignment of the course design factors with a student centred learning approach is imperative for the change to be successful. The concept of constructive alignment is to align assessment strategies with the educational tasks students are asked to complete as part of a teaching approach (Biggs, 1996, 2003). Therefore, if a student centred learning approach was implemented, the tasks and assessment strategies used would need to align with the students becoming active, involved and autonomous in their learning. It would also typically include working with peers in some capacity and a teacher acting as a facilitator i.e. guiding students learning. Due to this, the role of course design has a substantial effect on student engagement.

1.5 Rationale for research

The required production levels to meet the demand of an increasing population; policy influence, sustainable farming and the changing competencies required to farm are some of the most prominent factors influencing agriculture today (Brennan et al., 2016). This requires the use of farming practices and innovative technologies that are not only efficient but ones that can be sustained otherwise there is an increased risk of depleting the natural resources which enable the production of food. Education forms a key part in this process as those

who undertake an education in agriculture will in some capacity go on to work in the agricultural industry. This will require technical skills and the ability to judge what practices and technologies could help a farm enhance its sustainability. While education is a part of the overall AKIS (Agricultural Knowledge and Innovation System) an emphasis about the most effective teaching approaches can largely be underrepresented within agricultural literature. AKIS is the relationship between education, training and farm business management with regard to productivity, profitability, and sustainability (Kilpatrick, 2000; Kilpatrick & Johns, 2003).

Looking back at the history of agriculture within Europe the formation of the Common Agricultural Policy (CAP) was a critical aspect to how we find the current state of agriculture today. In 1957, post war, there was a political and economic consensus from the founding members to develop peace, unity and growth in post war Europe. This was known as the European Economic Community (EEC) and today known as the European Union (EU) where as part of discussions the formation of a common market place for agricultural products were discussed. The broad purposes of this was to create better food security, provide better incomes for farmers to have a fair standard of living and help farmers to increase production levels through the use of best practices (Stead, 2008). Once implemented the aim of this policy was to help increase production but today there has been a shift in focus for farming to increase production levels to meet demand but also do this in an environmentally friendly, sustainable and financially viable way. This is categorised as a neo-productivist era in which the focus within the agriculture sector has shifted to focus around these issues (Pelucha & Kveton, 2017). In order to achieve the objectives of being sustainably, environmentally and financially viable a number of stakeholders within AKIS will play a key role, including education. Within Ireland, the Department of Agriculture, Food and Marine have published targets for 2020 and 2025 where education features strongly (DAFM, 2010; DAFM, 2015). While education can teach farmers the best practices which research has proven to be effective there are other types of skills and competencies set out within these documents which revolve around environmentally friendly practices, sustainability and the development of key management skills associated with an enterprise. These typically include more transferable skills where farmers need to develop competencies about the financial management associated with running a farm, the management of a farm, being part of extension services to have access to the latest evidence based information and even the ability to interpret information and data themselves. This would enable farmers themselves to justify or understand the risk benefit analysis of making changes which could be innovative or progressive to their farming practices in an attempt to be more sustainable, environmentally friendly and also more profitable.

So, what is it that education can do for a farmer if they were more engaged academically? This depends on the design of the course they undertake i.e. the content covered and intended outcomes - knowledge, skills and competencies, teaching approaches used and assessment strategies. These could reflect and align with the knowledge, skills and competencies targeted in the Food Harvest 2020 and Food Wise 2025 reports (DAFM, 2010; DAFM 2015). Alternatively they may fail to develop these by not helping students to realise the relevance of the content. This is due to the possibility that a curriculum or course content can be delivered in several different ways and how this is done can be enhanced substantially by the course design.

1.6 Research questions & Research Objectives

The main objective of this study is to establish what is required to enhance academic student engagement in agricultural education for Teagasc in Ireland. This involves evaluating what is the most engaging teaching approach which can be taken and in turn what the key considerations are to incorporate it into courses.

Research questions:

- 1) What is the current teaching approach being taken within the Level 5 'Certificate in Agriculture' delivered by Teagasc Education?
- 2) Why do students struggle to engage academically with this approach?
- 3) Could a student centred learning approach be implemented within the current course design and would it enhance academic student engagement?

In addition several objectives were established for the study to investigate. The overall objective of the study was to enhance student engagement in classroom settings i.e. academic student engagement, therefore, several objectives were set out to achieve this:

Objective one – To investigate what aspects of the course students struggle to engage in and why?

Objective two – To establish the knowledge and attitudes of teaching staff in relation to what they believe affects student engagement in classroom settings.

Objective three – To analyse and compare the effects of the current teaching approach versus a more student centred learning approach on academic student engagement.

Objective four – To analyse the suitability of the current course design to implement a student centred learning approach.

Objective five – To establish the implications for Teagasc Education to implement a student centred learning approach effectively.

1.7 Study Methodology

In order to accurately address the research questions and objectives, a comprehensive review of literature has been taken throughout the project on topics such as; student engagement in education, pedagogical teaching approaches to engage students, the impact of course design on student engagement and on approaches to evaluating student engagement. This review allowed for evidence based decisions to be taken to evaluate student engagement and identification of the best pedagogical approaches which could enhance student engagement in classroom settings. A comprehensive overview of this review will be presented in chapter 2.

Data from this study was primarily taken from stakeholders within the level 5 'Certificate in Agriculture' (CIA). This varied in both the methods used and who was asked to participate. There was a combination of research methods used throughout the study including; Focus groups, interviews, direct observation, surveys and a desk analysis. Stakeholders who participated in these methods included; Students, teachers, college management, external educational specialists, a desk analysis (by the researcher) and direct observations of variety of student's classes on the Level 5 CIA course which Teagasc coordinate. These courses are offered in 6 agricultural colleges across Ireland with approximately 70 teachers, 40 technicians and an average of 500 students enrolled every year over the past 5 years.

This social science research project incorporated a mixture of methods which were utilised for various reasons in three phases of research. The overall methodology which has been used is an action research design (Creswell et al., 2003). This was considered to be the most appropriate methodology given the context although it has several similarities with a case study. Both methodologies are capable of providing an understanding of a particular situation and both of these key methodologies frequently are used within social science and even qualitative educational research (Opie and Sikes, 2004). The problem or situation for this research project (academic student engagement), was presented to the researcher rather than the researcher becoming interested in a particular situation or problem. This is a key difference between action research and a case study as a case study will most often be created by the researcher to investigate the situation or problem they become interested in within their environment (Blichfeldt and Andersen 2006; Opie and Sikes, 2004). The researcher in this instance was presented with the findings from the WCE and was responsible for investigating and evaluating potential solutions to this. This meant that the researcher analysed the problem, designed a suitable intervention, implemented this,

monitored the effects of this intervention and analysed this data to reflect on what modifications would be required to this going forward which is the reflective cycle of an action research project (Opie and Sikes, 2004; Blichfeldt and Andersen 2006).

Although both of these methodologies are recognised, both of these also have recognised shortcomings, particularly action research. It is therefore important to explain in detail the steps that were taken in order to provide transparency in its findings; declare an intellectual/theoretical framework; discuss analytical generalisations and the transferability of findings (similar to case studies); and define appropriate forms of accumulation of results from the action research process (Blichfeldt and Andersen, 2006). This not only means value for the organisation where the action research is being carried out but also to a wider academic community where more general themes are shared that can provide new knowledge to relevant communities.

Phase one represented the exploratory phase of this action research project. It investigated why students struggled to engage in classroom settings. Phase two acted on the findings from phase one by conducting a pilot module to test if academic student engagement could be enhanced based on the findings from phase one. Phase two found that a more student centred learning approach enhanced academic student engagement but that the current course design created significant barriers to implementing this type of approach. Phase three sought to investigate this finding from phase two in greater detail to create more awareness of what would be required for Teagasc Education to implement a SCL approach. This incorporated a desk analysis of the course, participation from the college management in all 6 agricultural colleges through interviews and a survey with teaching staff.

The quantitative data collected as part of this research was analysed using IBS SPSS 24. Qualitative data utilised NVivo Pro 12 software to thematically analyse data from interviews and focus groups. All qualitative methods were recorded and transcribed to upload onto the NVivo software where it was subsequently analysed. Qualitative methods include all interviews and focus groups conducted; Interviews with educational specialists, teachers who taught on the pilot module in phase two and college management in phase three, focus groups with teachers and students from phase one and two. Observations were analysed using Microsoft Excel for the raw data to be categorised in addition to thematic analysis for example; classes which were categorised as 'low', 'medium and 'high' engagement.

1.8 Reflexivity Statement

Reflexivity is increasingly seen as an essential element in quality educational research. To implement and practice reflexivity, a researcher needs to become aware of their positionality as well as the influence they have on the people or topic being studied, while simultaneously

recognising how the research experience affects them as researcher (Probst, 2015). It is important therefore whilst planning, conducting or writing about research to engage with reflexivity. This can be described as the researcher trying to be as objective as possible by attending to what is taking place in their field of study, “they become more aware of their own projections, attachments, assumptions, agendas and biases” (Probst, 2015). Each of the research methods used in this study required self-awareness but it was especially important when conducting classroom observations where the researcher has more scope to influence the data collection in a potentially negative way.

This was addressed by evaluating the literature on student engagement, teaching approaches and course design (See chapter 2) and thoroughly reviewing each of the research methods being utilised in this study (Bryan, 2016; Phellas, 2011; Acocella, 2011). In doing this, a researcher can become aware of how they may influence the collection of the data within a particular context. Becoming aware of this potential can then be planned for, the researcher can think about and plan for how they can prepare to deal with this for each research method. Planning for interviews consisted of outlining the topics and questions for the interviewee and consideration of how these questions would be phrased. Similar consideration was given when developing the survey in terms of how questions were asked. With semi-structured and key informant interviews it is important to probe answers to confirm an interviewee’s viewpoint or gather a more in depth understanding without leading the interviewee. With the use of classroom observations, a balance of elements was required to reduce the reactive effect of the researcher observing. This included getting to know a teacher and explaining the purpose of the observations before conducting them so that they were as comfortable as possible with the observer sitting in on classes. The same principle applied to students so that they would not be unnerved by an observer sitting in on classes. The observer’s explanation to the students in advance helped to address the reactive effect (Bryman, 2016). When conducting these observations in the classroom, the researcher had to be alert to their own biases: preferences for a particular approach, knowing the teacher on a personal level and even their own personal knowledge of the subject being taught. The observations that were noted, needed to state what was happening and how the students responded to this. Based on this, a judgement could be made in relation to the level of engagement being achieved with a variety of teaching methods in the classroom.

Using observation as a research method has value in building self-awareness and reflexivity for any researcher. It requires conscious concentration to try to gather data systematically and objectively on what is happening in the classroom, what the teacher is doing and how the students are reacting or responding. Pilot testing the use of the observation framework and discussing the outcomes with supervisors helped to identify where the researcher’s

biases might lie and in addition, how concentration might vary over the duration of the class which led to the framework being adapted. However it is important to recognise that such a process must always be interrogated for subjectivity much like any research method.

In terms of the data generated from the different methods, the researcher has to be open to understanding participants' perspectives on what engages students, the challenges and the barriers to this. The researcher also has to question and evaluate every aspect of the data. Researchers in qualitative research have traditionally been thought of as positioned inside or outside the social group being studied although it is recognised that the distinction between these positions can be blurred (Moore, 2012). In this study, I (the researcher) am a young Irish male graduate of Horticulture, Landscape and Sportsturf Management who did not grow up on a family farm. I had investigated teaching approaches as part of my final year dissertation in my undergraduate degree. I was conscious that I was 'an outsider' when it came to conventional agriculture (livestock and tillage crops) but also conscious that this allowed me to objectively examine how students engaged with different subjects in vocational agricultural education. As a young male I was investigating a vocational agricultural setting dominated by males. Reflexivity is essentially about questioning (Corlett and Marvin, 2018) – questioning our understanding of reality and the nature of knowledge and using different paradigms to come to new understandings of phenomena; questioning our relationship with the research context, the research subjects and the data; and questioning what is valid and valuable research. As a young early career researcher, the role of supervisors and a research studies panel was important in challenging my thinking and questioning my assumptions. Presenting my research at an international conference and submitting papers to peer reviewed journals and getting critical feedback also supported my reflective learning journal.

1.9 Utility of the study

It is envisaged that this study can be directly beneficial to Teagasc Education and not just its agricultural courses but also its horticulture and equine courses. The foundation of this study revolves around how to enhance academic student engagement, it just so happens to have focused on the Level 5 'Certificate in Agriculture' course which Teagasc provides. It is important to recognise that there are significant lessons and educational principles which are universal and can be applied to other branches of Teagasc Education. Likewise, these universal principals are also applicable to courses outside of Teagasc Education, especially providers in the vocational education sector. The findings from this research can help to inform the design of the courses delivered by Teagasc in the future and influence more of the day to day aspects of course design such as the organisation of the course. These all impact a student's learning experience in different ways with some being easier than others to make changes to. However, it is important for Teagasc Education and other providers to

understand the impact of their course design on student engagement within each course. Therefore, this research could help inform those who have an input on the design of any course and also those who organise the implementation of these courses.

1.10 Thesis Structure

Chapter 1 has provided the background and rationale for this study including how this study was formed, the literature around vocational education, the changing role of farmers and the role that education can play in helping farmers. In addition, it has detailed the research questions and objectives set out for this study to address, and the research methodology used to address these. This chapter has set the context for this study and highlighted the key objectives for the study.

Chapter 2 will go through the literature reviewed as part of this study. This will give a review of the history of agricultural education in Ireland, the development of vocational education, the economic return of formal agricultural education and describe the type of formal agricultural education which students can pursue. In addition, this chapter will then also discuss the approaches taken to deliver agricultural education and connect this to theories of learning from the literature. These theories will detail how the understanding of learning has developed over time and how this knowledge has helped educators align their teaching practices with different learning styles. In particular, the experiential learning theory is discussed in detail and draws on several learning theories that underpin it. This chapter culminates in a description of a student centred learning approach. This type of teaching approach has been developed and has a strong correlation with enhancing student engagement through the student becoming more actively involved in their learning. This teaching approach represents an application of the experiential learning theory in practice and this can be adapted to numerous types of education having originated in medical education.

Chapter 3 will provide an in depth look at the research methodology and the philosophy of social science which underpins it. The action research design which this study adopted will be discussed followed by the philosophy of social science research and the importance of ethics in social science research. This will be followed by a detailed description of the three distinct phases used in this study and a description of what research methods were used in each phase and why they were used. Finally, this chapter will discuss the ethical considerations for this study and how ethical approval was granted by University College Dublin for this study to go ahead.

Chapter 4, 5 and 6 represent the three peer reviewed papers developed as part of this study for publication. Chapter 4 focuses on an overview of the findings and methods adopted

in phase 1 and 2 of this study to describe how student engagement was enhanced. Chapter 5 describes in detail the multi-methodological approach adopted to evaluate academic student engagement as part of this study which again represents phase 1 and 2. Chapter 6 represents the third and final paper of this study. This paper represents phase 3 of this study and details how the current course design was analysed to evaluate what the barriers are to implementing student centred learning approaches on the Level 5 'Certificate in Agriculture'.

Chapter 7 will summarise and integrate the key findings from the three results chapters (chapters 4-6). This highlights the objectives of the study, summarises the methodology used and describes how the findings have met the objectives set out as part of this study. In addition the implications of these findings are discussed for Teagasc Education going forward as well as highlighting the limitation but also the potential for further research going forward.

Chapter 2: Literature Review

2.1 Introduction

This chapter reviews and discusses some of the critical literature around the topic of student engagement. This was used to guide and inform how this research project was conducted and helped to validate it. Chapter one has discussed the broad rationale for this research and the factors which have influenced it. The purpose of this chapter is to outline and give a detailed description of the literature that has influenced and underpinned how this project was carried out.

2.2 Agricultural education in Ireland

In this section the context of agricultural education options available for students to undertake will be discussed. The history of formal agriculture education will be discussed first to explain how agricultural education has got to where it is today. This will be followed by a description of the types of formal agricultural education which are available and the type of education which this study focused on. This will be followed by an explanation of educational philosophies, theories and learning styles. Finally, the rationale for having agricultural education will then be discussed to highlight the education options for those seeking to work in the agriculture industry.

2.3 History of agricultural education in Ireland

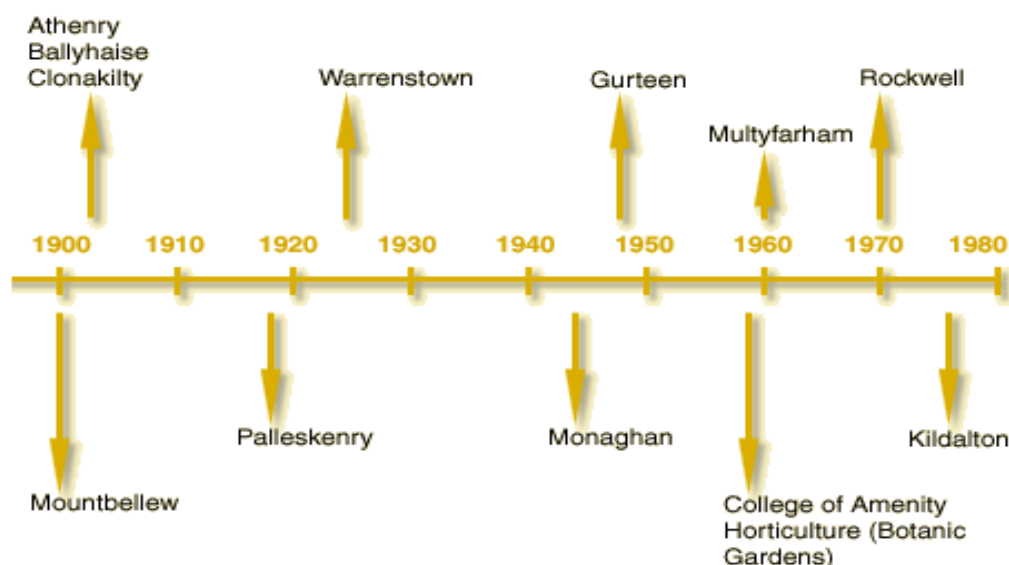
Over the past century there have been a number of significant changes to agricultural education in Ireland. This has stemmed from traditional farming practices progressively shifting towards a more scientific and labour efficient industry. Part of this shift came from Ireland joining the EEC (EU) in 1973 and as a result implementing the Common Agricultural Policy. This policy sought to increase production post-war within Europe to help avoid food shortages by creating a common market place in Europe where agricultural products could be traded to help countries find a market for their products, avoid food shortages of goods in European countries and reduce food wastage (Stead, 2008). This meant a shift in the way farmers operated as they shifted from mixed farming systems to more specialised systems in an effort to increase yields or production levels of their chosen system. This was achieved through a combination of education, advisory services and financial supports for farmers initiated by this shift in government and European policy.

Prior to joining the EEC, Ireland had begun to restructure its agricultural industry including its state provided services. Over a century ago, the Department of Agriculture was established and part of its function was the provision of grant-in-aid technical and scientific instruction. At the same time local authorities in each county were given the power to collect levy rates on agricultural land to finance county committees of agriculture. These committees were in turn obliged to provide technical instruction to young farmers and to stimulate the rural economy

by encouraging programmes of basic agricultural education throughout the national school system (Teagasc, 2017).

Subsequently several years later the department also financed training for agricultural instructors who conducted agricultural classes over winter months and attendance grew significantly by 1930. This coincided with the initial establishment of agricultural colleges in the early 1900's with Athenry, Co. Galway, Ballyhaise, Co. Cavan, Clonakilty, Co. Cork and Pallaskenry Agricultural College, Co. Limerick (Private – Salesian Order) all being established by 1920. Further investment in additional state owned and state aided agricultural colleges continued after this period into the mid 1900's and coincided with several reforms of the structure of agricultural education. In 1964, the 'Farm Apprenticeship Scheme' was created shortly after joining the EEC which was later reformed to establish the 'Certificate in Farming' also known as the 'Green Cert'. This was significant as it standardised the training being provided across the country (Banks et al., 2007). In addition, the uptake was high due to its accessibility in both colleges and local centres and also due to the incentive from government policies which enabled farmers to receive stamp duty and inheritance tax exemption on completion of the course. Agricultural colleges responded by expanding and investing, with the establishment of additional colleges in the late 1900's (See Figure 2.1). The establishment of ACOT ('An Comhairle Oiluna Talmhaiochta' or Council for Development of Agriculture) in 1980 represented an amalgamation of the county committees of agriculture, the advisory service and the Department of Agriculture Education section (ACOT, 1981). This helped to coordinate and implement the 'Certificate in Agriculture' around the country. Subsequently ACOT took over the running of the state owned colleges and state aided colleges. In 1985 a report was published by the government – 'Building on Reality' which indicated that '*the comparatively low level of training among Irish farmers has been a constraint on the development of a progressive agricultural sector*'. The establishment of the 'Certificate in Farming' course was seen as the building blocks to addressing this issue. Since this, there have been a number of reviews of this course as well as the creation of several courses at different levels ranging from vocational (Level 5 and 6) to partnerships with Universities and Institute of Technologies for higher education courses (Level 7 and higher).

Figure 2.1: A timeline of the agricultural colleges formed from 1900-1989



2.4 Formal Agricultural Education in Ireland

Currently in Ireland there are four main routes for a student to pursue agricultural education after completing compulsory secondary school education. For the majority of students in Ireland, the 'Leaving Certificate' represents the end of second level education. From here there are four options a student may pursue to achieve a qualification to be a 'Young Trained Farmer';

1. **University level of agriculture education – Honours Bachelor degree of Agricultural Science – Level 8 (QQI, 2009).** The various agricultural related courses require a certain level of points based on a student's results in the 'Leaving Certificate' and the demand for the course through student applications with the Central Applications Office (CAO). This means the point's requirement for each course can change and sometimes it can significantly range higher and lower depending on the demand and points achieved by applicants for the course.
2. **Institute of Technology (IT) –** These institutes offer a range of levels from Level 6 – Level 8 courses in agricultural related education. These courses also require a certain level of points based on the CAO. A number of these courses are delivered in conjunction with Teagasc.
3. **Vocational Agricultural Education – Level 5 to Level 7 courses –** These are mainly delivered by Teagasc with some other providers beginning to deliver some of these courses. A student can enter these via a direct application to the course provider. On completion of a Level 6 Advanced Certificate a graduate will qualify to

be a 'Young Trained Farmer' and this is commonly known as a 'Green Cert'. There are also some options to progress to a Level 7 course on completion of a Level 6 Advanced Certificate.

4. **Higher Diploma courses – Level 6** – There are a number of these courses available for adults or those seeking to continue education. Most of these are part time courses catering for adults seeking to become a 'Young Trained Farmer' and Teagasc is the main provider of these courses in Ireland.

There are also a variety of postgraduate degrees which students can pursue once they have graduated from a minimum of a Level 7 (Major) degree.

2.5 Vocational education – Teagasc

2.5.1 Level 5 Certificate in Agriculture - Course Entry Requirements:

For those entering formal agricultural education through vocational courses which Teagasc offer, they will start with the Level 5 'Certificate in Agriculture'. This full time course is most appropriate for those who have completed a Leaving Certificate as students must be at least 17 years old by the 1st of January after starting the course. This full time course can be completed in any of the six locations where Teagasc offer it; Ballyhaise College, Co. Cavan, Clonakilty College, Co. Cork, Gurteen College, Co. Tipperary, Kildalton College, Co. Kilkenny, Mountbellew College, Co Galway or Pallaskenry College, Co. Limerick. This course is also offered on a part time basis but applicants must be over the age of 23 on January 1st of entry to the course. This course is offered at the agricultural colleges listed previously but also in Regional Teagasc Centres. All of these courses are accredited by Quality and Qualifications Ireland (QQI).

2.5.2 Course Aims

The course aims to provide students with the best farming practices and to meet the challenges of future farming needs by exposing students to practical/ skills training, classroom (theoretical) sessions and also to the latest agriculture developments, harnessing the research and advisory services provided by Teagasc.

It aims to train the student to the level of trainee farm operatives, focusing on best farming practices, imparting technical farming knowledge, training and updating students in key farming operative skills, with an emphasis on safety, environmental protection, farm development, farm technology and an introduction to farm business. Personal development is integrated into the course using discussion groups, group work exercises, assignments, an 8 week on farm practical learning period and projects linked to real farm situations.

Students spend 8 weeks on an approved training farm which has the enterprise they choose as their specialism.

2.5.3 Progression options

On completion of the Level 5 course students have options to progress their formal education further;

- Students can go on to complete a Level 6 'Advanced Certificate' in one of the following options that the college offers; 1) Dairy Herd Management 2) Drystock Herd Management 3) Crops and Machinery Management 4) Agriculture Mechanisation 5) Forestry 6) Pig Management 7) Poultry Management.
- On completion of a Level 6 'Advanced Certificate' students may apply for a transfer to Year 2 of the Higher Certificate in Agriculture or a Bachelor of Science in Agriculture at an Institute of Technology (Level 7 & 8 related agricultural courses) if they want to pursue a higher education degree.

2.6 The economic returns of formal agricultural education

Reimers and Klasen (2013) conducted a study of the international rates of return (IRR) of education for agricultural activity across 95 countries. Rather than relying solely on basic data which other studies used such as school enrolment levels and literacy indicators, they included data on educational attainment to provide more valid findings. From this study they found a stable and significant impact from those who had higher levels of educational attainment with an average increase of approximately 3.2% agricultural productivity per year of schooling (Reimers & Klasen, 2013). In addition based on their findings they outlined three main reasons why formal agricultural education impacts positively on the rates of return with a profit on investment in it;

- 1) Education can help farmers to become better managers by enhancing their decision-making skills which can enable them to allocate their resources more efficiently.
- 2) Education can improve the ability of a farmer to access information and in turn could help them to achieve higher levels of production and profit.
- 3) As various empirical studies have shown, on average better educated farmers adopt promising new technologies faster and therefore have an advantage due to their ability to distinguish the risk benefit analysis of implementing a technology on their farm.

A similar study was conducted in Ireland which analysed the economic returns to formal agricultural education (Heanue & O'Donoghue, 2014). This study adopted the methods used in the study by Reimers and Klasen (2013) and other similar studies. It sought to quantify the benefits of formal agricultural education by correlating them with their economic returns in Ireland. The study conducted by Heanue and O'Donoghue (2014) found an increase in the uptake of formal agricultural education from 24%-44% in the period from 2000-2011. The greatest increase in the proportion of farmers achieving a 'Certificate in Agriculture' was those who undertook an agriculture certificate course i.e. vocational agricultural courses (Full time or part time), compared to those who completed a university level degree. The family farm income was highest in households where a farmer had completed either an agriculture certificate or had attended an agricultural college. Income increased more in these households over this period also. Those who had acquired a formal agriculture education tended to have larger farms with this report finding that these farms were between 1.6 to 1.9 times larger and had a higher average gross margin per hectare of 1.3 to 1.7 times more than those households with no formal agricultural education. This report analysed the internal rate of return of education for farmers with two primary characteristics considered; 1) Private Return (Farmers perspective) 2) Social returns (Benefit to society). Results show that on average, an 8.8% private return and a comparatively high social return of 13.4% at farm level which rose to 24.5% return to investment from agriculture education when the wider supply chain was factored in. This is above the average of 6.5% which Harmon et al. (2003) reported from a range of countries and model specifications. The economic returns of agricultural education are clear but a number of other factors that influence a student's decision to participate in formal agriculture education in Ireland were also identified by Heanue and O'Donoghue (2014);

- **Farm scale** – Total livestock numbers, forage area and size of the farm were all shown to impact positively.
- **Location** – Farmers in counties other than Louth, Leitrim, Sligo, Cavan, Donegal and Monaghan are more likely to seek formal agricultural education. This can be correlated to the fact that these counties have considerably less farming capacity, land and potential to make a career from farming at home than farms in other counties.
- **Distance** to agricultural colleges and **age** negatively impacted on the probability of a student seeking formal agricultural education.

- Being a **Teagasc client** and **participating in schemes** had a positive and significant effect on undertaking formal agricultural education.

It is noteworthy that there are extrinsic motivations for farmers to seek formal agriculture education in Ireland. Those who complete an agriculture certificate (Level 6 Specific Purpose in Farming '6S20487' or any of the Level 6 Advanced Certificates) or higher level courses are entitled to 'Stamp Duty Exemption' (Heanue & O'Donoghue, 2014). This means that those with the required qualification who wish to have land transferred into their name will receive a 100% exemption from stamp duty. This incentive was seen as a policy incentive for more people wishing to pursue a career in farming and receive formal agricultural education which would be seen to help provide them with a variety of skills for farming in Ireland. While there has been a positive correlation between formal agricultural education and economic returns, there is a need to ensure that the quality of learning is high when it comes to the competencies required by the next generation of farmers around the use of environmentally beneficial practices, increased focus on sustainability and on developing farmers' managerial skills for farming. Education will play a key role in providing farmers with access to information on the best approaches and technologies to be able to deal and cope with future opportunities and challenges. It should encourage them towards lifelong learning and continuous professional development.

2.7 Approaches to agricultural education

Education plays a key role in influencing the use of best practice by not only teaching farmers best practices but also increasing their understanding of the principles of these practices and their ability to analyse and evaluate the appropriate practices for their farm. Problem solving and managerial competencies are critical in farming today. The manner in which young farmers learn and develop these competencies is critical. The concept of student engagement was introduced at the beginning of this thesis. Student engagement in classroom settings can be explained as the following;

The degree of attention, curiosity, interest, optimism, and passion that students show when they are learning or being taught, which extends to the level of motivation they have to learn and progress in their education (Glossary of Education Reform 2016)

As the definition above suggests it is a multidimensional concept consisting of three key dimensions derived from psychology theory and emphasise the importance of all of these factors (Fredricks et al., 2016; Fredricks & McColskey, 2012);

- 1) **Behavioural** - Physical actions which show a student is engaged i.e. participating in activities assigned by the teacher or as part of a task they are completing.

- 2) **Cognitive** - The ability of a student to focus their attention on a task i.e. listening, thinking about and comprehending the material they are studying.

- 3) **Affective** - The moods, feelings and attitudes which students may display or have towards a subject i.e. enjoyment, laughter, passion whilst participating in a task for the subject which they are studying.

These dimensions can be interconnected given the activity or task which a student is asked to do or complete. For instance, a lecture can be a passive mode of delivery in education and may at best cognitively and/ or affectively engage students but this method can struggle to behaviourally engage students. Understanding how these dimensions of student engagement are interconnected leads to the next point that student engagement is on a continuum with 5 categories as it is not an all or nothing phenomenon (Schlechy, 2001) (See Figure 2.2 below). In order for a student to be authentically engaged, a student needs to be engaged in all three dimensions; Behavioural, Cognitive and Affective (Groccia, 2018). In order to achieve this there needs to be a course design to support an approach which can engage students in all three of these dimensions. A student centred learning approach is capable of doing this provided it is possible to implement it and the educational activities are designed effectively.

Figure 2.2: This infographic shows different levels of student engagement and was created by Dr Roland Rios based on Schlechy's student engagement continuum.



This description of student engagement is not always representative of the literature on the topic. Student engagement also includes other sub categories of the three dimensions presented previously but these were not considered in this study where the focus of engagement revolved around classroom settings i.e. academic student engagement. In addition to these three dimensions, the sub categorisation of some dimensions, Fredricks and McColskey (2012) and Fredricks et al. (2016) detailed that a variety of studies include a

social aspect under the behavioural dimension. This looks at a student's involvement in extra-curricular activities as well as academic activities in order to evaluate their influence on dropout rates. This is due to the increasing focus student engagement receives from researchers, educators and policymakers due to its ability to evaluate educational problems such as low achievement, high dropout rates and high rates of student boredom and alienation (Fredricks et al., 2016). These aspects of a student's educational experience from the literature around student engagement focuses much broader than what this study has focused on i.e. academic student engagement. This draws more parallels with studies conducted at elementary, primary and secondary level (Nguyen et al., 2018; Shapiro, 2013; Stallings et al., 2014). As such this research on student engagement for Teagasc Education focused on what interventions or teaching approaches could enhance academic student engagement.

2.8 Theories of learning

Over time there have been a number of educational philosophies and theories of learning which are well documented. Experiential Learning Theory (ELT) links several theories together around human learning and development which was conceptualised by Loo Kolb (Kolb, 1984, 2014). This has drawn on the work of several scholars from the 20th century to develop a holistic model of the experiential learning process and a multidimensional model of adult development (Kolb, 2013). The following are a list of the scholars which this work draws on with a short description of their work;

- 1) **John Dewey** – Experiential education
- 2) **William James** – Radical empiricism
- 3) **Jean Piaget** – Constructivism
- 4) **Kurt Lewin** – Action research and the T group
- 5) **Lev Vygotsky** – The proximal zone of development
- 6) **Carl Rodgers** – Self-actualisation through the process of experiencing
- 7) **Paulo Freire** – Naming experience in dialogue
- 8) **Carl Jung** – Development from specialism to integration
- 9) **Mary Parker Follett** – Learning in relationship and creative experience

To explain how these have contributed towards ELT, Kolb (2013) built on six propositions shared by these scholars;

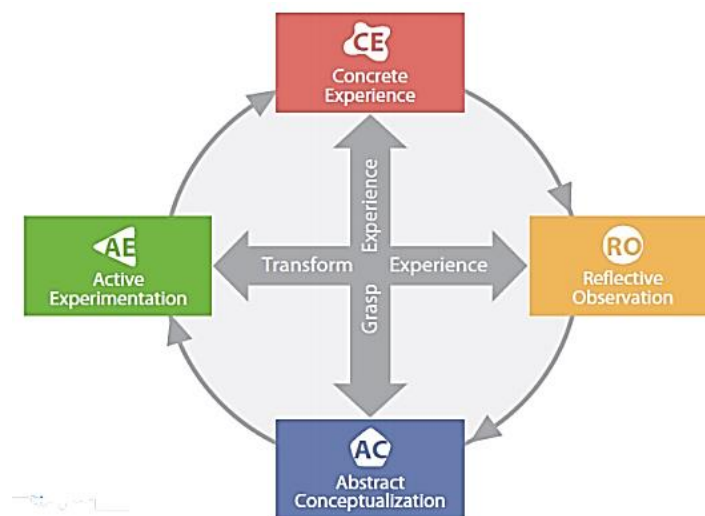
- 1) ***Learning is best conceived as a process, not in terms of outcomes*** (Dewey); i.e. learning occurs through the connected experience so knowledge is modified and reformed.

- 2) **All learning is re-learning** (Piaget - constructivism); Learning is best facilitated by a process that draws out students beliefs and ideas about a topic so that it can be examined, tested and integrated with new, more informed ideas.
- 3) **Learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world;** Conflict, differences and disagreement drive the learning process. These tensions are resolved in iterations of movement back and forth between opposing modes of reflection and action, and feeling and thinking.
- 4) **Learning is a holistic process of adaptation to the world;** Learning is not just the result of cognition, it involves the total person – thinking, feeling, perceiving and behaving i.e. scientific methods, problem solving, decision making and creativity.
- 5) **Learning results from synergetic transactions between the person and the environment** (Piaget); Learning occurs through the equilibration of assimilating new experiences into existing concepts and accommodating existing concepts into new experiences. Following Lewin, ELT outlines that learning is influenced by characteristics of the learner and the learning space.
- 6) **Learning is a process of creating knowledge;**
 - ELT proposes a constructivist theory of learning whereby social knowledge is created and recreated in the personal knowledge of the learner i.e. the transaction of two forms of knowledge.
 - This stands in contrast to some current ‘transmission’ models of education in which pre-existing, fixed ideas are transmitted to the learner.

2.9 The cycle of experiential learning

Experiential learning theory was developed based on these scholars and their propositions. As part of this theory, learning is defined as *“the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience”* (Kolb, 1984). This highlights two key processes which happen, namely, ‘grasping’ which refers to taking in information and ‘transforming’ which is how individuals interpret and in turn act on that information. These two processes form two dialectically related modes for the ELT model. For the ‘grasping experience’ process of this model, there are two modes; 1) Concrete Experience (CE) and 2) Abstract Conceptualisation (AC). There are also two dialectically related modes which make up the ‘transforming experience’ process of this model; 3) Reflective Observation (RO) and 4) Active Experimentation (AE) which collectively can be seen in Figure 2.3 below (Kolb, 2013);

Figure 2.3: Below are the four modes which make up the cycle of experiential learning



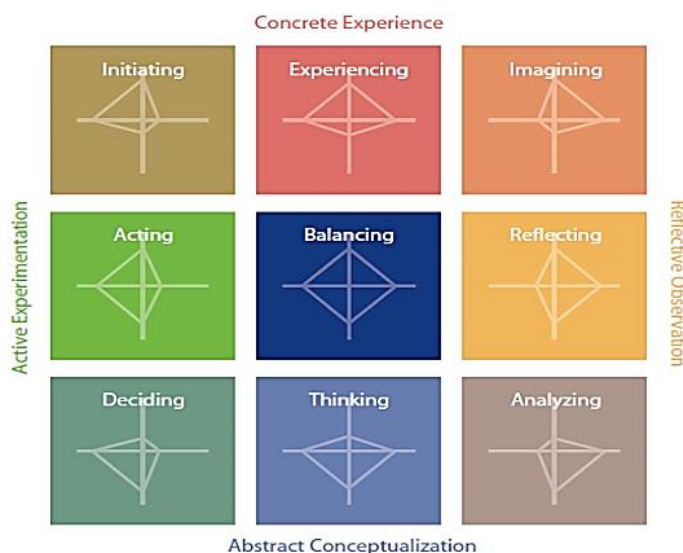
As the definition of learning suggested, learning is taken in (grasped) and then transformed. This figure represents this process and cycle as is it not just something which happens once or a handful of times. It is a recursive process and it is sensitive to the learning situation and what is being learned. As such learning arises from the resolution of creative tension among these four learning modes in Figure 2.2. The ELT can be closely linked with self-determination theory and student centred learning (Deci & Ryan, 2012; Lea et al., 2003). These require the learner to be active in their learning and have increased responsibility for their learning i.e. grasping, to be given to the learner. As a result, the learner becomes more autonomous and can achieve a deeper level of learning about the task and subject they have to work on i.e. transforming.

2.10 Learning styles

Whether consciously or unconsciously, we all have a style through which we learn. This is not a fixed psychological state, rather dynamic as an individual can change, adapt and even develop particular learning styles given the will or need to do so. ELT has developed and reviewed its categorisation of learning styles over time. Initially, based on empirical data, four categories of learning styles were established based on the work of Dewey, Lewin and Piaget but also corresponding to the Myers Briggs Type Indicator (MBTI) that was developed based on the work by Carl Jung. The initial four learning styles included; 1) Diverging 2) Assimilating 3) Converging and 4) Accommodating. A revision of this based on empirical and clinical studies led to nine style typologies which helped to better define individual learning styles and avoid confusion as the original four styles were found to have people who were on the border of two or more styles. Subsequently this led to reformation of learning styles into nine style typologies which are as follows (Kolb, 2013) (See Figure 2.4);

- 1) **The initiating style** – Initiating action to deal with experiences and situations (AE + CE)
- 2) **The experiencing style** – Finding meaning from deep involvement in experience (CE + AE + RO)
- 3) **The imagining style** – Imagining possibilities by observing and reflecting on experiences (CE + RO)
- 4) **The reflecting style** – Connecting experience and ideas through sustained reflection (RO + CE + AC)
- 5) **The analysing style** – Integrating ideas into concise models and systems through reflection (RO + AC)
- 6) **The thinking style** – Disciplined involvement in abstract reasoning and logical reasoning (AC + AE + RO)
- 7) **The deciding style** – Using theories and models to decide on problem solutions and courses of action (AC + AE)
- 8) **The acting style** – A strong motivation for goal directed action that integrates people and tasks (AE + CE + AC)
- 9) **The balancing style** – Adapting by weighing the pros and cons of acting versus reflecting and experiencing versus thinking (CE + AC + AE + RO)

Figure 2.4: Below is a figure representing the nine learning style typologies by Kolb

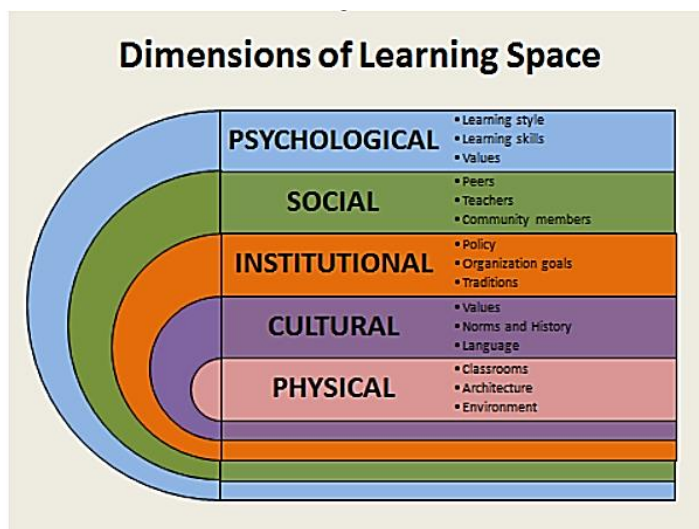


2.11 Learning space

Ultimately learning styles refer to a learner's preference to learn. An education provider will benefit from this knowledge but how can they create an approach where all learning styles can prosper? Building on Kurt Lewin's concept of life space; where the person and the environment are independent variables, where behaviour, the function of a person, the

environment and the life space are the total psychological environment which a person experiences subjectively. Therefore in a learning space, if learning is to occur, it requires space for it to take place. This includes 5 dimensions which can be seen in Figure 2.5 below (Kolb, 2013). These dimensions all have an influence on students learning; the physical space in which they learn, the cultural space within a college or school, the institutional influence i.e. governance, social influences and a student's own psychological learning space which they create and use. Learning space does extend beyond the classroom and the teacher but these in conjunction with the institutional goals play an integral role in creating learning space. The concept of learning space highlights that there is not one universal process but a map of learning territories within which many different ways of learning can flourish and interrelate. While all of the dimensions have an influence over learning spaces the teacher objectively creates the learning space for students by the educational activities they use but students experience this subjectively through the lens of their learning style which may or may not be engaging or experiential learning. To optimise the learning and development for a student, the learning space will need them to fully engage with each of the four modes in the learning cycle; 1) Feeling 2) Reflection 3) Thinking and 4) Action (Kolb, 2013). This relates to the three core dimensions of academic student engagement; Cognitive (Thinking), behavioural (Action) and affective (Feeling and Reflection) which are outlined by (Fredricks et al., 2016; Fredricks & McColskey, 2012; Groccia, 2018) and forms the basis of the student engagement continuum (Schlechty, 2001).

Figure 2.5: The five dimensions of learning space



2.12 Creating space for learning and development

To create a space for learning and development there are a number of educational principles underpinned by Dewey's educational philosophy (Kolb, 2013):

- **Respect for learners and their experience** – No matter the level or depth of student's experiences, it should be recognised and respected.
- **Begin learning with the learners experience of the subject** – Using students' experience as a starting point rather than jumping in too shallow or too deep into a subject.
- **Creating and holding a hospitable space for learning** – Where students can encounter differences and learn to deal with these differences.
- **Making space for conversational learning** – Within educational activities rather than leaving conversations to before, between and after lectures/ classes.
- **Making space for the development of expertise** – Develop a student's ability to retrieve reliable sources of information and their ability to organise, apply and transfer it to different contexts. Rather than overloading the curriculum with information or content, space is required for students to develop a deeper learning with deliberate recursive practices on areas that are relative to the learner.
- **Making space for acting and reflecting** – Learning involves taking in information, processing an experience and putting together an expression of what has been learned. Many courses today focus on impressing information on the mind of the student rather than presenting students with the opportunity to express and test in action what they have learned i.e. if students have lectures for 12 or more weeks and are assessed via a multiple choice questionnaire or similar surface learning examination of their learning.
- **Making spaces for feeling and thinking** – Emotions affect a person's ability to learn; negative emotions (fear, anxiety etc.) can block learning while positive feelings and interest can enhance student learning. These can both be encouraged by the culture and design of the course.
- **Making space for inside-out learning** – A process of focusing on the students experience by linking educational experiences to the learner's interests kindles intrinsic motivation and increases learning effectiveness. Learning spaces that over emphasize extrinsic rewards can drive out intrinsically motivated learning.

- **Making space for learners to take charge of their own learning** – By allowing students to take control and responsibility for their own learning can greatly enhance their ability to learn from experience even if a student has come from an experience of being passive in their learning. Active learning can enhance their ability to learn from being more involved and responsible for their learning.

Creating or making this space for learning within established courses can mean having to make significant changes to deal with barriers within a current course design (Bouhuijs, 2011; O'Neill, 2015; Schweisfurth, 2011). This can occur as a result of how courses are designed around outcomes as they have the potential to create a lack of flexibility and a lack of possibilities to use particular teaching approaches. Outcome based designs have originated as a result of the Bologna process whereby more structure and criteria were introduced with the design of a course and modules within it. Learning outcomes were introduced and are now commonly used within modules and these can be used effectively or misused. This depends on how they are written, the overall number of modules and outcomes on a course. Having a course with structure and learning outcomes does not result in a lack of space for learning and in particular active learning, moreover it is as a result of overloading the entire course with too many learning outcomes; individual modules with too many learning outcomes and the assessment strategies which are aligned to it.

Constructive alignment is when the aims, activities and assessments align constructively and coherently in order for students to achieve the course and learning outcomes to develop both discipline specific (technical) and non-discipline specific (transferable) knowledge, skills and competencies (Biggs, 1996). This type of constructive alignment would support the use of active learning strategies and assessments. This can be referred to as how the course is designed and is defined as part of this study as the collection of modules, resources, organisation and evaluation strategies which make up an education programme. This includes the course; aims, outcomes, structure, organisation, module specifications (learning outcomes, assessment strategies) and mode of delivery within the course. Course design is a large and complex area but it plays a critical role in supporting the type of delivery on any course (Bouhuijs, 2011; Fink, 2003, 2007).

To create space for learning and approaches which support this approach, course design plays a critical role as it can give slack and space for it. As such Knight (2001) highlights that if there is to be an opportunity for deeper learning, the course should not be overcrowded and there should be time and space for strategic thinking, reflection, planning and portfolio style tasks. These should be within the design of course in order to encourage students to achieve a higher level of development and deeper level of learning. A student centred

learning approach can encourage these competencies by incorporating active learning, increasing students responsibility for their learning, increased autonomous learning, reflection, working with peers, development of problem solving/ decision making skills and creativity by working on complex problems presented to them (T. Barrett & Cashman, 2010; Lea et al., 2003). An important aspect of this type of approach is to reward the students process as much as the product i.e. group work, displaying problem solving skills, creativity etc. and the product i.e. a report, research, presentation, essay, media (video or photography). For both aspects, assessments can use a rubric, whereby, students obtain an understanding of what they are being assessed on (Donnelly, 2004; Donnelly & Fitzmaurice, 2005; O'Neill, 2011).

2.13 Student Centred Learning approaches

Student centred learning approaches are categorised by Lea et al. (2003) and Brandes and Ginnis (1986) as an approach where students; adopt active rather than passive learning; have a deep approach to learning and understanding; are given increased responsibility, accountability and autonomy; interdependence and equality through a mutually respectful relationship between the teacher and learner; and a reflexive approach to the learning process on part of both the learner and teacher. In order to achieve this it is critical that learning activities can be designed to allow students to be actively involved and the assessments strategies used can align with the activity.

There have been numerous studies showing the benefits of student centred and active learning strategies. Wijnia et al. (2011) outlined how students adopted a deeper approach to their learning as a result of a Problem Based Learning (PBL) approach (a student centred learning – SCL – approach). Freeman et al. (2014) found that by introducing active learning across STEM (Science Technology Engineering Mathematics) subjects across a whole institution on increased academic achievement and Monks (2010) used an adapted PBL approach to enhance engagement on an apprenticeship course (vocational level) in Ireland.

A key aspect of being able to create the opportunity for student centred learning is the course design. This plays a crucial role in enabling the type of approach which a provider intends to deliver as it refers to the collection of modules, resources, organisation and evaluation strategies which make up an education programme. Another term which is used interchangeably with course is 'programme' for those working in roles within further and higher education. In some contexts the term course is also used to describe a single module, however in this study the term module refers to a single unit or subject taken by the student on a course. This study will refer to the term course as the collection of modules taken by

students in a particular field or range of related fields of education (Cambridge, 2020; IESCD 2011); in this case, the Level 5 Certificate in Agriculture course in Ireland (QQI, 2009).

As described by O'Neill (2015), design includes nine key elements; 1) Context 2) Educational Philosophy 3) Curriculum model 4) Course Aims and Outcomes 5) Course Organisation and Structure 6) Teaching, Learning and assessment strategies 7) Module Design 8) Student and staff supports 9) Evaluation Strategies. In order to use a student centred learning approach a number of key considerations have to be made. Firstly in relation to the design of the course it would have to be assessed whether a change of philosophy and culture for using a SCL approach is required. Secondly the structure of the course would need to be integrative and have the time and space i.e. opportunity, for students to have deeper learning experiences. This requires the overall course content not to be overcrowded as a congestion of content can lead to students 'surface learning'. This can happen when a course has an excessive amount of; modules, learning outcomes and assessment strategies which encourages surface learning. If the space and time can be created for deeper learning opportunities where students become actively involved, responsible, autonomous learners, working with their peers, their teacher acting as a facilitator and using reflective practices with an assessment strategy aligned to this, students could become authentically engaged (Groccia, 2018; Huff et al., 2016; Schlechty, 2001).

Finally, another critical aspect is the resources required to implement a SCL approach. Considerations have to acknowledge whether the college has the appropriate physical spaces, number of teachers, classroom equipment, materials and critically, whether the teachers have been given sufficient pedagogical training and guidance on implementing this approach. Co-creation is required both to successfully implement this approach but also to continuously evaluate and enhance it. Stakeholders include the heads of the programme, teaching and learning specialists (if they are within the organisation), programme/ curriculum team, college management, teachers and the students who experience the approach. Each stakeholder holds responsibility for some aspect of implementing the approach. For example, the head of the programme may indicate that the culture/ philosophy will be changing towards a student centred approach and provides the resources required for this change. From here the responsibility lies with the teaching and learning specialists and curriculum team to develop the appropriate design and guidance on how to implement the approach. This would include appropriate training and guidance for both college management and the teachers. When this has been completed it will be the college management and teacher's responsibility to provide appropriate supports for students to transition to a student centred learning approach especially if they haven't been exposed to it previously. Both during and after the use of a student centred learning approach, evaluation

strategies are necessary so that the provider can evaluate how the change has been received by all stakeholders. It is imperative that this preparation is carried out as a provider should not go into changing to a SCL approach blindly as they need to be prepared and ready to make the necessary changes to implement the approach effectively (Bouhuijs, 2011; Schweisfurth, 2011).

2.14 How Universal Design for Learning can be integrated

UDL is a principle based approach to designing teaching and learning to meet the learning needs of all students (Padden et al., 2017). This requires consideration by all stakeholders within an education provider facility in how they can provide an inclusive term recognising students with different learning styles, different levels of competence in the area being studied, from various backgrounds and includes how the content within a course can be effective at providing supports for those who require learning supports in a variety of ways (McGuire and Scott, 2006). McGuire and Scott (2006) outline nine principles of universal design for instruction which offers guidance on strategies which can be adopted which will benefit a variety of learning styles, students from a variety of backgrounds and if students have any learning supports:

Principle 1: Equitable use – This principle refers to the provision of class materials for all students without the need for any student to request an alternative format. This will provide all students with a variety or choice in how they can study the materials without the need to request this in public and prevent the potential for a student to be singled out.

Principle 2: Flexibility in use – This principle outlines the need to teach to an audience with a diverse learning styles. This requires the use of a variety of instructional methodologies and can include the use of choice in assessment. Research has shown that instruction which allows students to learn in a way that suits their individual learning style improves student performance outcomes (Higbee et al., 1991).

Principle 3: Simple and intuitive - This principle outlines the need for transparency and ease of use with regard to module content and assessment. Students should be able to ascertain all necessary details regarding topics to be covered, full reading lists, and assessment methods before choosing or beginning a module.

Principle 4: Perceptible information - This principle highlights the need for all material to be provided in an accessible format for all students.

Principle 5: Tolerance for error - This principle points to the problematic assumption that all higher and further education students come to a module with a certain set of 'core skills'. Students often come to modules without some of the experience or skills assumed by their lecturer/ tutor. This can be challenging as students can feel uncomfortable asking for help or clarification. It is vital to keep in mind the diverse range of students in a group. Students with hidden disabilities or those with varying educational backgrounds are not always easily identifiable.

Principle 6: Low physical effort - This principle highlights the need to remove any unnecessary physical exertion which includes excessive amounts of writing in class.

Principle 7: Size and space for approach and use - This principle points to the need for faculty to think about how best to use the physical space available to them. Faculty should consider the space when planning the design and delivery of modules.

Principle 8: A community of learners - This principle stresses the need for the development of a fruitful relationship among student groups and between faculty and students. It is the job of the faculty to provide opportunities for students to interact and collaborate with each other and with the teaching staff as this can have a positive impact both on student engagement and student retention (Elliot and Decker, 1999; Goodsell Love, 1999; Lenning & Ebbers, 1999, Tinto, 1998).

Principle 9: Instructional climate - This principle emphasises the need to ensure that each student has a positive educational experience. All students should be welcomed and an explicit affirmation of inclusivity should be provided at the outset of each module

These principles should be considered, evaluated, planned for and implemented within all education settings. Some of these principles can already be instilled in what an education provider offers but likely there will be some of these principles which have not yet been adopted. UDL requires more than just effort on part of the teacher or lecturer, it requires a college, programme management, teaching staff and support staff to work together to implement these principles and create a UDL environment. This is identical for the adoption of a SCL approach. For both UDL and a SCL approach, all stakeholders have responsibility and it is important that those in positions of management are acutely aware of this because they play a fundamental role in providing teaching staff with the platform to implement UDL and a SCL approach.

2.15 Chapter Summary

This chapter has described in detail the theories of learning that are intrinsically linked to student engagement and how this can be applied in practice to enhance engagement. The understanding of how people and indeed young adults learn is key to deciding how this type of learner is taught. It is clear from these theories and the psychology of engagement that a student centred learning approach can enable authentic engagement if it is done effectively (Fredricks et al., 2016; Groccia, 2018). As highlighted by literature on the use of student centred learning, it is imperative that education providers give it the appropriate consideration before implementing it (Bouhuijs, 2011; Schweisfurth, 2011). While the benefits of this approach are clear, the most important aspect of changing to a student centred learning approach is how this is done. Consideration for changes to the culture in the organisation, how to help teachers transition to their new role within this approach and the possible changes required to the course design i.e. course; aims and outcomes, structure, organisation and module design, must be considered. Failure to recognise these will lead to a less effective teaching approach and in turn less engaging experience for students.

Chapter 3: Methodology

3.1 Introduction

In this chapter, the research design, philosophy of social science research, research methods and ethical considerations for this study will be discussed. The action research design adopted in this study will be discussed according to the three phases of research in which this study was conducted. This will be followed by the philosophical perspective of social science research and its application within this study will be addressed. The phases of research will be broken down according to the research methods used in each phase. A description of how each research method was used and the objective they were working towards will also be discussed. This section includes a description of how the data was collected and subsequently analysed. This will highlight the degree of validity and reliability of the findings and ensure the trustworthiness of the findings presented. A description of the importance of ethics in social science research will be discussed followed by the ethical considerations in this study. The final section will conclude with a summary of the chapter.

3.2 Methodology – Action Research Project

The overall design for this study was an action research approach based on the Level 5 'Certificate in Agriculture' course in Ireland. As outlined by Elliot (1991) *“the fundamental aim of action research is to improve practice rather than to produce knowledge”*. While this is fundamentally true, it is important that action research explains in detail the steps taken in order to provide transparency in its findings; declare an intellectual/ theoretical framework; discuss analytical generalisations and transferability of findings (similar to case studies); and define appropriate forms of the accumulation of results from the action research process (Blichfeldt & Andersen, 2006). The broad purpose of action research can be traced back to Lewin (1946) who described how a theory can be put into practice but for it to be of value, this 'change' in approach needs to be investigated (Blichfeldt & Andersen, 2006). This not only means value for the organisation where the action research is being carried out but also to the wider academic community where more general themes are shared which can provide new knowledge to relevant communities.

The identification of student engagement in classroom settings as an issue where improvement was needed resulted from a whole college evaluation conducted by the Irish Department of Education and Skills (DES, 2016) and was the trigger for this study. Upon starting the research process an *“exploratory stance... where an understanding of a problem is developed and plans are made for some form of intervention strategy”* was adopted by the researcher Creswell et al. (2003). Phase 1 corresponds to when this project was originally a research Masters and explored factors that affect academic student engagement using a variety of research methods including classroom observations, interviews and focus groups. Subsequently, phase 2 (the first actions as part of the PhD study) implemented an

intervention strategy based on the findings from phase 1 by designing and implementing a pilot module in an attempt to create a more student centred approach within the current course design. During phase 2, data was again collected using the same research methods as phase 1 to compare data as a result of the intervention in phase 2 (Creswell et al., 2003). Phase 3 involved an analysis of the current course design based on the findings from phase 2. While academic student engagement was enhanced in phase 2, certain features of the current course design prevented constructive alignment with a student centred approach such as the assessment strategies and learning outcomes (Sagardia et al., 2018). In phase 3, data was collected which included feedback about the current course design from college management via interviews, a survey with teaching staff and a desk analysis of the current course design. This phase of research sought to investigate what steps may be taken by Teagasc to progress to the use of student centred learning approaches. There were a number of ethical considerations when conducting this research with students, teachers and college management, so full ethical approval was received from University College Dublin.

3.3 Philosophy of social research

The purpose of social science such as this action research project (Creswell et al., 2003), is to understand social reality as different people see it and demonstrate how their views shape the action which they take within that reality (Bracken, 2010). This study incorporated a mixed methodological approach with a combination of quantitative (positivist) and qualitative (interpretive) methods. These are considered the two major fronts within the domain of research (Bryman, 2016; Sarantakos, 2012). The focus of quantitative research is to quantify and generate statistics in relation to a social issue whereas qualitative research looks on words, meanings, pictures and objects that are seen to influence social issues.

Social research has the ability to generate knowledge and identify regularities in social processes which are expected to help us understand the presence, type, extent and causes of problems as well as the ways they can be controlled. Therefore, research projects are taken with a particular aim in mind and these aims depend on the paradigm that will guide how the project is carried out (Sarantakos, 2012);

- **Positivist research** – This type of research strives to explore, explain, predict and develop/ test theories;
 - Explore social reality for its own sake or in order to make further research possible.
 - Explain social life by providing reliable, valid and well-documented information.
 - Evaluate the status of social issues and their effects on society.
 - Facilitate predictions.
 - Develop and/ or test theories.

- **Interpretive research** – This focuses on understanding people;
 - Understand human behaviour and action

- **Critical research** – This aims to facilitate a critique of social reality, emancipating people, empowering them to change social reality by suggesting possible solutions and thus listening to them from oppressive and exploitative social structures;
 - Offer a basis for a critique of social reality
 - Emancipate people
 - Suggest possible solutions to social problems
 - Empower and liberate people

This research project followed a positivist approach whereby the project focused on exploring the issue of academic student engagement within the setting of Teagasc and tested theories on how to enhance academic student engagement. This is underpinned by the philosophy of social research whereby there are three fundamental factors that all social research projects have (Bracken, 2010; Sarantakos, 2012);

- 1) **Ontology** – Informs methodologies as to the nature of reality, or better as to ‘what’ social research is supposed to study.
- 2) **Epistemologies** – Informs the methodologies about the nature of knowledge, or about what counts as a fact and where knowledge is to be sought.
- 3) **Methodologies** – Prepares packages of appropriate research designs to be employed by researchers, instructing them as to where to focus their research activity and how to recognise and extract knowledge.

These are in a hierarchical and deterministic order as ontology constructs the logic of epistemology, epistemology structures the nature of the methodology and methodology prescribes the appropriate types of research methods, designs and instruments. Therefore, research is the execution of research designs which are constructed and guided by the ontological, epistemological and methodological prescriptions (Bracken, 2010; Sarantakos, 2012). There are two dominant ontologies when conducting research; realism and constructivism. The realist ontology has an empiricist epistemology, a quantitative methodology, a positivist paradigm and a fixed design. Constructionist ontology entails an interpretivist epistemology, a qualitative methodology, a number of paradigms and a flexible design although strict designs are also employed (Sarantakos, 2012). This project has adopted a predominant constructivist ontology but some aspects of a realist ontology have also been integrated. Therefore, it has been classified as a mixed methodology approach for this action research project.

3.4 Ethics in social science research

Ethics are a critical aspect of research as there can be motives for an organisation or a researcher to achieve a certain goal from a research project. Motives can be intrinsic i.e. personal interests of the researcher who commissioned the study or extrinsic which relates to the interests of those conducting the research. With either of these motives the goal of the research may be; educational – inform the public, magical – to offer credibility held by the researchers and/ or their sponsors, personal – to promote the academic status of the researcher, institutional – to enhance the research quantum of the institution for which the researcher works, political – to provide support to political plans and programmes or tactical – to delay decisions or action for as long as the investigation is underway (Sarantakos, 2012). Political has the potential to have the most influence out of these as there are three main sources of knowledge; the producer of knowledge, the controller of knowledge and the consumer of knowledge. The way in which these three sources affect political influence varies in a number of ways from; promoting one type of research and suppressing another, selective support of research beneficial to a political plan and the control of research practice by developing and enforcing relevant professional standards (Sarantakos, 2012). While ethics cannot stop these influences it can help research to achieve the primary goals of the code of ethics; 1) To protect the welfare of groups and individuals with whom and on whom sociologists work or who are involved in sociologists research efforts and 2) To guide the behaviour and hence the expectations of social science researchers, both between themselves and toward society at large (Bryman, 2016; Sarantakos, 2012). As part of this study, many considerations were made for stakeholders affected by this study. Students were asked to volunteer to participate and were informed of classroom observations prior to commencing, teachers were asked to participate voluntarily and the researcher worked with college management and the curriculum team to create and implement the pilot module. Consent was received from every participant as part of this project i.e. research methods and to implement the pilot module where permission was granted to implement the pilot module in phase 2 i.e. intervention strategy.

3.5 Research methods & Organisation of the study

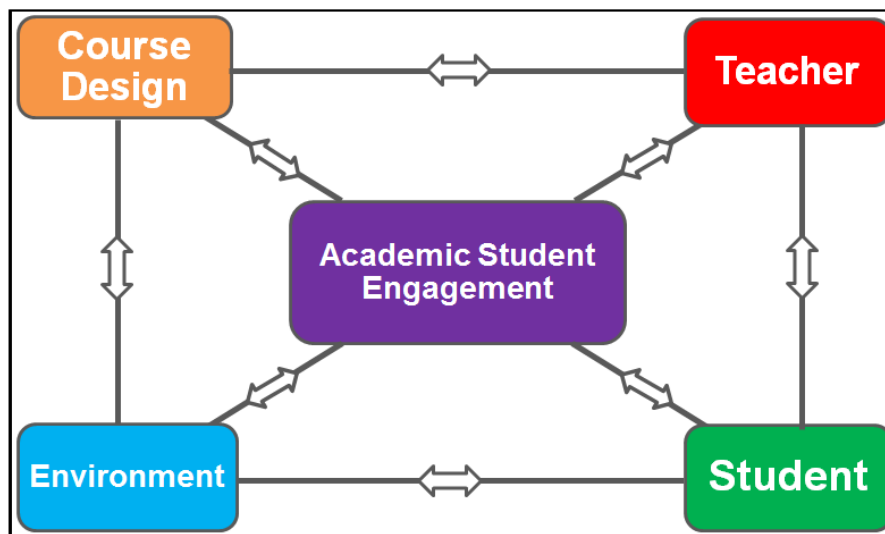
This research was conducted in three distinct phases in which a variety of research methods were used. These will be discussed in the order in which they were used within each phase:

3.6 Phase 1 – Exploratory phase

An exploratory stance was adopted in this phase due to academic student engagement being identified as an issue as part of a whole college evaluation of Teagasc courses. This research project was a response to this finding. This phase reviewed literature to understand student engagement, how to evaluate it and in turn what type of teaching approaches could

be implemented to enhance it. From this review of the literature, a conceptual framework was developed consisting of four factors which were considered to have an influence over academic student engagement; 1) Course Design 2) Teacher 3) Student 4) Environment (See Figure 3.1 below). This exploratory phase sought to investigate which of these factors had the most influence over academic student engagement on the Level 5 ‘Certificate in Agriculture’ course and in turn investigate what type of action may be taken to enhance it.

Figure 3.1: The original conceptual framework of the factors seen to affect academic student engagement were identified in phase 1



Course Design: A course refers to a collection of modules, resources, organisational and evaluation strategies. The design of a course includes the courses; aims, outcomes, structure, organisation, module specifications (learning outcomes, assessment strategies) and mode of delivery within the course (O'Neill, 2015).

Teacher: Refers to the teacher who is responsible for delivering material in the classroom. A teacher is responsible for delivering a module on a course i.e. learning outcomes and assessment strategies and as such chooses how to align their teaching methods with this. This factor includes the influence of a teacher’s delivery style, personality and ability to interact or engage students.

Student: This refers to a student’s own motivations to learn (intrinsic, extrinsic or a combination of both), their own learning style, their ability or willingness to engage and attitude towards their education.

Environment: This refers to the physical, affective and virtual learning environments. Students have physical classrooms spaces in which they have classes. An affective environment is primarily created by the teacher but also the education provider. A virtual

environment refers to the online learning environment which students have; Moodle, Blackboard, Brightspace etc. and is used as part of the overall teaching approach.

3.6.1 Key informant Interviews

Interviews were conducted with four educational specialists from national and international Universities. These interviews were semi-structured and conducted using the same interview schedule each time (See appendix 3). The aim of the interview was to ask each interviewee, which of the four factors they felt had the most influence over academic student engagement. This allowed the interviewees professional opinion to guide the interview by using a semi-structured interview and reduced the potential for the researcher to influence how a question was answered (Bryman, 2016). Once an opinion was expressed, the researcher could then probe why they felt a factor was influential and this was a distinct advantage of using a semi-structured interview with this group of participants (Bryman, 2016; Phellas et al., 2011). Once finished discussing which of the four factors they felt has the most influence, discussion would move onto the factor they felt had the second most influence over academic student engagement and so on, until all four factors had been discussed. From each interview, all four factors were discussed and ranked in the order the interviewee felt had most to least influence on student engagement (See appendix 3).

Each of the four educational specialists discussed at length the influence of each of the four factors on student engagement but did so in order of their ranking. While they considered course design as being the most influential, they did not suggest that the other three factors are not important. They highlighted that the course design factor influences all of the other factors significantly and therefore influences the type of learning environment which can be created by an education provider to engage students. One interviewee captured this thinking that course design “... *is the major one because if you really think through the course design, everything else follows from that philosophy and design*”. Another key rationale for considering course design as the important factor is that “... *Course design is ... something we can work with*”. A critical aspect of this research was its focus on what an education provider can do to enhance engagement especially within the academic setting rather than a broader focus on the topic of student engagement. From the experience of one interviewee, they highlighted that “*You can come up with a list of approaches, an easy list in some ways, that make the classroom more active or engaged but from my experience I think some of the bigger problems come from the design of the programme*”. These four interviews all pointed to the importance of the design of the course and to the need for this study to examine the influence and role of course design in enhancing engagement.

3.6.2 Classroom Observations

In phase 1, as part of evaluating academic student engagement, direct observations were chosen as a research method. There are two primary methods which are viewed as being capable of evaluating student engagement; direct observation and self-report methods (O'Malley et al., 2003). The advantage of using direct observations is that students can lack the ability to accurately report their own behaviour and a teacher may have a bias in reporting the level of engagement in the classes they teach i.e. be subjective (Assor & Connell, 1992). This method was therefore seen as a way in which the level of behavioural student engagement could be evaluated and categorised by the researcher i.e. potential to be objective (See chapter 5 for a more detailed description of how this was designed or appendix 1). The classroom observations used in this study are categorised as semi-structured, non-participatory observations (Bryman, 2016; Phellas et al., 2011). Semi-structured refers to an observation schedule that bears resemblance to an interview or focus group schedule; every observation took into account the same topics based on what happened in the class (Bryman, 2016). Non-participatory refers to the fact that the observer observes but does not participate in the class (Bryman, 2016). A total of six different teachers, four different modules and classrooms categorised as small and large were observed. This allowed for an evaluation of the effect of different teachers, different modules (4 modules - 3 types; Core modules, two specialised modules and a supplementary training module – See chapter 4, table 1 for a description) and different classrooms. This allowed for gathering reliable, generalizable and comparable data which was used to compare phase 1 and 2 of this study (Phellas et al., 2011).

3.6.3 Focus Groups

This research method was used twice in phase 1. The first was with 12 members of teaching staff from one of the agricultural colleges who deliver the Level 5 'Certificate in Agriculture' course. This focus group looked to obtain feedback from teachers about each of the four factors which had been identified in phase 1. This was a more efficient way to gather the thoughts of 12 teachers rather than using interviews. It also allowed for discussion about topics raised as teachers could and did; agree, disagree, build on issues raised and allowed for people to bounce off each other (Acocella, 2011). Teachers were divided into four small groups and were assigned to four stations i.e. 1) Course Design 2) Teacher 3) Student 4) Environment. They were asked to discuss what they felt encourages and discourages academic student engagement at all four stations. When all groups had completed each station, all participants gathered at one station at a time to summarise and discuss the findings of each station. The aim of this was to identify from the personal experiences of the teachers who deliver the course about each of the factors and how they feel it impacts on their ability to engage students (See appendix 2).

The second time this method was used in phase 1 was with students at the end of phase 1. Based on the findings from phase 1, 'Course Design' was identified as the factor which had the most influence over academic student engagement and classroom observations identified certain types of modules as being less engaging than others. The focus group sought to ask students why this was and see what type of teaching methods or approaches they do find engaging (See appendix 4).

3.7 Phase 2 – Action phase

Based on the findings from phase 1 of this study, 'Course Design' was identified as the factor with the most influence over academic student engagement. In addition 'Core' module types were identified through classroom observations as the least engaging (0% of classes rated as 'High' engagement) and the student focus group reinforced this finding. As a result of this and the project being approved to be upgraded to a PhD study, planning for phase 2 began. This phase implemented a new teaching approach with a pilot module and sought to evaluate whether it enhanced academic student engagement. The pilot module attempted to use a student centred learning approach – Problem Based Learning (PBL) – within the current course design. The following research methods were used to evaluate the impact on academic student engagement;

3.7.1 Classroom Observations

The same classroom observation schedule was used in phase 2 as in phase 1. This was used to evaluate and compare if attempting to use a PBL approach could enhance academic student engagement (See appendix 1).

3.7.2 Student Focus Groups

At the end of the pilot module students were asked to volunteer to participate in a focus group. A total of two focus groups were completed with n=12 and n=8, culminating in a total of n=20 students participating. Students were asked to provide feedback about what they found engaging about the module, what could be improved upon and discussions even expanded to other aspects of the course (See appendix 6). This method was beneficial to obtain an in depth discussion and understanding of feedback about the pilot module compared to the understanding that can be achieved from a survey (Acocella, 2011; Bryman, 2016).

3.7.3 Student Survey

A student survey was conducted at the end of the pilot module. Students were asked to volunteer and participate in this with n=108 or 88% of students responding. This asked a series of quantitative questions where students were asked to rate the; delivery of the module, the module content and the fairness of the assessment strategies. In addition to this

students were asked to provide up to two aspects of the module they found engaging and disengaging about the pilot module – qualitative data (See appendix 7). This allowed for clear and concise feedback to be gathered from the majority of students who undertook the module which helped to increase the reliability and validity of its findings (Bryman, 2016; Phellas et al., 2011).

3.7.4 Interviews with teaching staff

Every teacher who taught in the pilot module were asked to volunteer to participate in an interview after the module was finished. All four (n=4) teachers agreed to participate in the interviews which was a 100% response rate (only 3 taught at one time but a teacher had to be replaced during the course of the pilot module). These interviews had the same interview schedule which sought to ask the teachers about; their experience of teaching on the pilot module, what they liked/ disliked or thought could be improved upon and how they felt about the researcher observing them (See appendix 5). Again this was a method which could capture another perspective of the pilot module from another stakeholder who was involved in it.

3.8 Phase 3 – Evaluation and reflection phase

Phase 3 was an evaluation phase which allowed for reflection on issues that arose during the pilot module (Creswell et al., 2003). This phase sought to investigate these issues in further depth and looked to identify solutions to the issues which prevented constructive alignment with a student centred learning approach in the pilot module in phase 2. The following research methods were chosen to investigate this issue;

3.8.1 Interviews with college management

There are six colleges who are funded by Teagasc to run the Level 5 'Certificate in Agriculture' (State owned - 4 and Private - 2). Due to the pilot module only being run in one of these colleges, phase 3 sought to acquire feedback from every college about the current course design. The interviews were conducted with all college management from these six colleges with a total of n=12 which represents a 100% response rate. These interviews used the same interview schedule in which participants rated and discussed key topics around the course design of the Level 5 'Certificate in Agriculture'. The purpose of interviewing college management was to gather their opinion (subjective) of the current course design based on their experience of dealing with the course (See appendix 8).

3.8.2 Survey with teaching staff

A survey was conducted with teaching staff. This was again aimed at all six colleges where all teaching staff in the Level 5 'Certificate in Agriculture' were asked to participate (N=69). A total of n=31 participated and this represents a 45% response rate for the survey. The

survey had the same structural schedule as the interviews with college management. It asked participants about the same course design topics as the interviews; asked them to rate the key topics around course design and provide a short written reason for this rating if they wished to do so (See appendix 9). The purpose of this research method was to gather the opinion (subjective) from people who work in delivering the course and what their experience of it has been like.

3.8.3 Desk Analysis

In addition, as part of phase 3, a desk analysis was conducted on the Level 5 'Certificate in Agriculture' course. This was an objective analysis of the course design and was based on key indicators from literature of the characteristics of a course design compatible with a student centred learning approach. This looked at four key factors of course design taken from O'Neill (2015), which were seen as influential in creating a course which can be constructively aligned with student centred learning;

- 1) Course Aims & Outcomes
- 2) Module Design
- 3) Course Structure
- 4) Course Organisation

Each of these aspects of course design were investigated to find out why the current course design did not allow for constructive alignment with student centred learning. It is important to recognise that it is how these aspects of course design work together that allow for student centred learning and not any individual aspect. The purpose of this research method was to provide a more objective analysis of the course design compared to both the interviews and survey which were based on the subjective opinions of its participants. This method sought to triangulate, validate or disprove anything that arose from these methods. This is described and explained in more detail in Chapter 6 (See appendix 10 for analysis conducted on the course design).

3.9 Data analysis

As part of this research, a mixture of quantitative and qualitative methods were used to gather data throughout this research project; direct observations, interviews, focus groups, a desk analysis and surveys.

3.9.1 Qualitative data analysis;

For the qualitative data collected (Interviews, focus groups and part of the direct observations), a thematic analysis was conducted. For this to be achieved, NVivo Pro 11 software was utilised to thematically analyse the data from these methods. NVivo allowed for data to be coded under 'Nodes' which can be named according to a theme i.e. extracting

core themes from the transcripts (Bryman, 2016). This allows for each code which is created to become a category or theme under which aspects of the transcript can be placed. Bryman (2016) describes coding as “*a process whereby the data are broken down into their component parts and those parts are then given labels*”. Organising qualitative data in this manner then allows the researcher to interrogate the data for recurrences of certain themes within the transcripts and for links between these themes. Additionally as part of the desk analysis a number of comparisons to a student centred design were made against the current; course aims & outcomes, module design, course structure and course organisation (See appendix 10).

3.9.2 Quantitative data analysis;

The quantitative data collected as part of this research was analysed using IBM SPSS statistics 24 for the surveys used and Microsoft Excel for the classroom observations. The two surveys used in this research were analysed using the SPSS software which allowed for descriptive statistics to be extracted and used as part of the research. For classroom observations, the quantitative data where the researcher rated various aspects of the class that was observed under four headings was analysed with Microsoft Excel; 1) Course Design – Module Content 2) Teacher – Methods and Delivery 3) Environment – Physical and Affective 4) Student – Level of behavioural student engagement in class (See Chapter 5 for more detail of the classroom observation schedule and Appendix 1). Each of these categories included several sub-categories which were rated and the average of these accounted for the overall category rating. These ratings were recorded on a Microsoft Excel sheet, where on completion of all classroom observations the ratings were ranked according to the ‘Student’ column i.e. Section 4 - Level of behavioural student engagement. This ranking of classes was then categorised into; High, Medium and Low levels of behavioural student engagement based on criteria for their rating (See Chapter 5 for more detail).

3.10 Ethical considerations and approval

There were a number of ethical considerations undertaken as part of this research project. Firstly, any individual who volunteered and participated in the research would be informed of the purpose of the research and how the data will be used via an information leaflet (See appendix 11). In addition, each participant was asked to sign a consent form which detailed how this data will be used and also that they will be de-identified as part of it (See appendix 12). Similarly for classroom observations the researcher sought permission from college management, the teachers delivering the module and asked for their consent to conduct these classroom observations. In addition, when first entering a class for classroom observations, the researcher would explain to the students that they were sitting in on the class to observe but would not mention specifically they were observing student

engagement. This was in the hope that students would not act differently as a result of knowing why observations were being conducted i.e. a reactive effect. There were a number of ethical considerations when conducting this research with students, teachers and colleges, so full ethical approval was sought and received from University College Dublin (UCD) to complete this study.

3.11 Summary of chapter

This chapter has reviewed the philosophy of social science research and how it has been applied to this study. Based on this review and implementation of research methods the ontology of this study was a predominantly constructionist ontology with some aspects of realism i.e. a mixed methodology approach. These were conducted within three phases of action research with the first phase adapting an exploratory stance to investigate the topic (Creswell et al., 2003). Phase two built on the findings from phase one and took action on these findings by implementing a change of teaching approach to compare versus the conventional approach used in phase one. Phase three adapted an evaluation stance where it investigated the barriers to constructive alignment of student centred learning approaches in the current course design of the Level 5 'Certificate in Agriculture'. All phases adopted a mainly constructionist ontology with aspects of a realism ontology also being utilised. The research methods utilised in this study were; direct observation, interviews, focus groups, surveys and a desk analysis.

Findings from this study will be presented in the next three chapters which are papers that have been submitted to academic journals for peer review:

- **Chapter four presents;** *'Enhancing academic student engagement in vocational agricultural education; Why Course Design matters'*. Submitted to the Journal of Vocational Education and Training.
- **Chapter five presents;** *'The value of using classroom observations as part of a multi-methodological approach to evaluate student engagement in vocational agricultural education'*. Submitted to the Journal of Educational Research and Evaluation.
- **Chapter six presents;** *'Examining course design barriers to implementing student centred learning approaches to enhance academic student engagement'*. Submitted to the Journal of Vocational Education and Training.

Chapter 4: Results

Enhancing academic student engagement in vocational agricultural education; Why Course Design matters

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Enhancing academic student engagement in vocational agricultural education; Why Course Design matters

Abstract

This paper outlines the influence course design has on the ability of a college to deliver a student centred learning approach. This action research project is an example of a course redesign at vocational level which created a more student centred approach and in turn enhanced academic student engagement compared to its traditional delivery. Phase 1 of research looked at academic student engagement in a traditional lecture format and was observed 66 times in three different types of modules. This identified that one type of module presented a significant challenge with 0/16 classes rated as 'high engagement', primarily due to the subject content. Phase 2 redesigned this type of module to create a more student centred learning approach to evaluate if this would enhance academic student engagement. Observations carried out on 24 classes of the redesigned module resulted in 16/24 rated as 'high engagement'. This course redesign enabled the use of a more student-centred learning approach in a course which did not support its use. Greater awareness amongst those working within vocational education is required on the impact of course design on academic student engagement. To enhance academic student engagement, course design should be the first consideration.

Keywords: Academic student engagement, course design, student-centred learning approaches, action research, classroom observations

Introduction

This paper presents an action research project which investigated the keys to enhancing academic student engagement in an Irish vocational agricultural setting. Teagasc is a semi state organisation in Ireland which delivers vocational agricultural education as well as agricultural research, and advisory services. It provides further education in agriculture, food, horticulture, forestry and equine studies in seven colleges in Ireland (Teagasc, 2019). From 2013 to 2016 the Irish Government's Department of Education and Skills (DES, 2016) carried out whole college evaluations in Teagasc colleges on the vocational agricultural courses. It was found that academic student engagement needed improvement and this paper presents the findings of the initial response to this challenge.

What is Academic Student Engagement and why does it matter?

Academic student engagement can be defined as the:

degree of attention, curiosity, interest, optimism, and passion that students show when they are learning or being taught, which extends to the level of motivation they have to learn and progress in their education

(Glossary of Education Reform 2016)

Academic student engagement is seen as a gateway to learning which can lead to higher academic achievement (Fredricks et al., 2016; Zyngier, 2008). Following the whole college evaluation, it was recommended that Teagasc take action to enhance academic student engagement. Evidence from the literature outlines that student engagement has three distinct dimensions that are categorised from a psychology standpoint by (Fredricks et al., 2016); and (Fredricks & McColskey, 2012) as;

- (1) Behavioural** - Physical actions which show a student is engaged i.e. participating in activities assigned by the teacher or as part of a task they are completing
- (2) Cognitive** - The ability of a student to focus their attention on a task i.e. listening, thinking about and comprehending the material they are studying
- (3) Affective** - The moods, feelings and attitudes which students may display or have towards a subject i.e. enjoyment, laughter, passion whilst participating in a task for the subject which they are studying.

A student centred learning approach can target the psychological needs (autonomy, competence and relatedness) of a person i.e. the student in this case. The three dimensions are targeted by giving the student more responsibility, autonomy and from this the student engages deeply in order to achieve a goal either individually or as part of a team. This

approach creates value in the work being done by the student and acts as a motivation which facilitates optimal functioning and psychological wellbeing (Huff et al., 2016; Jang et al., 2016; Ryan & Deci, 2000).

Lea et al. (2003) and Brandes and Ginnis (1986) outline key aspects of student centred learning as; active rather than passive learning; a deep approach to learning and understanding; increased responsibility, accountability and autonomy in the learner; interdependence, equality and mutual respect with the teacher/ learner relationship; and a reflexive approach to the learning process on part of both the learner and teacher. Student centred learning targets the development of the student through participation, responsibility, autonomy and development of both discipline specific (technical) and transferable; knowledge, skills and competencies.

Another important aspect of academic student engagement is a student's own initial motivation. Extrinsically motivated students want to achieve high grades, get qualified, and may have pressure to achieve from parents, family, scholarships, rewards, or punishments as their motivations. Intrinsically motivated students have an interest in the subject area or enjoy the tasks, take responsibility for a challenge and want to learn more about the subject. How a student is motivated can significantly impact on their engagement (Huff et al., 2016; Ryan & Deci, 2000; Saeed & Zyngier, 2012). Intrinsic motivation is necessary for enhanced engagement, but it is important to note that a balance of extrinsic and intrinsic motivations can be targeted together in the design of a course (Zyngier, 2008).

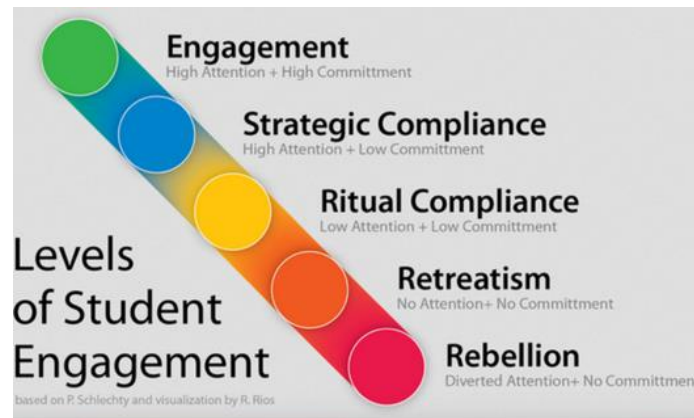
Why Course Design is critical for academic student engagement

The design of any course needs to take into account the intended approach to be taken so that constructive alignment can be achieved. This is when the aims, activities and assessments align constructively and coherently in order for students to achieve the course and learning outcomes to develop both discipline specific (technical) and non-discipline specific (transferable) knowledge, skills and competencies (Biggs, 1996). The design of a course needs to support the type of teaching approach to be used and there are 9 key design elements which apply to any course; 1) Educational philosophy 2) Curriculum model 3) Aims and Outcomes 4) Organisation and structure 5) Teaching, learning and assessment strategies 6) Module Design 7) Staff and student supports 8) Evaluation Strategies 9) Context (O'Neill, 2015). Failure to consider constructive alignment in the design of a course can lead to critical barriers to delivering an engaging learning experience for students.

Previous research by Schlechty (2002) has established a continuum for student engagement which categorised engagement into five levels (See Figure 1 below - Rios, 2019). The

continuum shows that a student can range in their level of engagement during their course depending on the type of activities which they have to carry out, the content, the time of day/year, the teacher for their module and their peers.

Figure 1: This infographic shows different levels of student engagement and was created by Dr Roland Rios based on Schlechty's student engagement continuum.



A course which is delivered and assessed in a traditionally didactic or teacher centred manner gives a student less opportunity to engage actively, to take responsibility for their learning and doesn't enhance a student's intrinsic motivations. A student-centred learning (SCL) approach can give the student the opportunity to take more responsibility for their own learning. Newmann (1992) encapsulates the concept of engagement and motivation about student's involvement in their own learning as:

...a psychological investment in learning. They try hard to learn what the school offers. Students take pride not simply in learning the formal indicators of success (grades for example), but understanding the material and incorporating or internalizing it in their lives (p. 1)"

Engaged students associate the task they have been set with a result or product that has meaning and value for them which in turn inspires the student to persist in the face of difficulty and in turn learn at higher levels (Schlechty, 2001). The ability of a student to develop during these learning opportunities can test their ability to be creative, analyse, problem solve and work with peers.

Research Design

This was action research design based on a single vocational agricultural course in Ireland. As outlined by Elliot (1991) "the fundamental aim of action research is to improve practice rather than to produce knowledge". While this is fundamentally true it is important that action research explains in detail the steps that were taken in order to provide transparency in its

findings; declare an intellectual/ theoretical framework; discuss analytical generalisations and transferability of findings (similar to case studies); and define appropriate forms of accumulation of results from the action research process (Blichfeldt & Andersen, 2006). The broad purpose of action research can be traced back to work by Lewin (1946) who conceived it as a way in which theory can be put into practice but that this 'change' in approach needs to be investigated in order for it to be of value (Blichfeldt & Andersen, 2006). This not only means value for the organisation where the action research is being carried out but also to a wider academic community where more general themes are shared that can provide new knowledge to relevant communities.

As outlined at the beginning of the paper the problem of engagement was identified as a result of a whole college evaluation. Thus the problem, engagement in this instance, was presented to the researcher which is a key difference between action research and a case study as outlined by Blichfeldt and Andersen (2006). As a result of this an "*exploratory stance*" was adopted "*where an understanding of a problem is developed and plans are made for some form of intervention strategy*" (Creswell et al., 2003). In Phase 1 of research, factors that may affect academic student engagement in the agricultural college were explored using a variety of research methods including classroom observations, interviews and focus groups. Subsequently Phase 2 implemented an intervention strategy based on the findings from phase 1 by designing and implementing a pilot module (a core and transferable skills module combined¹ - See Table 1) in an attempt to create a more student centred approach within the current course structure. During Phase 2, data was again collected using with the same research methods as Phase 1 to allow for a comparison of data due to this change or intervention (Creswell et al., 2003).

There were a number of ethical considerations when conducting this research with students and teachers, so full ethical approval was sought and received from University College Dublin.

¹ For ethical reasons the name of the modules used are not being disclosed to protect the identity of the participants in this study. This is the same approach taken with interviews and focus groups and was in line with the guidelines from the ethics committee in University College Dublin.

Table 1: Description of all module types which were observed.

Descriptions of Core, Specialised, Supplementary training and transferable skills modules:
- Core Modules are mandatory and cover the basic principles of agricultural science, financial management, health and safety, the structure of Irish agriculture, policy and legislation.
- Specialised modules focus on the basic principles, knowledge and skills necessary for animal and crop husbandry associated with different farm enterprises.
- Supplementary training modules are also provided which are technical in nature as they focus on knowledge and skills ranging from maintenance of farm buildings to safe application of pesticides.
- Transferable skills module is mandatory and covers the principles and practice of a variety of personal skills for students to develop; Interpersonal skills, communication skills in a variety of formats, team work, research skills and time management. The purpose of this type of module is to focus on the competencies and skills which are transferable to a variety of scenarios which will be beneficial to students in their future careers.

Research Methods - Phase 1

Interviews, focus groups and observations were used in Phase 1. Key informant interviews with four educational specialists from national and international universities highlighted how much of an influence course design has on academic student engagement. A focus group with teachers in an agricultural college also highlighted how much course design impacts their role. Observations across 66 classes overwhelmingly showed a clear struggle for students to engage with core modules compared to any other type of module observed (See Table 2). Finally a student focus group concluded that students found core modules more difficult to engage with due to their content and the didactic manner in which they are delivered.

Research Methods - Phase 2

Phase 2 involved the redesign of a core module combined with a transferable skills module to form a pilot module. This enabled the use of a more SCL approach in a course structure and assessment verification process designed for a traditional teacher centred approach. The combination of two modules allowed for the integration of discipline and non-discipline specific knowledge, skills and competencies in order to create a reward for students (Maher, 2004; Saeed & Zyngier, 2012) to engage with a more SCL approach by incorporating aspects of problem based learning (Barrett, 2017; T. Barrett & Moore, 2010). Problem based learning (PBL) can be defined as (Merritt et al., 2017):

...a teaching/ learning experience that provides students with problems before they receive any instruction

The purpose of PBL is to create educational activities which relate to what a graduate will do in real life on completion of their course. These will also consist of some form of transferable skills integrated with these educational activities. This is achieved through 'problems' or 'scenarios' whereby a student is required to decide how they should deal with the situation presented to them. A real life task or problem provides students with an opportunity to practice and develop how they will deal with these scenarios by developing knowledge specific to the task (discipline specific) as well as transferable skills (non-discipline specific) i.e. evidence based research, peer-peer learning, problem solving. Students are expected to work actively and collaboratively in small groups to investigate, pose questions, gather information, and carry out the work necessary to resolve the problem. Students engaged in PBL:

...increase knowledge and develop understanding by identifying learning objectives, engaging in self-directed work, and participating in discussions

(Barrows & Tamblyn, 1980)

The current overall course structure is characterised by segregation of discipline and non-discipline specific knowledge and skills. Therefore the theoretical framework for this research was to implement a 'course redesign' that would integrate these to allow a more student centred approach that could enhance academic student engagement. This created a pilot module which aimed to test the difference in behavioural engagement of students with a more SCL approach compared to the traditional didactic approach which was explored in Phase 1.

The stages in the redesign process included:

- (1) Identification of a core module and a transferable skills module that could be combined to incorporate aspects of PBL. Combining two modules would allow for smaller group sizes as well as rewarding students with marks for the transferable skills such as working in teams, problem solving and making presentations that are required in PBL (extrinsic motivation).
- (2) Design of real life problems that would address the learning outcomes within each module. Students would be assessed on their transferable skills as they worked on the problem in small groups (Intrinsic & extrinsic motivations) culminating in a presentation. Similar to the study by Monks (2010) in a vocational electrician apprenticeship in Ireland, students completed a prescribed summative assessment (theory examination as part of the core module) at the end of each problem to comply with the current quality assurance standards. The current set of assessment strategies on the course did not have the flexibility to be changed to align with a different approach thus

impeding the constructive alignment of the pilot module (Biggs, 1996, 2003). The problems were developed by the researcher through consultation with faculty in the college.

- (3) Plan the organisation and structure of the module so that students would work on two problems for the module with a timeline for each problem and each assessment. Three teachers and three small classrooms were assigned to the pilot module.
- (4) Guidelines were prepared on the use of problems for learning for teachers so that they understood how the pilot module would work. This included explaining the teaching, learning and assessment strategies. Ideally the teachers should have been involved in the development of the problems but the teachers were not allocated until two weeks before the beginning of the module. Meetings and communication with the teachers took place once they were assigned to explain the process and address/ clarify any issues or concerns raised by the teachers.
- (5) Guidelines and an introductory phase were also planned for the students so that they would understand what was expected of them with a problem based learning approach.
- (6) The final stage of the design process involved ensuring the staff had all the required materials (an introduction to problem based learning for students, problems, marking schemes etc.) and were clear on what they would be doing. Teachers were also briefed on how and what research would be conducted i.e. classroom observations, interviews, and a rough timetable for when these would be happening.

Classroom observations

Semi-structured non-participative classroom observations (Bryman, 2016) were used in both phase 1 and 2 to observe in reality what affects behavioural academic student engagement. An observation framework was developed and piloted to assess the level of behavioural academic student engagement. Prior to commencing observations teachers were approached to acquire their consent. The teachers were told the purpose of the observations, how often they would be and how they would be used. The researcher sat as a non-participant at the back of the class for 66 classroom sessions in Phase 1 and 24 classes in Phase 2 (pilot module), noting behavioural indicators of engagement and how/ if they changed over the course of the class.

In Phase 1, the 66 classes covered three different types of modules, six different teachers, small and large class sizes. The results from each observation were collated and categorised as having had low, medium or high levels of behavioural engagement based on a rating scale used in the observation framework. Those that were categorised as 'low' were ones where students showed little interest, were distracted or visibly bored. Those categorised as 'high' were typified by students asking questions, answering questions, enjoying participating in questions, debates, role plays etc. These classes showed that students were interested and willing to participate in activities and tasks allocated to them.

In Phase 2 the same framework and categorisation was used with the pilot module. Observations were conducted with each teacher and each cohort of students several times in both phases to overcome the reactive effect of the researcher observing i.e. affecting the normal behaviour of teachers or students (Bryman, 2016).

Student Survey and Focus Group

A student survey was conducted with 108 students who took the pilot module (89% response rate). This gathered feedback in the form of ratings (quantitative data) of particular aspects of the module as well as some open ended questions about what they found engaging and not engaging about the module (qualitative data). While a survey is effective at collecting feedback from a large proportion of the population, it can lack in-depth feedback (Assor & Connell, 1992). Focus groups were conducted to follow up on the survey data to get more insight from students.

Two focus groups were conducted (12 and 8 participants). Students were asked to volunteer to participate in these by the researcher. A focus group is an ideal opportunity for a researcher to ask questions, have discussions, for students to build on comments made, probe answers given and gathering in depth feedback from the group (Acocella, 2011; Bryman, 2016). Giving the student a voice to give feedback was imperative in the case of this pilot module but could also be a valuable evaluation strategy for any course (Brooman et al., 2014).

Teacher Interviews

Interviews were conducted with all four teachers who taught on the pilot module to get feedback on their experience. Three of the teachers who taught on the pilot module had completed a Level 5 (EQF – European Qualification Framework) Certificate in Teacher Training prior to the pilot module. However, none of these courses had dealt specifically with PBL. This is a recognised limitation as the researcher planned for teachers to be involved from the early stages but circumstances outside of their control did not allow for this.

Results

The results from Phase 2 (pilot module) of the research are presented and discussed in this section;

Classroom Observations

Observations were conducted in the pilot module (Phase 2) to compare engagement levels with Phase 1. Observations show that students were substantially more engaged in the core module in Phase 2 (16/24 – 66.66% categorised as high - Table 3) than they were in Phase 1 (0/16 – 0% categorised as high - Table 2). The pilot module allowed the students to work in small teams on real life problems and this impacted significantly on their engagement with the subject.

Table 2: Results from the classroom observations conducted in Phase 1

Type of Module	No. of classes observed	No. in Low Engagement Category	No. in Medium Category	No. in High Engagement Category	Classroom Type
Core	16	12	4	0	Large (11) & Small (5)
Specialised No. 1	31	4	18	9	Large (6) & Small (25)
Specialised No. 2	11	0	1	10	Large (11)
Supplementary Training	8	2	4	2	Large (8)

Table 3: Results from the classroom observations conducted in Phase 2

Core & Transferable skills module combined	No. of classes observed	No. in Low Engagement Category	No. in Medium Category	No. in High Engagement Category	Classroom Type
Pilot Module	24	1	7	16	Small

Student Survey (n=108)

At the end of the module, students were given a questionnaire and asked to rate several elements in the pilot module out of 5. Table 4 below summarises the ratings given:

Table 4: Student ratings on content, delivery and assessment of the pilot module (n=108)

Elements of pilot module	Rating Scales (5 Point Likert scale)	Average Rating out of 5
Module content	Very irrelevant - Very Relevant	2.74
Delivery	Very ineffective - Very Effective	3.01
All assessment types	Very unfair - Very fair	3.22

Students were also asked to give qualitative answers about aspects of the module that they found engaging and aspects that they did not find engaging. Table 5 below summarises the number of times different aspects were mentioned as either engaging or not engaging.

Table 5: Aspects of the pilot module which students mentioned as engaging or not engaging (n = 108)

Aspects of Pilot Module	Mentioned as Engaging	Mentioned as Not Engaging
Group work	64 (59%)	8 (8%)
Presentations	40 (37%)	42 (39%)
Content	40 (37%)	11 (10%)
Problem Base Learning approach	18 (17%)	3 (3%)
Working on problems	10 (9%)	3 (3%)
Assessments	20 (19%)	7 (6%)
Computers/ Researching	11 (10%)	12 (11%)
Too many classes per week	0	24 (22%)
Teacher	5 (5%)	0
Change of teacher	0	3 (3%)

This indicates that students found many aspects of the pilot module engaging. The delivery in a variety of forms, as well as the fairness of the assessments had the highest rating. Assessments were mostly aligned to the tasks that they were given and students knew what was expected of them in the assessments. The elements that students found engaging were group work, content, PBL, working on problems and assessments. It is unsurprising that there were elements that didn't engage some students or that they found challenging. This does not mean that challenging tasks should not be done, but that tasks should be balanced so that they are both engaging and challenging for students.

Student Focus Group - Thematic analysis

Twenty students participated in the two focus groups. A key theme from the student focus group was that whilst it was an engaging module there were also elements of the pilot module that caused frustration. The collection of this type of information is vital and corresponds with the teacher's feedback and observation results.

Positive Engagement

A variety of factors contributed to positive engagement by students; getting to know the teacher better, how they were taught, working with groups, discussions and also the subject matter itself. Students discussed how ordinarily they find core modules less engaging as they can be in large classrooms where teachers predominantly rely on a traditional lecture format. By combining two modules it was possible to have smaller class sizes and to use problems

as a basis for learning. This course redesign enabled the use of a more SCL approach which in turn enhanced engagement.

Students found it beneficial to work with groups on a problem as it allowed them to engage with their peers and opened their mind to other ideas. Students were engaged behaviourally and likely cognitively as a result of this. Two students commented that;

S1; It is more relevant and brings it back to how you might do it at home (on the farm) so using real life examples makes it much more interesting. Other times when lecturers just read off their slides, you don't really see any relevance of it

S2; You were getting other people's opinions so that you weren't working on your own all of the time

Issues leading to low engagement;

Students highlighted some issues in the pilot module such as having too many contact hours per week and having to do too many presentations. The presentations provided a challenge for students so perhaps unsurprisingly they weren't enthused to do more than one. This does not mean they are not worth doing but that students find them challenging and they need some time to become accustomed to doing them.

In the focus groups, students also discussed challenges with their overall course work. They struggle with the amount of content they need to know for assessments. The current course structure and organisation means students can take 11 modules at once. Of these 11 modules, 9 have theory examinations that focus heavily on recalling knowledge and are all taken during the same short period of time.

Teacher interviews - (*T = Teacher)

Due to reasons outside of the control of the researcher teachers were assigned to the pilot module less than two weeks before it began. This meant that teachers missed out on the design stage of the pilot module and the problems as well as planning how it would work. This caused some confusion and anxiety before the module began as it was not only a new approach but it was also planned differently to a traditional module. Teachers highlighted these issues but also the benefits which they found during the pilot module.

Preparation, Structure and Organisation from the teachers' perspective;

The pilot module was designed, developed and delivered under a number of organisational constraints. These included timetabling, teacher allocation, resourcing as well as concerns over the 'fit' with the institutional assessment verification processes. This was a cause of

uncertainty and anxiety for teachers and college management. The time allocated to the pilot module was in line with the recommended hours for each of the two modules whereas when combined, they required less hours and teachers concluded that there had been too much time allocated:

**T1; We couldn't do anything because we were constrained by the modules having a certain number of hours, certain learning outcomes and assessments that we had to use*

Perception of students' readiness for a more student centred approach;

Teachers had concerns about student readiness for a more student-centred approach. They cited student immaturity, diversity and lack of experience with independent learning as challenges. When probed they elaborated that students have been conditioned through the secondary education system in Ireland where passive learning predominates. They felt that more support and preparatory work is needed to help students transition towards being independent learners as they progress towards a more student-centred approach:

**T2; It was certainly a much friendlier way of learning ... at a more mature level I feel there is a greater potential for it ... first year students are used to a system where they are being told what to do ... and suddenly they are being asked to think about it*

While the teachers did feel that some students were not quite ready for a more student-centred approach, they believed that students should develop these competencies and skills. This could be achieved by spiralling and scaffolding the competencies required for these approaches throughout different stages of the course i.e. that they are integrated into the course design (Hunkins & Ornstein, 2016; O'Neill, 2015). It is recommended and logical that if there is any knowledge, skill or competency which you wish your students to develop, especially some more complex ones, the sooner they start developing these the better. This will benefit the student as they will get more time and opportunities to develop them rather than attempt to do this in a condensed period of time.

Student engagement and group size

The teachers highlighted the benefit that the course redesign had on student engagement compared to traditional delivery;

**T3; We definitely got much better engagement than in a lecture theatre, I don't think anyone will argue against that*

The smaller group size allowed teachers to get to know their students better and they could react in real time to student's misunderstandings;

**T4; I like it because in smaller groups I got to know the students very well and I enjoyed going into the class ... that benefited the class and how I taught them*

Both teachers and students valued getting to know each other better reflecting the importance of a reciprocal and trusting relationship with a student centred learning approach. This benefited both parties as teachers could adapt to the needs of students and students were guided by their teacher when they felt they needed it resulting in them being more engaged with their work.

Discussion

This paper has presented an action research project which implemented a more SCL approach within a rigid course structure. As a result of this change in approach, academic student engagement was enhanced substantially in comparison to Phase 1 of the project. A key aspect of this was the course redesign (Combining two modules together for the pilot module) as it provided a structure for a more SCL approach to be taken. This allowed students' to participate in group work, take responsibility for tasks, discuss ideas with their peers in order to create a solution to their given problem, create presentations of their solution and coordinating how they would present it as a group. Students were behaviourally, and likely cognitively engaged in completing these tasks as they were responsible for their learning.

The pilot module not only allowed smaller group sizes but marks for students (extrinsic motivation) to engage with the tasks. The use of problems which used real life examples or scenarios engaged students as they became responsible for learning the module content (intrinsic motivation) rather than the teacher delivering the module content. This change in approach enhanced their engagement and was facilitated and guided by the teacher in the process. Students and teachers developed a reciprocally beneficial relationship and this came across in the feedback from both students and teachers.

This change in approach was not something every student immediately took to but over time they adapted and took on the challenge. Similarly the PBL style module was a challenge for the teachers as it was not something they had done before and not something that they had any formal training on. This caused some doubt and anxiety as students took time to adapt to this approach. Teachers saw this and the diversity of the classes meant that some students adapted very well and became comfortable with the task whereas some took longer to adapt. This challenge can be addressed and aided by alignment of the course design with a SCL approach i.e. aligning the delivery approach being taken with the learning activities and

subsequent assessment strategies used (Biggs, 1996, 2003). This was also a key and critical finding from a comparable study by Monks (2010) which discussed another vocational course within Ireland which introduced an adapted problem based learning approach. Formal training for teachers on the use of pedagogical strategies such as student centred learning approaches would also be beneficial as it would give teachers more knowledge, confidence and motivation (Flannery et al., 2020) on how to use SCL approaches and assessment strategies. However, without an overall course design to support this, teachers face significant barriers to putting their training into practice with the current course design in this context.

The pilot module, outlined in this paper, was parachuted into an established course design which had elements that constrained its effectiveness such as; the assessment verification process, the course structure and organisation, all of which need to align with a student centred approach to optimise its potential (Bouhuijs, 2011). Attempting to introduce problem based learning (a student centred learning approach) into an established college and course can be more challenging than in a new college (Bouhuijs, 2011; Schweisfurth, 2011). An important recommendation to any college when introducing student centred learning is not to underestimate the changes required especially to the key elements of the course design (Bouhuijs, 2011). According to Bouhuijs (2011) and (Barrett, 2005), viewing PBL or SCL as a classroom technique is a mistake as it is a total educational approach so the overall course design needs to be considered in order to implement it in a sustainable manner.

Several themes emerging from this study resonate with those of Monks (2010) who conducted a similar action research project; introducing an adapted PBL approach in an Irish vocational electrician apprenticeship course. In both cases the existing rigid assessment strategies were not flexible enough to allow them to be constructively aligned with a student centred learning approach (Biggs, 1996, 2003). In both cases a compromise was required to ensure that the students were prepared for the traditional type of assessment. Where this study differed from Monks (2010) was in the redesign decision to include a transferable skills module that would allow students to be rewarded for group work, problem solving and communications. This provided an extrinsic motivation (Saeed & Zyngier, 2012), to engage with the content from the core module which they struggled to engage with in Phase 1. This study also used classroom observations as an innovative research methodology with the findings triangulated by student and teacher feedback.

While both of these examples have been able to enhance academic student engagement in their contexts, a common theme is that they are hampered within the current course design i.e. constructive alignment is difficult when traditional theory examinations are the main means of summative assessment. This might suggest that within the Irish vocational education setting

that consideration will be required to the design of the course to enable constructive alignment with a student centred learning approach. Further empirical and macro level research may be required in order to determine whether this is a widespread problem within Irish vocational education and even within European vocational courses.

Conclusion

It is clear from the two phases of research that the course redesign was the catalyst to enhance academic student engagement in the classroom as it enabled the use of a more SCL approach. Students were more active, learned from their peers through group work, had to be responsible for their learning and worked on their problem solving skills in response to the problems which they were presented. Due to the diverse nature of the students within agricultural education their preference for practical work meant that enabling an opportunity for them to engage actively with theory was a motive for students to engage.

A limitation within this study was the extent to which changes could be made to the current course design. Further research could be conducted within this context to further improve on the results achieved within this study. Improvements to the constructive alignment of the course; structure, organisation and the module design to align with a student centred learning approach would provide the platform to optimise the approach and in turn sustain enhanced academic student engagement (Biggs, 1996, 2003; Monks, 2010). Given the substantial increase in academic student engagement from the changes made in this study, more awareness within vocational education is required on the impact of course design on creating an engaging learning experience for students. Further research and work on course design by organisations delivering vocational courses will be required to develop a better understanding of this topic within education at vocational levels and possibly higher education also.

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Declaration of interest statement

No potential conflict of interest was reported by the authors.

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Chapter 5: Results

The value of using classroom observations as part of a multi-methodological approach to evaluate student engagement in vocational agricultural education

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The value of using classroom observations as part of a multi-methodological approach to evaluate student engagement in vocational agricultural education

Abstract

This paper discusses the value of using classroom observations as part of a multi-methodological approach to understand what influences student engagement in classroom settings. This action research aimed to gain insights into what influences students to participate in the classroom and was conducted in an Irish vocational agricultural college as part of an initiative aimed to enhance classroom engagement. Classroom observations were used to examine how students interact in classroom settings: student's behavioural engagement as the cognitive and affective domains of engagement are more difficult to observe. The findings were triangulated and validated with data from teacher interviews, student focus groups and a student survey. This paper details the approach taken, how classroom observations were developed, used and the value they brought to evaluate what impacted student engagement within this context.

Keywords: Classroom observations, student engagement, multi-methodological approach, reactive effect, student-centred learning approaches, problem based learning.

Introduction

Teagasc is a semi-state “national body providing integrated research, advisory and training services to the agriculture and food industry and rural communities” in Ireland (Teagasc, 2020). Teagasc is the main provider of vocational education in agriculture, food, horticulture, forestry and equine studies in Ireland. From 2013 to 2016 the Irish Government’s Department of Education and Skills (DES, 2020) carried out whole college evaluations of these agricultural vocational colleges. These whole college evaluations were carried out over four days and like its title suggests, sought to understand a student’s overall experience in colleges delivering Teagasc courses. These evaluations looked at three key areas in each college: 1) The quality of management and leadership 2) Teaching and learning including the quality of care and support for students 3) The self-evaluation process. Based on these evaluations several strengths, areas for improvement and main recommendations were made from these reports for each college. One of the common themes was that student engagement in classroom settings was an area that could be enhanced through discussion, sharing of practices (within and between colleges) and action research. Practical aspects of the course were also evaluated but were not identified as an area where engagement was an issue. Several research topics were formed as a result of these reports: teacher training, student supports, work placement and the issue of engagement in classrooms. This paper will discuss the action research conducted as a result of this finding. It is important to distinguish that this project was formed to focus on and obtain a deeper understanding of the academic area of student engagement while several additional research projects were also formed to evaluate other issues found within these reports.

The whole college evaluations utilised a variety of methods such as meetings, surveys, classroom observations and focus groups with key stakeholders. The focus of these methods would have been broad in order for the government to obtain an understanding of the whole college. For this research project to obtain a deeper understanding of why student engagement in classroom settings was an issue, an action research design was adopted in this study and phase 1 was initiated by exploring the topic of student engagement (Creswell et al., 2003): A review of literature on student engagement, defining student engagement in relation to this project, identifying what research methods can be used to evaluate it and what teaching approaches have been shown to have the most potential to engage students.

What is Student Engagement?

Student engagement can be defined as the “degree of attention, curiosity, interest, optimism, and passion that students show when they are learning or being taught in classroom situations, which extends to the level of motivation they have to learn and progress in their

education” (Glossary of Education Reform, 2016). This definition includes several dimensions with three distinct dimensions coming from a psychology perspective (Fredricks et al., 2016; Fredricks & McColskey, 2012; Groccia, 2018):

- (1) Behavioural** - Physical actions which show a student is engaged, for example participating in activities assigned by the teacher or as part of a task they are completing or a reluctance or rebellion against the task which they are assigned.
- (2) Affective** - Moods, feelings and attitudes which students may display or have towards a subject, for example, enjoyment, laughter, passion or boredom, negativity or sadness.
- (3) Cognitive** - The ability of a student to perform mental activities associated with a given task, for example, activities most closely associated with learning and problem-solving.

Student engagement is clearly seen as a multidimensional concept but some studies extend this beyond learning behaviours to a broad range of campus activities within and beyond the classroom (Burns et al., 2004; Groccia, 2018; J. Groccia & Hunter, 2012). However, for this study, the focus needed to be on the academic aspect of student engagement. For a student to be authentically engaged they need to be engaged across all three of these dimensions concurrently: behavioural, affective and cognitive (Groccia, 2018), as student engagement is not simply an all or nothing phenomenon (Schlechty, 2001). Instead, there is a continuum of student engagement whereby students may be engaged in one dimension and not in some or all of the other dimensions. This continuum outlines the different ways in which a student can be engaged. A precursor to being authentically engaged would be the behaviour dimension as it is possible to be engaged cognitively and/or affectively without being behaviourally engaged. Behavioural engagement is when the learner has some degree of participation or effort which is visible and is persistent in the learning process (Groccia, 2018).

What is important from the perspective of an education provider is to create an engaging learning environment. Unless behavioural engagement is targeted through active and engaging learning activities, the opportunity for authentic engagement will be removed. Being behaviourally engaged moves learners from being passive recipients of knowledge to participants who elaborate, discuss, share knowledge or experiences, question and problem solve which increases their motivation and depth of learning (Bonwell & Eison, 1991). Authentic engagement is unattainable unless all dimensions are targeted. In order to achieve this, it is useful to target behavioural engagement as a starting point as this can lead to activating the cognitive and affective dimensions if learning tasks are designed effectively. The feasibility of creating this learning environment is a question of whether or not the

course design is supportive of an approach that can target these dimensions (Biggs, 1996, 2003; O'Neill, 2015). As outlined by Fredricks et al. (2016), the benefit of creating this type of learning environment to enhance engagement is that it has the potential to help students optimise their academic achievement. There is no causal or strong correlation between these factors (Zyngier, 2008) but this is mainly due to the variety of learning environments in which students can participate in. Depending on the learning environment, a student may optimise their academic achievement without being authentically engaged. In addition, students may only be engaged academically and lack engagement with the social aspect of the college or vice versa, as some studies on student engagement include a social dimension in addition to the three outlined from a psychological perspective (Fredricks et al., 2016; Fredricks & McColskey, 2012; Groccia, 2018). What is clear from the literature is that if educational activities have been designed to be real life and of value to students then this can enable a more authentically engaging learning experience by enhancing the competencies and skills which students will require in their careers upon graduating (Groccia, 2018; Kahu, 2013; Land et al., 2012).

Based on these findings from the literature, the exploratory stage (phase 1 of this study) proposed four key factors that could affect behavioural student engagement in classroom settings within the context of vocational agricultural education in Ireland (Creswell et al., 2003). These were categorised and a conceptual framework was proposed for the research project (See Figure 1);

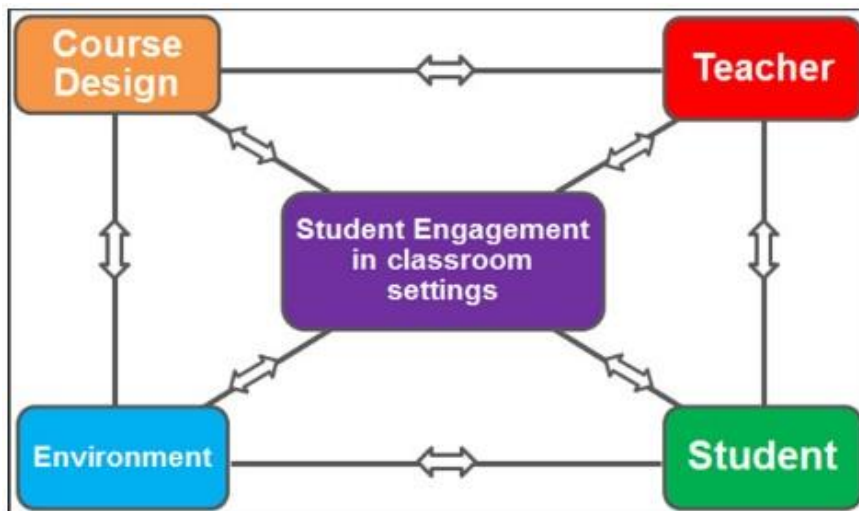
1) Course Design – This encapsulates how the modules taken by students are designed: the resources, learning outcomes and assessment strategies, what supports are available to staff and students, how they are structured and how these modules are organised for students.

2) Teacher – This includes the type of personality a teacher has within the classroom, how they teach and what approach they have to cover the course content.

3) Environment – This relates to the physical, affective and virtual learning environments. Physical relates to the type of classroom classes are held in, affective is the type environment created by the teacher: whether it is open or not to participation from students and virtual relates to how a virtual learning environment is incorporated with the delivery approach, if at all.

4) Student – This relates to a student's own experience, motivations and attitude towards engaging with their education.

Figure 1: The original conceptual framework for this research project



A multi-methodological approach was adopted to establish which of these factors has the most impact on academic student engagement. Focus groups, interviews and classroom observations were chosen to evaluate what had the most influence on behavioural student engagement in classroom settings. Behavioural student engagement was targeted with classroom observations as behaviour is observable and is seen as having a clear link to enhancing engagement in all dimensions (Nguyen et al., 2018). Creating a learning environment that is behaviourally engaging for students can give a platform for students to engage affectively and cognitively.

Evaluating student engagement in classroom settings

Traditionally self-report methods and direct observation are seen as the two prominent methods to evaluate student engagement (O'Malley et al., 2003). Classroom observations, also known as direct observation were chosen in addition to the use of self-report data collection methods. The rationale for this was that whilst self-report methods are a very informative way to gather feedback, the picture being presented may be distorted due to the participants' ability or biases. To increase the validity and reliability of this study both methods were adopted so that findings could be triangulated. Direct observation can consistently capture what is happening in reality in classroom settings and the self-report methods can provide user-feedback from both the teachers who delivered classes and the students taking the classes. A student's ability to accurately assess their behaviours can vary greatly for example how engaging they found educational activities which they completed (Assor & Connell, 1992). Similarly, teachers may have their own biases, misconceptions, agendas or reasoning to report how engaged students are.

A further review of the literature was required to establish if any existing observation framework could be used to assess the level of behavioural student engagement in classroom settings. A variety of observation frameworks exist: the Pearson's Behavioural Observation of Students in Schools (BOSS) observation software (Shapiro, 2013), the Experience Sampling Method (ESM) (Nguyen et al., 2018) which shadowed student's activities inside and outside of the classroom, the Flanders Interaction Analysis Categories (FIAC) (Flanders, 1970), the Attending Round Observation System (AROS) (Weinholtz et al., 1986), the Code for Instructional Structure and Student Academic Response (CISSAR) (Carta et al., 1988) and the Stallings 'Classroom snapshot' Observation System (SOS) (Stallings et al., 2014) which has also been adapted for use by the World Bank Group (World, Bank Group 2015; World Bank Group 2017). All of these observation schedules have some similarities but have been adapted to meet the requirements in each circumstance. The direct observation framework which aligned the most with this research was the BOSS observation software (Shapiro, 2013). This was used in secondary agricultural education in America which is equivalent to students in Ireland completing secondary school, aged 11-18 years (Witt et al., 2014). However this method and the others all had aspects which rendered them unsuitable to this study, whether that was the context in which they are used, for example medicine and kindergarten or the time intervals used to measure a student's activity or a focus on individual students which inevitably could lead to misrepresentation of how engaged an entire class is.

Following this review, a tailored observation framework was constructed for this study. Aspects from the frameworks mentioned above were used and adapted to create a tool that evaluated the level of behavioural student engagement in classroom settings whilst also evaluating the three other factors from the conceptual framework (see figure 1). In addition to classroom observations, focus groups, interviews and a survey were used where appropriate to gather self-report data and feedback about student engagement in classroom settings.

The observation schedule needed to be capable of capturing key events within the classroom and based on these, categorise the level of behavioural student engagement for that class. It needed to recognise the limitations of the observer, who can only observe a small number of visual stimuli simultaneously (O'Malley et al., 2003). The observation schedule needed to assist in the objective collection of the data to enhance its reliability and needed to relate to aspects of the factors identified in the conceptual framework (Figure 1). The observation schedule also needed to be reliable and produce results that accurately reflected the reality it was intended to measure (Bryman, 2016; O'Malley et al., 2003). This meant that the classroom observation process should not alter the normal behaviours within

the class as it should be unobtrusive. If it were to cause a reactive or Hawthorne effect, it would impact the collection of data negatively (Bryman, 2016; Gall et al., 2007; Phellas et al., 2011). Provisions were required to make the observations as unobtrusive as possible and how this was achieved will be discussed later in this paper.

Engaging teaching approaches

For a teaching approach to be authentically engaging it needs to behaviourally, cognitively and affectively engage students (Schlechty, 2001). This begins with creating an active learning environment for students to participate in and become more responsible for their learning (the behavioural dimension). Freeman et al. (2014) highlighted that active learning helped to enhance student engagement and academic achievement in STEM (Science Technology, Engineering and Mathematics) subjects. Within active learning, the educational tasks given to students need to be of value and relevance to them in terms of their real-life application. These characteristics are some of the hallmarks of a student-centred learning (SCL) approach as Lea et al. (2003), O'Neill and McMahon (2005), Bayram-Jacobs and Hayirsever (2016) and Brandes and Ginnis (1986) outline that SCL: adopts active rather than passive learning; harnesses a deep approach to learning and understanding; increases student responsibility, accountability and autonomy; harnesses interdependence, equality and a mutually respectful relationship between the teacher and learner; and a reflexive approach to the learning process on part of both the learner and teacher.

Problem Based Learning (PBL) is a SCL approach used in various types of education around the world with many peer-reviewed papers written about it and its benefits. A PBL approach can be defined as: "...a teaching/ learning experience that provides students with problems before they receive any instruction" Drake and Long (2009, p. 1).

Within PBL the problems presented to students need to be relevant and comparable to real-life tasks that they will complete upon graduating from their course. This approach dates back to McMaster Medical University, Canada in 1960 (Masek & Yamin, 2011). Medical students were presented with a patient's case, asked to identify the symptoms using best practice (evidence based) and recommend what the best course of medical treatment would be. Instead of students just learning this material in theory they were asked to apply that theory in practice, evaluate the case (problem) presented to them and create a solution for each case. The same principle can be applied to any type of profession. A study from Wijnia et al. (2011) showed that a PBL approach enhances student's engagement as they adopt a deeper approach to learning. Barrett (2017, p. 2) based on the work of Barrows and Tamblyn (1980) highlights that students who participate in PBL: "...increase knowledge and develop

an understanding by identifying learning objectives, engaging in self-directed work and participating in discussions”.

Adoption of a student-centred learning (SCL) approach such as PBL is limited within Ireland and even more so at vocational level. An example of an adapted use of PBL at vocational level is by Monks (2010) who highlighted some issues within the current design of their course to constructively align their assessment strategies with a PBL approach (Biggs, 1996, 2003; Monks, 2010). Within the context of this study, Teagasc vocational agricultural education, there is an intention to enhance student engagement and implement the use of PBL as part of this (Teagasc, 2018). The purpose of introducing this teaching approach as part of this study was to ascertain if this could enhance student engagement. Specifically, the behavioural dimension of student engagement was identified as this is observable and if students are engaged behaviourally, it is likely they will also be cognitively and also affectively engaged. Due to this the research questions for this project were:

- 1) Within the traditional delivery of the course, which of the four identified factors have the most influence on student engagement in classroom settings?
- 2) Within classroom settings would a SCL (PBL) approach enhance student engagement?

Research Design

This was an action research project where the researcher was based within a vocational agricultural college in Ireland. The exploratory phase (phase 1) proposed a conceptual framework for exploring why students struggled to engage in classroom settings. Phase 1 examined engagement in the traditional classroom using observations and feedback from students and teachers. It included 66 classroom observations conducted in three different types of modules (See Figure 2), with six different teachers, and in small (maximum 30 students) and large classrooms (maximum 75 students). Classroom observations were designed to evaluate and compare the influence of modules (Course Design factor), teachers (Teacher factor) and classrooms (Environment Factor) on behavioural student engagement (classes categorised). These classroom observations aimed to categorise the level of behavioural student engagement in the classroom and to use the findings to help identify which of the factors had the most influence over student engagement. In addition, interviews were conducted with educational specialists and a focus group with teachers within the Teagasc College to establish within the context of the four factors, what encourages and discourages engagement. Finally, a focus group with students at the end of the academic year was conducted to get feedback based on initial analysis from the classroom observations to investigate why they struggled to engage in certain areas of the course.

Figure 2: Description of all module types observed

Descriptions of Core, Specialised, Supplementary training and transferable skills modules:
- Core Modules are mandatory and cover the basic principles of agricultural science, financial management, health and safety, the structure of Irish agriculture, policy and legislation.
- Specialised modules focus on the basic principles, knowledge and skills necessary for animal and crop husbandry associated with different farm enterprises.
- Supplementary training modules are also provided which are technical in nature as they focus on knowledge and skills ranging from maintenance of farm buildings to safe application of pesticides.
- Transferable skills module is mandatory and covers the principles and practice of a variety of personal skills for students to develop; Interpersonal skills, communication skills in a variety of formats, team work, research skills and time management. The purpose of this type of module is to focus on the competencies and skills which are transferable to a variety of scenarios which will be beneficial to students in their future careers.

Phase 2 of this research project involved designing a pilot module to enable the use of a more student-centred learning approach. This involved combining a core module with a transferable skills module to integrate these two areas of the course. This enabled the integration of key skills and competencies with the theory from the core module, as students struggled to engage with this type of module the most in phase 1 of this study. By creating a more active learning approach with marks for skills and competencies, students were encouraged to become actively involved in learning this content and learning new skills and competencies. This was designed mainly by the researcher in consultation with the curriculum development and standards unit in Teagasc, college management and college teaching staff to help develop problems for the module. The intention was to have the teaching staff who would be teaching the pilot involved in the design but due to reasons outside of the control of the researcher, teaching staff were only assigned to the module two weeks before the pilot module began. This meant that they were briefed on the design, the teaching approach and how it was going to be organised shortly before the module was implemented which was not ideal preparation or organisation. Classroom observations were also carried out on the pilot module, a student survey was conducted post completion of the module ($n = 108$), along with two focus groups with students ($n = 12$ and $n = 8$) and interviews with the teachers on the pilot module to triangulate the findings from these methods.

There were several ethical considerations when conducting this research with students and teachers, therefore full ethical approval was sought and received from University College Dublin (UCD) to complete this study.

Research Methods

Classroom Observations

The classroom observations used are categorised as semi-structured non-participatory observations (Bryman, 2016; Phellas et al., 2011). Semi-structured refers to an observation schedule that bears the same resemblance to an interview or focus group schedule in that every observation takes the same topics into account much like in an interview or focus group (Bryman, 2016). Non-participatory refers to the fact the observer observes but does not participate in the class (Bryman, 2016). This allowed for gathering reliable, generalizable and comparable data which can be used to compare against each other in other phases of the research (Phellas et al., 2011).

The classroom observation schedule was developed and piloted using indicators of behavioural student engagement before being used in phase 1. Behavioural actions that led to either interaction or involvement (positive behaviours) in the class were noted. Similarly, negative behaviours such as a lack of interaction, reluctance to interact with the teacher in the class and negative interactions were also noted. The observer noted the type of actions being displayed by the teacher and students along with a timescale throughout the class: introduction, beginning, middle and end/ wrap up. Students participating in classroom activities would also display some affective actions which would be noted. Positive affective engagement such as passion, enjoyment, laughter whilst participating and negative affective engagement such as negativity when participating in activities: boredom, on a mobile phone, asleep or anything distracting the student from the class. Once the class was finished the observer made key notes which summarised the class and categorised the class for the four factors; course design (Module design), teacher (methods & delivery) and the environment (physical and affective). The level of behavioural student engagement dictated the categorisation of the class as either high, medium or low. Rating all of these factors in relation to the class allowed for a consistent and comparative analysis of each factor for every class that was observed. This allowed for an in-depth understanding of the influence of each factor on behavioural student engagement in classroom settings in addition to its categorisation.

Prior to commencing classroom observations, teachers were approached to acquire their consent. The teachers were told the purpose of these observations, how often they would be observed and how the data would be used. The researcher sat as a non-participant at the back of the class for 66 classroom sessions in Phase 1 and 24 classes in Phase 2 (pilot module), noting the different indicators and how or if they changed over the course of the

class. The researcher noted some general information (See Figure 3) for every class observed as well as observations based on the factors in the conceptual framework.

Figure 3: General information gathered for each class observed

Teacher:	Observer:
Age (Range)/ Gender/ Experience (Range):	Pedagogical Training:
Course title:	Level/Stage of Course:
Module:	Class Topic:
Classroom type:	Student numbers:
Date:	Time of day:
Length of Class:	Class start time:

The observation schedule for this study was developed and pilot-tested 15 times with revisions to ensure that the data generated from the observations would have validity and reliability. The data gathered for each of the factors from the conceptual framework is represented by a dedicated section at the end of the classroom observation schedule (see Figures 4-7). This enabled the categorisation of classes into three categories of high, medium or low based on the rating given for the behavioural student engagement section (see Figure 7). While it is recognised that the rating and categorisation of classroom observations (see Figure 7) has a degree of recognised subjectivity, categories were created based on a set of criteria for each category. For every class categorised as high, a score of 3 had to be achieved in every sub-section (total of 5 subsections) with a minimum score of 4 in at least two of the sub-sections. For the medium category a maximum score of 4 could be achieved and no more than one score of 4 in the 5 sub-sections. For the low category a minimum score of 1 was required with no score higher than 3 in any sub-section and no more than 3 scores of 3 in the 5 sub-sections.

Classes categorised as ‘Low Engagement’

Classes where students showed little interest, were distracted or visibly bored were categorised as low engagement. This may have been because the teacher was not willing or encouraging interaction or the teacher was trying to get students to interact but students were reluctant and/ or uninterested to do so. Examples of this include the teacher reading from the PowerPoint slides, having little or no variation from PowerPoint slides, a distinct lack of questions posed to students or opportunities for a student to interact or if the student did ask a question/ make a comment, this was dismissed quickly by the teacher and another example was when the module content itself was not intriguing to the students. In the low

engagement category, students were not very attentive as they were visibly bored, distracted, on phones, talking, sleeping or in some cases left the class. Every class which was categorised as low had either:

- 1) A teacher who was didactic in their delivery.
- 2) Module content that was uninteresting to the students.
- 3) An environment in which interaction and involvement was not encouraged by either the physical classroom setting, the teacher's behaviour or a combination of these.

Classes categorised as 'High Engagement'

Those categorised as high engagement were typified by a teacher who encouraged students to engage and interact in class through questions asked, encouraging questions to be asked, debating issues that arose and the use of role-playing and/or demonstrations involving students. In these cases, the teacher was willing and able to get students involved with the topic in order to clarify and improve their understanding. These classes had examples whereby the teacher would take moments to talk, discuss, pose questions and build on the responses which students gave or asked about. These examples included the teacher using PowerPoint presentations as well as working with module workbooks and groups working on problems. In these cases, the teachers were actively seeking student interaction and working with them to help them understand the course material. Some of the classes categorised as high engagement were in modules where students already had an interest in the subject and therefore may have made it easier for the teacher to achieve a higher level of engagement. Every class which was categorised as high had either:

- 1) A teacher who was actively seeking contribution and participation of the students in their delivery.
- 2) An environment in which interaction and student participation was encouraged by either the physical classroom setting or teacher's behaviour or a combination of these together.
- 3) Module content which students had a primary interest in regardless of how it is delivered or a combination of interest and good delivery.

Conducting classroom observations

To gather data, the observer sat in the class, noted the generic information (See figure 3) and once class began they noted observations about the teacher and students interactions. The researcher noted what happened along a timeline for the class: what teaching methods

were used, how students' responded, teacher's response to questions as events happened during the beginning, middle and end of class. The observer then made notes about the observed class under the headings of summary and key events of the class. Once these elements had been completed the researcher would look at the rating scales for each subsection and based on all of the information collected during class would rate the subsections on a 5 point 'Likert' scale (See Figure 4-7). Once the researcher had completed this, the data was inputted in a Microsoft Excel file. The rating given to each subsection was entered and an average score was generated for each factor. Figures 4-7 show the criteria by which the 4 factors were scored and categorised based on the activities within the class observed.

It is the dynamic combination of these factors that leads to a low, medium or high categorisation for behavioural student engagement in classrooms using classroom observations. For instance, if a class was categorised as highly engaging this was generally due to a combination of the course design factor, the teacher factor and the environment factor each rated highly. The opposite is true for a class categorised as low. The physical environments of the different classes observed only differed in terms of size and therefore were found to have a limited influence on the ability of a teacher to engage students. Similarly, if a class was categorised as low engagement then it would be due to a combination of the subject matter, how the teacher delivers it, their attitude towards teaching the subject and the learning environment for students being less conducive to participation or active learning.

Figure 4: The 'Course Design' section of the observation schedule

Factor rating: 1 - Very Low 2 - Low 3 - Medium 4 - High 5 - Very high	
Factors of Student Engagement	Factor rating of Observations
1. COURSE DESIGN - MODULE CONTENT	Factor rating: 1 2 3 4 5
1.1 - Relationship & Relevance of content	
1.2 - Relates to Module Learning Objectives and Outcomes	
1.3 - Length of the class appropriate for module?	
1.4 - Accurate – reflecting recent research	
1.5 - Challenging students at the appropriate level	

Figure 5: The 'Teacher' section of the observation schedule

Factor rating: 1 - Very Low 2 - Low 3 - Medium 4 - High 5 - Very high	
Factors of Student Engagement	Factor rating of Observations
2. TEACHER	Factor rating: 1 2 3 4 5
2.1 Encourage student participation	
2.2 Teaching methods used – Appropriate & clear for what the students should be doing i.e. Engaging or not?	
2.3 Students response rates to teacher questions	
2.4 Response rate of teacher to student question/ comments	
2.5 Praise/ Encouragement/ Use of students ideas/ Comments	
2.6 Class summarised & linked to other Classes/ Experiences/ Industry	
2.7 Classroom management skills are displayed	
2.8 Clearness of Voice	
2.9 Pace is appropriate to audience	
2.10 Distracting mannerisms are avoided	
2.11 Teaching aids - Used for clarification, hold attention of audience	

Figure 6: The 'Environment' section of the observation schedule

Factor rating: 1 - Very Low 2 - Low 3 - Medium 4 - High 5 - Very high	
Factors of Student Engagement	Factor rating of Observations
3. ENVIRONMENT	Factor rating: 1 2 3 4 5
3.1 - Resources available - Adequate for achievement of aims and outcome	
3.2 - <i>Does the teacher provide a positive atmosphere in which the students can engage in?</i>	
3.3 - Are the following elements the class to an acceptable standard for the purpose of the class: <ul style="list-style-type: none"> • Classroom temperature • Layout • Space • Seating 	

Figure 7: The 'Student' section of the observation schedule

Factor rating: 1 - Very Low 2 - Low 3 - Medium 4 - High 5 - Very high	
Factors of Student Engagement	Factor rating of Observations
4. STUDENT - STUDENT ENGAGEMENT (BEHAVIOURAL & AFFECTIVE)	Factor rating: 1 2 3 4 5
4.1 - Degree of Attention/ Curiosity/ Interest shown?	
4.2 - Mutual respect between teachers and students	
4.3 - Did students participate in activities/ Express their opinions?	
4.4 - Did the students ask questions/ Enquire for more info/ detail?	
4.5 - Are the students motivated, passionate, enjoying or bored etc.?	

The semi-structured observation schedule allowed for the same type of data to be recorded in every class and had the flexibility to record events that occurred during the class. The degree of subjectivity in this process is recognised but this process allowed for capturing data that is representative of the whole class in terms of the behavioural student engagement in classroom settings.

Results:

Phase 1

The results for phase 1 (See Table 1) indicated that overall the type of module (Course Design) had the most influence on engagement with 'Core Modules' having the lowest levels of engagement (0/16 with high engagement). 'Core Modules' (See figure 2 for description) are taken by all streams of students, they are typically held in large classrooms (lecture theatres with 50-75 students) and the content is complex incorporating basic sciences, health and safety, legislation and policies concerning agriculture. Students often struggle to see the practical relevance of these core modules. In contrast, 'Specialised Modules' deal with the practical management of farm enterprises and these types of modules achieved much higher levels of engagement. The size of the classroom alone was not found to be a significant influence. The 'Teacher' factor was important but observations revealed that the same teacher could achieve higher levels of engagement in a 'Specialised Module' than they could achieve in a 'Core Module'.

Students feedback from a focus group conducted at the end of the academic year after classroom observations were completed also highlighted this, with students outlining "We know it's an important subject" but how it is delivered leads to a lack of interest "... if a teacher is just reading off their slides it's not that interesting". In addition to this feedback, interviews with educational specialists from national and international universities highlighted the importance and key role that course design plays with one participant stating "Course design is incredibly important and it is something we can work with" in creating an engaging learning experience and another highlighting that:

You can come up with a list of approaches, an easy list in some ways, that make the classroom more active or engaged but from my experience, I think some of the bigger problems come from the design of the course ...

Table 1: Results from the classroom observations conducted in Phase 1

Type of Module	No. of classes observed	No. in Low Engagement Category	No. in Medium Engagement Category	No. in High Engagement Category	Classroom Type
Core	16	12	4	0	Large (11) & Small (5)
Specialised No. 1	31	4	18	9	Large (6) & Small (25)
Specialised No. 2	11	0	1	10	Large (11)
Supplementary Training	8	2	4	2	Large (8)

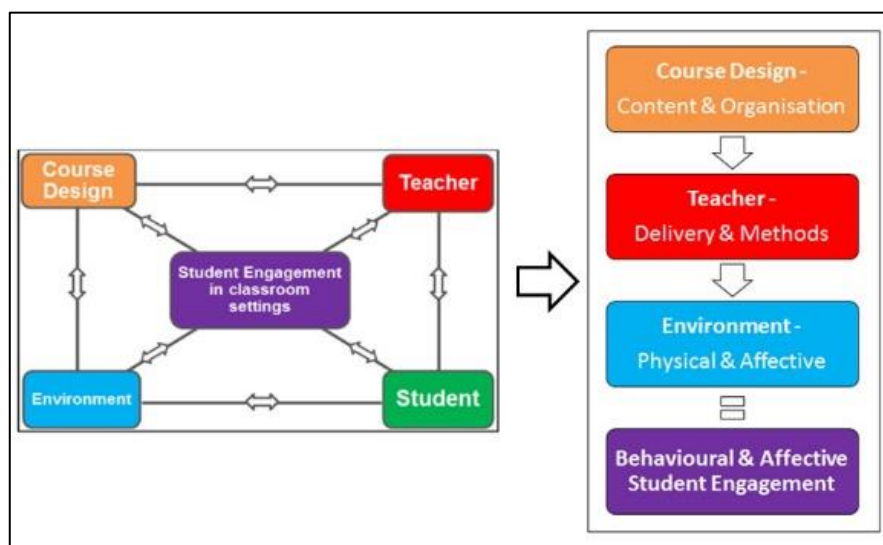
Similarly, a focus group with teachers highlighted the impact that course design has on them. The teachers discussed each factor and their influence on creating an engaging learning environment. The influence of course design came up as an issue when discussing each of the other three factors. When discussing the 'Teacher' factor the discussion centred on learning outcomes where one participant outlined "You need to have practical adherence with learning outcomes because they are very rigid".

When discussing the 'Student' factor, discussions again came back to the assessment strategies used in the current course design. Teachers felt that summative assessments take away students' motivation as they are learning for the sake of an assessment rather than being motivated to engage in more depth with the content as this quote describes: "Assessments should be a learning tool and not an end goal".

In relation to the 'Environment' factor, the teachers felt that the physical classroom matters if you want to have an engaging and active learning environment for students. The teachers brought up issues of course structure and course organisation as impacting on the class size and classroom type. If students are continuously in a large type of classroom environment it presents a bigger challenge for teachers to have an active and engaging learning environment. One teacher commented that: "You can work with students in a small classroom for an hour and a half, whereas the lecture hall for an hour and a half is hell".

So while the other factors are influential, the factor that emerged as having the most influence in phase 1 was 'Course Design' and this impacts what the 'Teacher' can do within it. These findings from Phase 1 allowed the original conceptual framework to be adapted as shown in (Figure 8) into a more linear relationship between these four factors. This shows that the design of the course has an influence (both positive and negative) on how the teacher teaches and indeed on the class size and classroom type.

Figure 8: A transformation of the conceptual framework post phase 1 of this research project



Phase 2 Results

Based on the findings from Phase 1, a pilot module was designed combining a core module with a transferable skills module (See table 2). This redesign allowed for smaller class sizes and elements of a problem based learning (PBL) approach (Barrett, 2017) to be used in an attempt to make the content more engaging for students. It also supported the student's extrinsic motivation to engage by allocating marks for transferable skills such as group work, problem-solving and presentations (Maher, 2004; Zyngier, 2008) which would not be the case in the traditional core module. Problems used were representative of real-life problems that the students are likely to face in their future careers in relation to the module and were ill-structured as there should be no definitive right or wrong answer per se in PBL problems (Barrett, 2017). PBL is capable of engaging students and getting students to achieve a deeper understanding of the content they cover provided it is designed correctly to suit the needs of the module (Barrett, 2017; Wijnia et al., 2011).

The researcher conducted 24 observations on the pilot module using the same semi-structured observation framework as Phase 1. The results from the pilot module showed a substantial improvement in behavioural student engagement (Phase 2 - 21/24 classes observed categorised as high engagement) (See Table 1) compared to phase 1 (0%).

Table 2: Results from the classroom observations conducted in Phase 2

Core & Transferable skills module combined	No. of classes observed	No. in Low Engagement Category	No. in Medium Engagement Category	No. in High Engagement Category	Classroom Type
Pilot Module	24	1	2	21	Small

The development of the pilot module in phase 2 highlighted that it was possible to achieve higher levels of behavioural student engagement in 'Core Modules'. Classroom observations were used to evaluate the level of behavioural student engagement compared to Phase 1 with a student survey, student focus group and teacher interviews (self-report methods) used in addition to classroom observations. From the survey which had an 89% response rate ($n = 108$) the ratings were given for the module content, the delivery and the assessments used (See Table 3).

Table 3: Ratings given by students from survey in Phase 2

Elements of the pilot module	Rating Scales (5 Point Likert scale)	Average Rating
Module content	Very irrelevant - Very Relevant	2.74
Delivery	Very ineffective - Very Effective	3.01
All assessment types	Very unfair - Very fair	3.22

In addition, open-ended questions were also used whereby students were asked to list elements they found engaging or not engaging about the pilot module. The answers are categorised in Table 4:

Table 4: Themed responses to open-ended questions from student survey in Phase 2

Aspects of Pilot Module	Mentioned as Engaging	Mentioned as Not Engaging
Group work	64 (59%)	8 (8%)
Presentations	40 (37%)	42 (39%)
Content	40 (37%)	11 (10%)
Problem Based Learning approach	18 (17%)	3 (3%)
Working on problems	10 (9%)	3 (3%)
Assessments	20 (19)	7 (6%)
Computers/ Researching	11 (10%)	12 (11%)
Too many classes per week	0	24 (22%)
Teacher	5 (5%)	0
Change of teacher	0	3 (3%)

From the results from both Table 3 and 4, it can be seen that students found it engaging to be actively involved with the new teaching approach with delivery receiving a rating of 3.01 and students mentioning group work, content, PBL and working on problems as engaging. Students also felt the way that they were assessed was 'fair' (Rating of 3.22) and 'engaging' (20 mentions). Two student focus groups were also conducted. Twenty students took part in the two focus groups where students discussed their experience with the pilot module. Students highlighted that a PBL style approach helped as: "You were getting other people's opinions so that you weren't working on your own all of the time" (student 1) and that it was:

“More relevant and brings it back to how you might do it at home (on the farm) so using real-life examples makes it much more interesting. Other times when lecturers just read off their slides, you don’t really see any relevance of it” (student 2)

Students provided additional feedback in that they found particular aspects difficult such as doing a presentation. When considering the term ‘engagement’ it is important to realise that this doesn’t mean easier as a challenge represents something that a student needs to engage with to understand, figure out and complete. It was positive to hear that students found aspects of the pilot module challenging. In addition, it was also encouraging to hear that students identified and were able to articulate course design challenges they had found during their academic year. These were aspects of the course such as repetition, an overload of assessments, teacher-centred approaches and assessments which heavily focus on recalling knowledge. They discussed their struggle with this as the amount of content they need to know for assessments in addition to the assessment overload is challenging. Students take up to 11 modules at once, 9 of these have theory examinations that focus heavily on recalling knowledge and are all taken during the same short period of time. This rewards the ability of a student to surface learn and recall information for assessments rather than trying to foster a deeper understanding.

Teacher’s feedback on being observed

Interviews were conducted post completion of classroom observations with the teaching staff that were observed to capture their experience, insights about being observed and the pilot module. All teachers reported that they had felt comfortable with the researcher observing them due to the relationship that had been built between them and also the status of the researcher (a postgraduate student). The teachers felt they would have been more anxious if being observed by someone more senior or someone they don’t know: “I think it helped that I know you but if it was someone I didn’t know then I would have found it more nerve-wracking and it would have affected my class and how comfortable I would be teaching” (teacher 1).

Another important aspect was the effect of the observer sitting in on classes. A conscious effort was made to prevent the reactive effect from affecting data collection negatively. Before observations began the researcher outlined to the group of students that they would be sitting in on the classes to observe how the pilot module is going. The topic of student engagement was not mentioned in order to avoid students changing their behaviour as a result of knowing the focus of the observations. Teachers commented on the effect of the researcher’s presence on the students: “I don’t think it affected the class because you were in quite frequently and you had talked to them at the start of it all to explain that you would be there” (teacher 2).

The effect of class size on observations

In a large classroom or indeed a lecture theatre it was easier for the researcher to blend in and get a good view of the activities within the class. This was the case for many of the observations that were conducted in Phase 1. When the classrooms were small it was more difficult for the researcher to sit at a distance from the students and activities in the class. The frequency with which the researcher attended classes helped to overcome this but it is important to note the influence it can have on conducting classroom observations: “I don’t think it impacted them hugely, I just think they were more aware of you in smaller groups whereas at the back of a lecture theatre they would barely even notice you” (Teacher 3).

Reflections from the researcher on doing a pilot module

From phase 1 it was clear that students struggled to engage with ‘Core Modules’ and phase 2 tried to establish whether a different approach to the design of these core modules, based on a more student-centred approach, could enhance engagement with these important subjects. The use of real-life problems and an adapted PBL approach for the pilot module showed that this was possible. However, it highlighted that there are some substantial constraints with the current course design to align with a student-centred learning approach. These constraints would need to be addressed if the intention to increase the use of PBL is to progress.

Key aspects of the current course design that do not align with a student-centred learning approach include the module design, course structure, course organisation and teacher supports. Flannery et al. (2019) highlighted the need for pedagogical training for teachers in Ireland’s vocational education sector based on a competency framework due to there only being generic forms of teacher training available for some staff to complete. Regardless of the training available for staff, the issue of constructive alignment with a SCL approach needs to be addressed. The design of any course will influence a student’s approach to learning as this is not considered a stable psychological state for students and depends on the context in which the task is being experienced by the student and this is the embodiment of situated learning theory (Nijhuis et al., 2005; Struyven et al., 2006). The responsibility for this lies with the education provider and the type of learning environment which they wish to create for their students.

Discussion:

This study has discussed the use of a multi-methodological approach to evaluate student engagement. Both direct observation and self-report methods were used to evaluate student engagement in classroom settings (O’Malley et al., 2003). This allowed for analysis from two

different sources: 1) Feedback coming from students and teachers directly involved in the classroom 2) An external observer. There is value in both methods so the combination of these allowed for a more rounded perspective of what affects student engagement in classroom settings. Phase 1 adopted an exploratory stance as part of the action research and found that of the four factors identified, 'Course Design' has the most influence on student engagement in classroom settings. Phase 2 acted on these findings and successfully enhanced student engagement in classroom settings with a pilot module that used aspects of a PBL approach.

The value brought to this research by the use of classroom observations was substantial. It allowed the researcher to sit in on classes as a non-participant to capture and represent what was happening. By observing different teachers, in different classroom types and different types of modules, it was possible to capture what students found engaging. Self-report methods helped to triangulate and evaluate why this was but critically classroom observations provided the basis for what feedback would be gathered from teachers and students. Classroom observations identified that students struggled to engage with 'Core modules' the most. The focus group with students investigated if this was true and if so, why this was the case. Core modules are important, covering basic sciences, legislation, policies and health and safety but despite students knowing their importance, students were not naturally enthusiastic about them. While the approach that was taken in 'Core modules' didn't differ significantly from the approach taken in other types of modules where students naturally engaged more easily, it was clear that an alternative approach needed to be tested with core modules to try to enhance student engagement.

Monks (2010) similarly used an adapted PBL approach in another vocational education setting in Ireland in a subject where students traditionally struggled to engage. The shift to a more SCL approach did lead to enhanced engagement and there is substantive evidence from the literature which shows SCL approaches to be more engaging for students. So based on the findings from phase 1 and the literature around the use of SCL approaches, the second phase of this research undertook a course redesign with a pilot module using adapted PBL. This was due to some of the current features of the course design which prevented complete constructive alignment with a PBL approach. While student engagement was enhanced, some of the challenges identified by Monks (2010) also arose in this study regarding constructive alignment (Biggs, 1996, 2003). That being the current prescribed assessment strategies being inflexible to align with PBL (a SCL approach). This echoes the findings from Monks (2010) as well as Bouhuijs (2011) who suggest it can be more challenging to introduce a PBL approach into an established course due to existing course design constraints and even cultural issues (Schweisfurth, 2011). There can also be a

misunderstanding of SCL approaches being a teaching method rather than an educational approach (Bouhuijs, 2011) thus constructive alignment with SCL is often constrained due to the current course design.

This action research project did demonstrate the value of pilot testing a different approach to a module. The pilot module allows for an objective assessment to be made of the receptivity of the audience (both students and teachers) to the SCL approach before a longer-term commitment is made. It allowed for proof of concept that a SCL approach can and was able to enhance student engagement in classroom settings in this context. While the literature suggests that this type of approach is more engaging (Monks, 2010; Wijnia et al., 2011), within this context it had to be tested. This could be utilised in other studies with the use of SCL approaches to test a different approach, evaluate it and publish the findings to enable more knowledge of how SCL can be incorporated in a variety of sectors of education.

In addition, reflexivity was used as it is increasingly seen as an essential element in quality educational research. This is when a researcher has an awareness of the influence they have on the people or topic being studied, while simultaneously recognising how the research experience is affecting the researcher (Probst, 2015). It is important therefore whilst planning, conducting or writing about research to engage with reflexivity. This can be described as a researcher developing their objectivity by gaining more awareness of the concept they are researching. Probst (2015, p. 38) describes as the researcher attends "... to what is taking place in the field of study, they become aware of their own projections, attachments, assumptions, agendas, and biases - like an eye that sees itself while simultaneously seeing the world". Each of the research methods used in this study helped to establish something: the teacher focus group allowed for teachers to discuss how they feel about the effect of each of the four factors on student engagement, classroom observations categorised the level of behavioural engagement in classrooms across a variety of classes and interviews with educational specialists all highlighted that 'Course Design' has a substantial influence over student engagement. These findings were brought to the students via a focus group to ascertain if this was true and if so, find out why this is the case. The research process was guided by the literature, analysis and findings which formed the action research design of the study.

Particular awareness of subjectivity had to be developed when conducting classroom observations. This was again to be aware of the researcher's own "projections, attachments, assumptions, agendas and biases" (Probst, 2015, p. 38). A balance of elements needed to be adapted in order to reduce the reactive effect of the researcher observing. This included getting to know a teacher and explaining the purpose of the observations before conducting

them so that they are as comfortable as possible with the observer sitting in on classes. The same principle applied to students so that they would not be unnerved by an observer sitting in on classes. The observer's explanation to the students in advance helped to address the reactive effect (Bryman, 2016).

Using observations as a research method has value in building self-awareness and reflexivity for any researcher. It requires conscious concentration to gather data systematically and objectively on what is happening in the classroom, what the teacher is doing and how the students are reacting or responding. Pilot testing the use of the observation framework and discussing the outcomes helped to identify where the researcher's biases might lie and how concentration might vary for the duration of the class. This allowed the framework to be adapted. However, it is important to recognise that such a process must always be interrogated for subjectivity.

Conclusions:

There were two main research questions for this research project. The first was addressed in phase 1 which concluded that the 'Course Design' factor has the most influence over student engagement in classroom settings. In phase 2, the second was addressed by adopting a more student-centred learning approach and subsequently behavioural student engagement in classroom settings (of 'Core Modules') was enhanced (Phase 1 - 0/16 = 0% – Phase 2 – 21/24 = 88%). The multi-methodological approach adopted was required as simply measuring the level of behavioural student engagement in phase 1 would not have informed how this action research project could evaluate what type of actions would have the most potential for enhancing student engagement in classroom settings.

As student engagement is a multidimensional and complex phenomenon, it makes sense to utilise a multi-methodological approach to evaluate and in turn enhance it. As student engagement was identified as an issue by the whole college evaluation (DES, 2020) this action research project needed to identify why it was a problem. Developing an understanding of this within this context enabled evidence-based decisions to be made in an attempt to enhance it. Despite the enhanced student engagement in classroom settings in the pilot module, the course design was still an issue. Further development of the current course design would be required to constructively align with a student-centred learning approach such as Problem Based Learning. This correlates with the findings from Monks (2010) on the use of adapted PBL in another Irish vocational course. However, both of these studies are too small to draw conclusive conclusions so further studies would be required to establish if this is a wider issue in vocational education.

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Chapter 6: Results

Examining course design barriers to implementing student centred learning approaches to enhance academic student engagement

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Abstract

The purpose of this paper is to analyse the course design barriers to implementing a student centred learning approach in vocational education using the Level 5² Certificate in Agriculture course in Ireland as a case study. The main research question was; why does the course design prevent the use of student centred learning approaches? Three research methods were adopted as part of the course design analysis process for this case study; Semi-structured interviews with college management (n=12), a survey with teachers who deliver the course (n=31) and a desk analysis. An analysis framework for the desk analysis was developed based on four key areas of course design; 1) Course Aims and Outcomes 2) Module Design 3) Course Structure 4) Course Organisation. Findings indicate that the current course design creates significant barriers to implementing a student centred learning approach. For successful implementation of a student centred learning approach; constructive alignment of the educational activities and assessment strategies with a student centred learning approach is required. For an educational organisation this may require structural, organisational and/or module design changes.

Keywords: Course Design; Student Centred Learning; Academic Student Engagement; Course Structure; Module Design; Course Organisation

² This is based on the Quality and Qualifications of Ireland (QQI) National Framework of Qualifications (NFQ). This organisation is the awarding body within Ireland and has developed the levels of education courses/ programmes within Ireland (NFQ). A level 5 is the equivalent to a level 4 course on the European Qualification Framework (EQF) QQI (2009).

Introduction

The key features of student centred learning outlined by Lea et al. (2003) and Brandes and Ginnis (1986) are that students; adopt active rather than passive learning; have a deep approach to learning and understanding; are given increased responsibility, accountability and autonomy; interdependence, equality through a mutually respectful relationship between the teacher and learner; and a reflexive approach to the learning process on part of both the learner and teacher. Notwithstanding its many virtues, it is apparent from the literature and practice that the process of implementing a student centred learning approach is not simple in practice for the individual teacher or indeed for the educational institution.

Course design factors can restrict a teacher or college from implementing student centred learning (SCL). Bouhuijs (2011) outlines how a new college would find it easier to implement a SCL approach as it would not require changing what currently happens within an established course. So what is it that creates barriers to implementing student centred learning? Issues arise from the underestimation of the task to introduce a student centred learning approach and a possible lack of research into the approach before implementing it (Bouhuijs, 2011). SCL approaches such as Problem Based Learning (PBL) are not just a classroom technique/teaching method, they require greater contribution from the system or design in place within the course (Barrett, 2005; Bouhuijs, 2011; Fink, 2007). A study from Schweisfurth (2011) showed that another common reason that student centred approaches encounter problems in implementation can be due to cultural issues within an organisation. Bouhuijs (2011) also supports this sentiment as a variety of issues can arise in any context; Resources, the current culture within the organisation i.e. high power distance (Schweisfurth, 2011), and even anxiety amongst the teachers who implement it as their role may be changing significantly to an approach they may not have even experienced as a student (Bouhuijs, 2011).

Numerous studies have showed the effectiveness of a student centred learning approach at enhancing academic student engagement; Wijnia et al. (2011) outlined how students adopted a deeper approach to their learning as a result of a Problem Based Learning (PBL) approach (a student centred learning approach), Freeman et al. (2014) found that by introducing active learning across STEM (Science Technology Engineering Mathematics) subjects across a whole institution increased academic achievement and Monks (2010) used an adapted PBL approach to enhance engagement on an apprenticeship course in Ireland at vocational level. A study by Morris (2018) highlighted that based on inspectors reports, 'outstanding provision' of education was identified when there was collaborative relationship between the learner and teacher in the learning process (a key characteristic of SCL) and 'inadequate provision' arose from an overwhelmingly teacher directed approach. Interestingly this study also highlighted that the framework from which students are taught does not explicitly identify the need for

learner involvement in the learning process. All of these examples have shown that a more student centred approach has enabled enhanced engagement from their students. In some cases it can be a difficult task to introduce a student centred approach due to a variety of course design issues; organisational constraints, a lack of encouragement from the framework or design of the course and even the supports available for teaching staff.

In order to enhance academic student engagement it is important that the course design can support and align with a student centred learning approach. Typically structural changes may be required such as integration of subject content, changes to classes i.e. less lectures and more tutorials, alternative classroom activities to give more emphasis to a process model of learning and alignment of assessment strategies with SCL (Barrett, 2017; Biggs, 2003; Bouhuijs, 2011; O'Neill, 2015; Sagardia et al., 2018). The purpose of changing this is so that the focus of students can shift onto the process (tasks they do in order to learn) as much as the product (what they learn) (Neary, 2002). These changes can cause anxiety amongst staff in management and teachers until they understand the structure and their role within it i.e. a change of culture (Bouhuijs, 2011; Schweisfurth, 2011).

The main aim of this project is to enhance academic student engagement in vocational agricultural education in Ireland. It is important to first consider the type of student engagement which needs to be enhanced as there is a broad definition of student engagement within the literature. This project focuses on academic student engagement and the definition for engagement for this study is;

The degree of attention, curiosity, interest, optimism, and passion that students show when they are learning or being taught, which extends to the level of motivation they have to learn and progress in their education

(Glossary of Education Reform 2016)

In terms of enhancing academic student engagement there is a wealth of published research and this paper seeks to add to this research by examining barriers to implementing engaging approaches. To enhance engagement from a teaching and learning but also psychological perspective, there are several commonalities. From a teaching and learning perspective; a student centred learning approach gives the student more responsibility, accountability, choice, autonomy and students are expected to work with their peers while their teacher acts as a facilitator (Brandes & Ginnis, 1986; Lea et al., 2003). There are 3 key aspects of student engagement derived from psychology theory and a student centred learning approach targets all of these (Fredricks et al., 2016; Fredricks & McColskey, 2012; J. E. Groccia, 2018);

- (1) **Behavioural** - Physical actions which show a student is engaged i.e. participating in activities assigned by the teacher or as part of a task they are completing
- (2) **Cognitive** - The ability of a student to focus their attention on a task i.e. listening, thinking about and comprehending the material they are studying
- (3) **Affective** - The moods, feelings and attitudes which students may display or have towards a subject i.e. enjoyment, laughter, passion whilst participating in a task for the subject which they are studying.

It is important to recognise that student engagement is not an all or nothing phenomenon rather it is a continuum with 5 categories as outlined by Schlechty (2001) (See Figure 1 below). In order for a student to be authentically engaged, a student needs to be engaged in all three dimensions; Behavioural, Cognitive and Affective (Groccia, 2018). In order to achieve this there needs to be a course design to support an approach which can engage students in all three of these dimensions. A student centred learning approach is capable of doing this provided it is possible to implement it and the educational activities are designed effectively.

Figure 1: This infographic shows different levels of student engagement and was created by Dr Roland Rios based on Schlechty's student engagement continuum.



Course Design

Course design refers to the collection of modules, resources, organisation and evaluation strategies which make up an education programme. This includes the course; aims, outcomes, structure, organisation, module specifications (learning outcomes, assessment strategies) and mode of delivery within the course. Course design is a large and complex area but it plays a critical role in supporting the type of delivery on any course (Bouhuijs, 2011; Fink, 2003, 2007).

Another term which is used interchangeably with course is 'programme' for those working in roles within further (vocational) and higher education. In some contexts the term course is also used to describe a single module, however in this paper the term module refers to a single unit or subject taken by the student on a course. This paper will refer to the term course as the collection of modules taken by students in a particular field or range of related fields of education (Cambridge, 2020; IESCD 2011); in this case the Level 5 Certificate in Agriculture course in Ireland (QQI, 2009).

From the literature around engagement, design and student centred learning it is apparent course design has a substantial knock on effect on the type of approach which can be taken. This paper is part of a wider research project where course design was identified in Phase 1 as having the most influence over academic student engagement in the conventional delivery of the Level 5 Certificate in Agriculture (CIA) course. Subsequently Phase 2 developed and delivered a pilot module incorporating elements of Problem Based Learning (PBL) within the current course structure. This enabled improved academic student engagement but there were course design issues which prevented a complete PBL/ student centred learning approach. This paper represents Phase 3 of the research which analysed the barriers to use a student centred learning approach within the current course design.

Materials and methods

The research design and methods will be discussed in this section.

Research Design - Phase 3

Building on the findings from Phase 1 and 2, the research question for Phase 3 was formulated as; why does the current course design restrict the use of student centred learning approaches? The research design for phase 3 was a case study of the Level 5 Certificate in Agriculture course delivered by Teagasc in Ireland. A mixed method approach was used in this case study which analysed the current course design barriers to the use of student centred learning approaches on this course (Starman, 2013). Teagasc are a semi state national body in Ireland who provide integrated research, advisory and training services. Their training focuses mainly on vocational education in agriculture, food, horticulture, forestry and equine studies in Ireland (Teagasc 2020).

Research Methods

Key informant semi-structured interviews were conducted with college management from the 6 colleges which deliver the Level 5 Certificate in Agriculture and a survey was conducted with teachers who deliver the course were conducted. In addition a desk research analysis of the

current Level 5 Certificate in Agriculture course design was also conducted. This covered 4 key areas of course design; Course Aims and Outcomes, Module Design Course Structure and Course Organisation:

Interviews

Semi structured interviews were conducted with a total of 12 participants. The interviewees were college management from 6 agricultural colleges which offer the CIA level 5 course (n=12 out of N=12 - all members of college management participated). These interviews elicited the managers views of the CIA Level 5 on a range of course design topics; Educational Philosophy, Curriculum Models, Aims & Outcomes, Organisation & Structure, Teaching, Learning and Assessment strategies, Module Design, Student and Staff Supports, and Evaluation Strategies (O'Neill, 2015). Thematic analysis of these interviews was conducted using NVivo 12. Interviews incorporated ratings for each topic which enabled comparisons against the survey. Based on the ratings given by the interviewees, they were asked to elaborate and discuss different matters which arose in relation to each section.

Survey

A questionnaire survey was conducted with teaching staff on the level 5 CIA course. The survey was sent to 69 teachers within the six colleges. There was 31 responses (n=31) to the questionnaire survey which is a 45% response rate (RR). The survey questions used were adapted from the interviews. Therefore both the survey and interviews; covered the same course design topics; used the same rating scales; and surveys adopted short answer (open ended) questions in place of discussing the participants ratings like in the interviews. The survey was analysed using IBM SPSS statistics 24. Descriptive statistics were mainly used and further thematic analysis using NVivo 12 was conducted on the short answer questions.

Course design analysis – Desk Research

A framework for a desk review analysis was developed focusing on 4 key areas of course design; 1) Aims & Outcomes 2) Structure 3) Organisation 4) Module Design. These 4 key aspects provide the core elements of how a course is designed and provide a framework to analyse their compatibility for a student centred learning approach. Information about the course was provided from official course documents in relation to the level 5 certificate in agriculture course. Results from this analysis were triangulated using the data collected from both the interviews and survey.

Results

The results are discussed under the 4 key areas of course design which have been identified:

1) Are the Course Aims & Outcomes Student Centred?

Adam (2004) notes that course aims are concerned with teaching and the teacher's intentions and outcomes are concerned with learning. Aims are usually in the region of 3-4 broad aims which describe the intention of the entire course (O'Neill, 2015). Course outcomes are considered the sum of the experiences of learners on a particular course relative to a particular qualification level (O'Neill, 2015; University of Exeter, 2007). Instead of a specific topic or area like learning outcomes, course outcomes focus broadly on 'What should course graduates know and be able to do upon completion of the course?' (Fink, 2003; Arizona State University, 2011). Course outcomes synthesise the attributes a graduate will achieve as a result of completing a course. Fink (2003) outlined two key definitions in how to determine what an outcome is and how it is achieved:

- 1) What is it I hope that students will have learned, that will still be there and have value, several years after the course is over? (**Outcomes**)

- 2) 'What would the students have to do to convince me that they have achieved these learning goals (outcomes)?' (**Assessment**)

To enable the use of student centred learning approaches, course outcomes need to incorporate characteristics such as "active learning" which is typically defined as learning that requires students to engage cognitively and meaningfully with the materials (Bonwell & Eison, 1991), to get "*involved with the information presented, really thinking about it (analysing, synthesizing, evaluating) rather than just passively receiving it*" (King, 1993). This is to promote and nurture independent learning where the learning focus moves from the teacher to the individual or student group. Students have more responsibility for their learning and as reported by (Carlile & Jordan, 2005) this promotes student centred learning which is heavily linked with the concept of self-determination theory which promotes independent learning (Deci & Ryan, 2008, 2012; Ryan & Deci, 2000). This should be reflected in aims and outcomes within the knowledge, skills and competency domains outlined. For the Level 5 Certificate in Agriculture, the course aims and outcomes are shown in Table 1 below:

Table 1: Below the aims and outcomes for the level 5 certificate in agriculture course

Course aims:	Course outcomes – At the end of this course the student will be able to:
<p>This course enables students to access agriculture education on a full-time basis at a time relevant to their career needs. The course aims to provide students with the basis to farm well, and to meet the challenges of future farming needs by exposing students to practical/ skills training and classroom (theoretical) sessions and also to the latest agriculture developments, harnessing Teagasc research and advisory services.</p> <p>It aims to train to the level of trainee farm operatives, focusing on best farming practice, imparting technical farming knowledge, training and updating students in key farming operative skills, with an emphasis on safety, environmental protection, farm development, farm technology and an introduction to farm business. Development of self and learning to learn is integrated into the course using discussion groups, teambuilding exercises, and problem based learning, assignments and projects linked to real farm situations.</p>	<p>Knowledge:</p> <ol style="list-style-type: none"> 1. Apply theoretical concepts of agriculture production to farming operations 2. Interpret technical and financial data <p>Skills:</p> <ol style="list-style-type: none"> 3. Utilise tools and equipment to carry out husbandry skills in accordance with best practice 4. Comply with legislative, environmental and farm assurance responsibilities and obligations 5. Comply with health and safety legislation <p>Competencies:</p> <ol style="list-style-type: none"> 6. Manage, prioritise and schedule actions for a farm enterprise in accordance with best practice 7. Develop their professional and personal development

The aims broadly set out what the student should achieve from the course and the ways in which this will be achieved. It also sets out the level a student is expected to reach on completion of the course i.e. ‘Trainee farm operative’, and the discipline specific skills i.e. technical knowledge. Finally, there is reference to some of the transferable skills and assessments which would use real life farming scenarios. It is clear in the aims that there will be a focus on personal development and transferable skills. A student-centred learning approach is also mentioned i.e. Problem Based Learning, which could be utilised through discussion groups, teambuilding exercises, and assignments linked to real farm situations. There are 7 course outcomes listed; the knowledge, skills and first competence outcomes are all technical and discipline specific with the final competence related to personal and professional development. This would indicate that the course aims and course outcomes could give students an experience of all of the characteristics of student centred learning (Brandes & Ginnis, 1986; Lea et al., 2003).

The interviews and survey painted a slightly different picture. Participants related the stated aims and outcomes back to their own experience and felt the aims and outcomes were “*aspirational*” of what happens. They felt that in reality there is “*too much emphasis on assessing students and not enough on transferable skills like practical’s, problem solving and critical thinking*”. This focus on assessment can “*drown the student with the idea of needing to pass instead of learn*” as one participant expressed. Teachers were more critical of the aims and outcomes (See table 2) compared to college management. This may be due to their role

as they may not have the macro view of the overall course as college management would. However there is an agreement from both groups on the issue of assessment of knowledge getting more attention than transferable skills on the course.

Table 2: Ratings from college management and teachers on whether they feel the current aims and outcomes reflect what happens on the course

	College Management Interviews (n=12) N=12 – 100% RR	Teachers Survey (n=31) N=69 - 45% RR	Average
Fully captures course in reality	n=5 (42%)	n=6 (19%)	31%
Partially captures the course in reality	n=7 (58%)	n=12 (39%)	48%
Does not reflect the course reality	0	n=13 (42%)	21%

2) Why Module Design can create barriers for student centred learning approaches

The design of individual modules is a critical aspect of the overall course design. In order for a module to support student centred learning it must be within a structure which allows for integration of content and it must have aims, outcomes and assessment strategies which align with student centred learning (O'Neill & McMahon, 2005). Sagardia et al. (2018) has described the inability of aligning assessments with competencies, such as those in SCL, as one of the biggest pitfalls within vocational education. Huntley-Moore and Panter (2015) identify eight key elements as essential to design any module: 1) Establish the rationale for the module; 2) Articulate clear aims; 3) Explicit learning outcomes; 4) Subject content; 5) Sequencing of content; 6) Teaching approach/ strategy/ resources; 7) Assessment strategies; and 8) Evaluation. For this analysis, 5 key components were examined as they were considered fundamental to the adoption of a student centred approach:

- 1. Aim of the module** – What is the overall aim of the module i.e. the knowledge, skills and competencies which it is aiming to develop?
- 2. Learning outcomes** – What specifically does the module want each student who graduates/ passes the module to have done?
- 3. Subject content** – What is the content?
- 4. Assessment strategies** – How will a student demonstrate their achievement of each learning outcome?
- 5. Teaching approaches and resources** – What approach to learning will be taken with students based on the design of the module?

Analysis:

If a module aims have student centred characteristics it will encourage the use of a Student Centred Learning (SCL) approach. If these characteristics are not stated in the module aims the likelihood of a SCL approach being taken by the teacher decreases unless an individual teacher is personally motivated to do so. Leaving this decision to an individual teacher could negatively impact on a student's learning experience due to a lack of cohesion in the overall design of the course. For module aims to incorporate SCL characteristics they should ideally integrate discipline and non-discipline specific knowledge, skills and competencies relevant to a SCL approach (Ornstein & Hunkins, 2009). From an examination of the stated aims of the current suite of modules, there is a lack of integration of these which leads to the focus being on the discipline specific knowledge, skills and competencies. From a total of 15 modules which a student could undertake, a total of two modules (Work Practice and Personal Effectiveness or any other Category 2 module) have explicit non-discipline specific knowledge, skills and competencies. Only one (Work Practice) has both discipline and non-discipline specific knowledge, skills and competencies but the module happens outside the college facilities i.e. on a host farm. The aim of students' personal development is relegated to the Category 2 transferable skills module.

Learning outcomes, subject content and assessment strategies:

The majority of modules have discipline specific knowledge, skills and competencies and the majority of content reflects this. The desk review highlighted the quantity of learning outcomes on the course and on average in a module (See table 3). Each learning outcome has to be covered and in turn assessed and this has a significant knock on effect to the delivery of the module. On average, modules have 13 learning outcomes with a range of 10 to 16 learning outcomes per module. This culminates in a total of 157 learning outcomes on the course (See table 3). While the number of learning outcomes does not strictly define the approach that will be taken, guidelines would suggest a range of 4-8 learning outcomes per module with a maximum of 25 in one academic year of a programme/ course (Donnelly & Fitzmaurice, 2005).

Table 3: The number of learning outcomes on the Level 5 Certificate in Agriculture

	Learning Outcomes on the Certificate in Agriculture
Total	157
Average	13.08
Maximum per module	16
Minimum per module	10

Of these 157 learning outcomes, 60% (94/157) are assessed using theory examinations (See Table 4 below). Students complete a total of 18 theory examinations as 9 modules have 2 theory exams. Skills assessments are also used 9 times but account for 28.6% (52*/157) of the learning outcomes. These are completed by a tutor demonstrating, the student practicing and then the student is subsequently assessed on that skill on a later date. The portfolio of work is used in two modules to gather evidence of student's attainment of learning outcomes i.e. reflective learning (Work practice and Personal Effectiveness), completion of assignments for personal development such as a curriculum vitae etc. and a collection of host farm details in relation to work practice. Assignments are used three times between two modules where students complete a task in response to a brief which they are given. Finally the learner record is used once within work practice where a student is required to provide details, records, a diary and talk about challenges which they faced whilst on work practice.

Table 4: A breakdown of Assessment Strategies used and the associated learning outcomes on the Level 5 Certificate in Agriculture based on a 125 credit example

Assessment Strategies	Total Marks	No. of times used	Associated learning outcomes
Theory Examination	540	9	94 (60%)
Skills Assessment	430	9	52* (28.6%)
Portfolio of Work	90	2	7 (4.4%)
Assignment	80	3	5 (3.2%)
Learner Record	60	1	6 (3.8%)
Total	1200	-	157*

* 7 Learning outcomes are assessed using both theory examination and skills assessment

As 60% of learning outcomes are assessed through theory examinations, the exam papers were analysed based on the cognitive domain of blooms taxonomy and this analysis is presented in table 5. It highlights that the majority of these assessments focus on students to recall or remember and this rewards surface learning rather than deeper learning.

Table 5: Categorisation of questions asked in Theory Examinations on the Level 5 Certificate in Agriculture Course (Surface → Deep learning approach to Theory Examinations)

	Remember	Understand	Apply	Analyse	Evaluate	Create
Category Average	79%	15%	4%	2%	1%	0%
Minimum	55%	0%	0%	0%	0%	0%
Maximum	100%	53%	40%	15%	10%	0%

Assessments compatible with a student centred learning approach include; written pieces, presentations, project work, assignments and other similar tasks (O'Neill, 2015). However simply incorporating these won't make a module student centred. For an assessment strategy to be student centred; students need to be actively involved and participate in their learning when using these strategies. Student centred would involve tasks which are representative of real life tasks so that students can see the relevance of what they are learning for their future careers and they are actively involved and responsible for (Barrett, 2017). Any and all of these could also involve some form of peer to peer learning. From analysis of the assessment strategies used currently it is clear that there is not enough choice or options for assessments and teachers do not have the flexibility to change it.

The interview and survey participants felt strongly that the sheer volume of learning outcomes and consequent need to assess these presented a real barrier to using student centred learning approaches. One interviewee captured this dilemma:

We love choking modules up with learning outcomes' but you have to assess those learning outcomes, if you take a home, the kitchen is the hub of it and usually has 3-4 doors in it; compare that to our modules, it's like having a kitchen with 16 doors in it

The quantity of learning outcomes, the style of theory examination assessments, the lack of integration between knowledge, skills and competencies (course structure) and the short time period within which they happen i.e. course organisation, creates significant barriers to the use of student centred learning approaches. This promotes surface learning by students for assessment strategies that are predominantly passive rather than active. This limits the opportunity for students to use a deep approach to learning, and have choice over how they are assessed. They limit the possibilities for reflective practices, peer to peer learning, and for the teacher to act as a facilitator of learning rather than a deliverer of knowledge.

3) Does the Course Structure enable Student Centred Learning?

In order for a course structure to be supportive of a student centred learning approach it would need to support horizontal integration. Horizontal refers to the linkages of knowledge, skills and competencies within the course so that students can develop a holistic overview of the curriculum (Ornstein & Hunkins, 2009). By doing this the course can in turn link the course content to real life situations which a student would face in their future careers (Kolb, 2013; Ornstein & Hunkins, 2009). This enables more than just the acquirement of technical knowhow through the integration of personal development i.e. transferable skills and competencies (Ornstein & Hunkins, 2009). Modularisation has the potential to jeopardize this by segregating the personal development aspects of the course away from the technical. The purpose of making these linkages with the course structure is so that students experience these linkages rather than leaving it to them to make the link which will benefit their learning. Ramasamy (2020) describes how modularisation is used in several different ways within Europe and how it can be designed to align with a student centred learning (SCL) approach. Ramasamy (2020) also highlighted that while modularisation can support a SCL approach, the exam and assessment strategies may also need to change to align with this approach.

Teagasc Level 5 Certificate in Agriculture - Course profile description:

The Curriculum Development and Standards Unit (CDSU) within Teagasc Education are responsible for structuring the courses based on the guidelines from Quality and Qualifications Ireland (QQI). In Ireland, QQI is an independent state agency responsible for promoting quality and accountability in education and training services in Ireland (QQI, 2016; QQI, 2013). The Level 5 Certificate in Agriculture is aimed at students who are 17 years or over. It is run for a 9-month period with a total learner effort of 1,200 hours (120 ECTS³ credits - Contact hours in college of 130 days and 40 days of work practice). Full time students have a choice of 6 different college locations in the Republic of Ireland. The course consists of a range of core, generic and discipline specific modules as shown in Table 6 below.

³ 1 European Credit Transfer (ECT) is worth 20-25 estimated student effort hours. So for a 10 credit module this is equivalent to 200-250 hours of student input which is a culmination of class contact time and assessments.

Table 6: The structure of the level 5 Certificate in Agriculture

	QQI code	Teagasc Title	Credits
Category 1 - Core Modules - Learners must complete all of these modules	5N1433	Work Practice (Home Farm)	15
	5N20368	Principles of Agriculture	15
	5N20371	Farm Safety and Farm Assurance	15
	5N20374	Soils and the Environment	10
	5N20377	Farm Business and Technology	10
	5N20380	Safe Use of Pesticide Products	5
Category 2 - Generic Modules - One module to be completed by	5N1390	Personal Effectiveness	15
	5N0690	Communications	15
	5N1418	Start Your Own Business	15
	5N2985	Personal and Professional Development	15
Category 3 - Discipline Specific Modules - Minimum of 20 Credits from the following component(s)	5N20385	Sheep Husbandry	10
	5N20388	Beef Husbandry	10
	5N20396	Dairy Husbandry	10
	5N20399	Grass Production	10
	5N20402	Tillage Crop Husbandry	10
	5N20405	Potato Production	10
	5N20408	Equipment for Crop Establishment	10
Category 4 - Minimum of 5 Credits from the following component(s)	5N1750	Chemical Fertiliser Application	5
	5N20420	Farm Structures	5
	5N20426	Tractor Maintenance	5
	5N1752	All Terrain Vehicles Operations	5
	5N20423	Organic Farming Principles	5

Students must complete all category 1 modules. Individual colleges choose one module they will deliver from category 2 and will then be taken by all students on the course in that college. From category 3, students typically complete a total of 3 modules (30 credits) where students would be given some choice based on what the college offers. From category 4, each college typically delivers 10 credits, typically colleges will offer 'Chemical Fertiliser Application' to ensure compliance with European Union legislation around the use of pesticides and one more module from this category. Colleges choose this extra module from category 4 for students to take as part of the course. This culminates in a total of 12 modules and 125 credits completed by students.

Analysis of course structure:

For students, the modules are categorised and organised well so it is clear what a student needs to do to complete the course. The modules in category 1-3 have high credit values with a choice for students in category 3 modules. However there is segregation of content which can create a barrier for creating real life and relevant scenarios for use as part of student centred learning approaches. Currently content may be integrated somewhat by those delivering the course but as college management member commented "*it is not the course design that is doing that, let's be clear about that*".

For students the real challenge in the course structure is the lack of linkages i.e. integration, between the modules. The generic (Category 2) module⁴ is separate from all other modules where students work on personal development. Interview and survey participants also emphasised that the current structure “...ring fenced...” the personal development module.

This segregation of the discipline specific (Technical) knowledge, skills and competencies from the non-discipline specific aspects i.e. personal development, represents a significant barrier to the use of student centred learning within the current course structure. Without a course structure which is capable of integrating subject content and personal development, the opportunity for using a student centred learning approach will be restricted.

4) How does Course Organisation impact Student Centred Learning?

The way in which a course is organised to deliver the component parts and achieve the aims and outcomes is a key element of design that impacts on academic student engagement and its student centeredness. In order for it to support student centred learning there needs to be opportunities within the course for active learning, peer to peer learning, working with the teacher as a facilitator and working independently (Barrett, 2017; Lea et al., 2003; O’Neill & McMahan, 2005). A prerequisite to this is that these need to be part of the content of the module and timetables need to accommodate space for working with peers, working independently on a task (e.g. computer research or searching for information or performing actions required for the task) and with a facilitator.

Overview of course organisation

Each of the 6 agricultural colleges has to decide how to organise the delivery of the course. College management organise the timetables for theory classes, practical lessons, and assignments as well as allocating teachers and classrooms/ facilities for each component. They must also organise the work placements for the students including the timing, the location of placements and the associated administration, monitoring and evaluation. The organisation of the Level 5 course in any college also has to be coordinated with the organisation for delivery of other courses within that college, some of which are delivered in partnership with other institutions. These competing demands on teachers, the time available and facilities can present a challenge for a student-centred approach as evidenced by the following example.

⁴ The module is not being named to protect the identity of participants in this study for ethical reasons.

Example of course organisation:

For this representative example, the course delivers a total of 12 modules (125 credits) which colleges organise and students complete. There are 15 credits for the 'Work Practice' module which happens outside of the college which leaves 110 credits to be delivered within the college setting. Students complete their 'Work Practice' through 8 weeks of farm placement split into two blocks of 4 weeks. One block is completed in the month of October and the other in February. It is at the discretion of each college to decide which week in these months they will schedule placement for.

In a typical agricultural college, 6 weeks will be completed in the college setting before students leave for placement in October for 4 weeks. They then return to college for 6 weeks before a Christmas break in late December. January into February will see a further 6 weeks completed in the college before students go for the second block of 4 weeks and return for a final 8 week block until May when the course will finish.

The 11 modules (excluding Work Practice) have to be organised and timetabled for students to complete. For this example all of these modules are timetabled for the full academic year as this is considered easier from an organisational point of view with staff, classrooms and resources.

Analysis of example course organisation:

Benefits:

From a practical perspective, most college management indicated they prefer timetabling all modules every week as it allows the weekly timetable to be repeated for the 26 weeks students are in college. It makes it relatively easy to assign teachers to a regular schedule and the students get used to this routine. Modules with larger credits can be assigned more of the weekly hours and modules with fewer credits less hours per week. Managing the weekly timetable this way can make it easier to allocate the required classrooms and other resources required for various aspects of the course e.g. computer rooms, livestock, machinery, tools, agricultural buildings etc.

Issues:

While a regular timetable is not a barrier to student centred learning, there is a challenge from the concurrent delivery of 11 different modules, all of which are subject to summative assessments (Dixson & Worrell, 2016; Earl & Katz, 2006; Nicol & Macfarlane-Dick, 2006). While the importance of summative assessments cannot be undermined the concurrent

delivery of 11 different modules i.e. course organisation, promotes a surface learning approach towards assessments for students.

In terms of academic student engagement, every week a student has the same 11 modules for varying amounts of classroom time requiring them to split their focus and concentration in at least 11 different ways. Modules have between 2-4 different assessment strategies which can further split the student's focus. A quote from one interviewee captures this dilemma:

A teacher may be teaching 2 or 3 modules but the student is studying 11 modules. We (teachers) look at our modules and say 'oh it is an easy subject so why are they failing?' But we have to realise that the student has 11 modules to focus on.

Assessments extrinsically engage students but the current organisation and assessment strategies underutilise this type of motivation (Saeed & Zyngier, 2012). Assessments, primarily theory and skills which account for 88.6% of all assessments are timetabled for a set period i.e. December before breaking for Christmas, January/ February before placement and also in May at the end of the academic year. This timetabling creates a pressure for content and skills to be covered quickly so that assessments can be completed. It also rewards the student for being able to surface learn or rote learn for exams (Bonwell & Eison, 1991) and creates unnecessary pressure on students. Participants from the interviews and survey felt that this type of timetabling and volume of assessments encourages a surface approach to learning as illustrated in this quote:

We are timetabling everything together and trying to prioritise certain assessments to ensure they are done in time for when they need to be done

Discussion

A key message from the literature is that viewing student centred learning (SCL) approaches as a teaching method or classroom technique is a mistake. It should be viewed as an educational approach or model whereby the focus of instruction shifts from the teacher to; what the student learns and how they learn it (Barrett, 2017; Bouhuijs, 2011). This study has reinforced this message. While a college or institution may want to implement SCL in their course, they need to consider where and how the SCL approach will be incorporated within the course design. This means in the development stages or in redeveloping a current course.

It is apparent from both the literature and this research project that while course design remains a complex task, it is a critical one. It has a significant impact on the student experience whether it is academic student engagement, the use of SCL or active learning strategies and its impact on the options a teacher is equipped with to teach. This paper draws on the work of

O'Neill (2015) who synthesises different theories around course design and outlines 9 key areas for designing a course; 1) Context 2) Educational Philosophy 3) Curriculum Model 4) Course Aims and Outcomes 5) Course Structure and Organisation 6) Course Teaching, Learning and Assessment Strategies 7) Module Design 8) Student and Staff Supports 9) Evaluation Strategies. This paper adopted the principles of this framework in examining why the current course design of the Level 5 Certificate in Agriculture creates barriers to the use of SCL approaches which in turn could enhance academic student engagement (Fredricks et al., 2016; Fredricks & McColskey, 2012; Lea et al., 2003; O'Neill & McMahon, 2005).

Academic student engagement is multidimensional and as a result it is not simply an all or nothing phenomenon (Schlechty, 2001). Instead it can be viewed as a continuum with levels of engagement and in order to be authentically engaged students need to be engaged in all three domains; behavioural, cognitive, and affective domains (J. E. Groccia, 2018). A SCL approach has the ability to do this as the behavioural domain is targeted through active learning where students become involved, participate (active learning), work with a facilitator and/ or work with peers. The cognitive domain is targeted as the student is given the task and asked to work it out/ on it i.e. a problem, a task, project rather than solely relying on the teacher to deliver material and studying it. They are required to think about it (engage cognitively) in order to complete the task they have been set. Finally the affective domain is targeted as students are challenged by having to adapt a deep approach to learning which will be difficult but will be rewarding when completed and will involve a mixture of emotions endured by the student. In addition the task set for students should be relevant and real life so that they can see the relevance of completing the task. This also encourages students to learn about the attitudes required towards challenges they encounter (positive and/or negative) and they can learn from this by reflecting on their different experiences of what worked well i.e. keeping a positive attitude that they can complete the task/ solve a problem. A study by (Monks, 2010) where an adapted PBL approach was adopted experienced enhanced engagement through a change of approach towards a student centred learning approach. Similarly a study by Morris (2018) highlighted that inspectors reported 'outstanding provision' within vocational education to those who had a collaborative relationship between the teacher and learner in the learning process which is a key characteristic of a student centred learning approach.

Creating these opportunities within a course requires a course design aligned with student centred learning which in turn can be planned, organised and implemented. Valuable learning opportunities could be created for students through giving students a holistic overview of the curriculum through linking aspects together; business, enterprises, health and safety, environment etc. (Kolb, 2013; Ornstein & Hunkins, 2009). These types of opportunities for a student to learn would provide a highly engaging but also critical learning experience and help

to build deeper knowledge, skills and competencies of both discipline specific and non-discipline specific areas.

The analysis framework for the course design focused on 4 key aspects; 1) Course Aims and Outcomes 2) Module Design 3) Course Structure 4) Course Organisation. These 4 aspects enabled clearer insights into why SCL approaches are restricted within this context. The course aims and outcomes allowed an insight into the intentions of what the course would deliver. The module design gave an insight into the problems created by a large volume of learning outcomes and assessment strategies which are not constructively aligned with SCL approaches (Biggs, 1996, 2003; Sagardia et al., 2018). The structure gave an insight into the modules which would be taken and if there were any clear indicators of it being unsuitable for SCL and finally analysis of the course organisation constraints were also identified in terms of their impact on the student. This mainly revolved around the issue of timetabling and how many modules are concurrently run at one time.

Conclusion

It is clear from this research that there is no single critical element of course design; moreover what is critical is how the elements of course design work together. The analysis of the Level 5 Certificate of Agriculture has shown that the current course design creates significant barriers to implementing a SCL approach. The two biggest obstacles which would have to be addressed to create opportunities for SCL in this circumstance are the course structure and module design. If these aspects were revised and redesigned the course could better support a SCL approach. The course design analysis process or framework used in this study provided results for the course discussed in this paper but could be used by other colleges, organisations and programme teams in vocational and further education. It is hoped that this paper can create more awareness of the importance of course design to implement a SCL approach and adds to the literature currently published in this area.

Declaration of interest statement

No potential conflict of interest was reported by the authors.

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Chapter 7: Discussion

7.1 Introduction

This chapter represents an integration of the literature and the results of this study. It also reflects on the implications of this research for Teagasc education and the wider academic community who have interests in education design for academic student engagement. In addition, this chapter will discuss the key recommendations this study can provide to inform how positive change can be achieved by enhancing academic student engagement.

7.2 Objectives of the study

There were three key research questions created at the beginning of this study. They revolved around academic student engagement;

Research questions:

- 1) What is the current teaching approach being taken within the Level 5 'Certificate in Agriculture' delivered by Teagasc Education?
- 2) Why do students struggle to engage academically with this approach?
- 3) Could a student centred learning approach be implemented within the current course design and would it enhance academic student engagement?

In addition, several objectives were established for the study to investigate. The overall objective of the study was to evaluate how student engagement in classroom settings could be enhanced i.e. academic student engagement.

Objective one – To investigate what aspects of the course students struggle to engage in and why?

Objective two – To establish the knowledge and attitudes of teaching staff in relation to what they believe affects student engagement in classroom settings.

Objective three – To analyse and compare the effects of the current teaching approach versus a more student centred learning approach on academic student engagement.

Objective four – To analyse the suitability of the current course design to implement a student centred learning approach.

Objective five – To establish the implications for Teagasc Education to implement a student centred learning approach effectively.

The study sought to investigate why academic student engagement was an issue on the Level 5 'Certificate of Agriculture', could this be enhanced using a different teaching approach and what the implications would be for the organisation to successfully enhance academic student engagement. A variety of steps were taken to achieve these objectives; a

wide body of literature was critically reviewed to gain insights into evaluating student engagement and also teaching approaches that have been proven to enhance it. An investigation was conducted into the current teaching approach on the Level 5 'Certificate in Agriculture' to assess why students struggled to engage with it. This was achieved by examining which of the four factors in the conceptual framework were the most influential. A different teaching approach was piloted and tested in an attempt to enhance academic student engagement and evaluated the potential for using student centred learning approaches going forward in Teagasc Education.

7.3 Summary of methodology

An action research design was adopted as part of this study. This consisted of three distinct phases; An exploratory phase, an intervention phase and an evaluation phase (Creswell et al., 2003). This incorporated a mixed methodology design with the predominant use of qualitative research methods. A review of the literature around the topic of student engagement both in terms of how to evaluate and enhance it was instrumental in the decisions taken in the study. Literature highlighted that student engagement is multi-dimensional; Cognitive, affective and behavioural, and as a result when evaluating engagement it helped the researcher to focus on what dimensions they were evaluating. Additionally, student engagement is not an all or nothing phenomenon, rather, there are levels that can be associated with a continuum (Schlechty, 2001). This highlighted that student engagement is a dynamic concept and that students vary in their level of engagement over time e.g. over a semester. To achieve authentic engagement (the highest level of engagement), all dimensions of student engagement need to be targeted as part of the teaching approach being taken (Groccia, 2018). To explore why engagement was low with the current teaching approach, phase one adopted several research methods to evaluate the approach and level of engagement.

7.3.1 Phase 1 of the theoretical phased structure of this study

Classroom observations – n=66

The use of direct observation was chosen as it is recognised as a valid method to evaluate student engagement (O'Malley et al., 2003). It enabled the researcher to capture what happens in reality in classroom settings and how that influenced students to engage. This targeted mainly the behavioural dimension of student engagement but also was able to capture aspects of the affective dimension if students displayed it (Fredricks et al., 2016; Fredricks & McColskey, 2012; Groccia, 2018).

Phase one observed six different teachers ('Teacher' factor), in a variety of classrooms ('Environment' factor – physical environment), with several different groups of students

(‘Student’ factor) and four different modules (‘Course Design’ factor). This allowed for an analysis of the observable aspects of each factor and how they influenced student engagement in the classroom i.e. academic student engagement. This helped to evaluate the conventional teaching approach that is typically used to deliver the Level 5 ‘Certificate in Agriculture’ and this constituted a valuable source of information for this study.

Interviews – n=4

Having identified four key factors seen as influential on academic student engagement, to evaluate which factor is the most influential, educational specialists were seen as a valuable source of information due to both their knowledge and experience. A total of four semi-structured interviews were conducted with educational specialists from national and international Universities.

Interviewees were presented with the conceptual framework created in phase 1, consisting of four factors (See Figure 3.1). The interviewees were asked which of the four factors they see as the most influential over academic student engagement. From here, the interviewee continued to rank the factors in the order in which the interviewee felt had the most influence and discussed why they felt this way.

Focus groups – n=12 & n=12

A total of two focus groups were conducted in phase 1. The first was with 12 teachers (n=12) from one of the agricultural colleges delivering the Level 5 ‘Certificate in Agriculture’. This sought to gather the perceptions of teaching staff on what they feel affects academic student engagement based on their experience. The second focus group was conducted after classroom observations had been completed and analysis of them indicated that in particular, one type of module (‘Core Modules’) being the least engaging for students (0% of classes rated as ‘High’). In addition to this finding from classroom observations, the focus group sought to understand if students felt this was true and discuss why.

7.3.2 Phase 2 of the theoretical phased structure of this study

As a result of the findings from phase 1 which explored why students struggled to engage, phase 2 sought to implement a change in teaching approach and test whether it could enhance engagement. As a result, a pilot module was formed which involved combining two types of modules together which could be delivered using a more student centred learning approach. This required a course redesign in an attempt to implement a problem based learning (PBL) approach. This combination was necessary due to the alignment of the current course design with a more teacher centred approach. The following research methods captured data during this phase;

Classroom observations – n=24

Classroom observations were used again with the same observation schedule as phase 1. This allowed for a comparison of the level of academic student engagement from phase 2 versus phase 1. These were only carried out within the pilot module and helped evaluate the impact of an intervention to the conventional approach taken on this course.

Interviews – n=4

On completion of the pilot module, teachers were asked to volunteer to participate in an interview to evaluate and gather their feedback about it. This helped to gain more insight about the pilot module from one of the key stakeholders in it.

Student Survey – n=108

A student survey was conducted at the end of the pilot module with an 88% voluntary response rate. This allowed for the gathering of feedback from another key stakeholder and with a high response rate gives reliability and validity to the feedback from students about the module. This involved a combination of quantitative questions where students rated aspects of the module and some qualitative questions, whereby students were asked to provide short answers to what they found engaging and disengaging about the module.

Student Focus Groups – n=12 & 8

At the end of the pilot module and after the surveys, in addition, students were asked to volunteer to participate in a focus group. This allowed the researcher to obtain a deeper understanding of several topics in relation to the pilot module from students.

7.3.3 Phase 3 of the theoretical phased structure of this study

This was the evaluation and reflection phase of this action research project. Based on the data and information generated from the first two phases of research, an evaluation of the course design issues encountered was required. This involved an evaluation of why the current course design prevents the use of student centred learning approaches. To do this the following research methods were used;

Interviews – n=12

The twelve members of college management who manage and direct the delivery of the course in six colleges were asked to participate in these interviews, with all twelve participating. These interviews sought to gather the views of college managements on the current course design and its influence on teaching approaches. This allowed for the personnel with experience of managing and delivering the course to express their opinion about the current course design and their opinion on teaching approaches. This allowed for

a deep understanding of issues they face in delivering the course based on their experiences.

Survey – n=31

This had the same topics and structure as the interviews with college management but was adapted for use in a survey format. This allowed for teachers to participate and provide their opinion of the current course design and its influence on teaching approaches based on their experience. Both of these methods were important to gather the opinion of stakeholders who operate within the current course design.

Desk Analysis

As the first two methods used in this phase were subjective (participants feedback), the researcher wanted to provide a valuable but also reliable analysis of the current course design. The findings generated as part of the desk analysis were objective as they were based on statistics, facts and analysis of a variety of aspects of the current course design versus a student centred design. To achieve this, a desk analysis was conducted around four fundamental aspects of the current course design;

- 1) Course Aims and Outcomes
- 2) Module Design
- 3) Course Structure
- 4) Course Organisation

This allowed the current course design to be compared against the characteristics of a student centred learning course design. This allowed for an objective analysis of these aspects of course design. In analysing these aspects of course design, a number of factors were considered to determine their compatibility with a student centred learning approach. To analyse the course aims and outcomes, the documentation Teagasc submitted to Quality and Qualifications Ireland was requested to gather these details. These documents were subsequently analysed to evaluate if there was evidence that it would create a barrier to using a student centred learning approach or not. The module design was analysed under the following sub-headings; Learning outcomes (Categorised according to how it was assessed and totals were established), the marks associated with each assessment strategy and an analysis of typical 'Theory Examinations' which are used on the Level 5 'Certificate of Agriculture'. This was analysed utilising the cognitive domain of bloom's taxonomy whereby the type of answer a student is required to give indicates the complexity or depth of learning required for that question. This helped to determine if a surface or deep approach to learning is encouraged based on the assessments used. The course structure was analysed by assessing its ability for a student to develop a holistic overview of the content on the course.

Holistic means that students are encouraged by the design of the course and not just their own interest, to integrate the knowledge, skills and competencies from various aspects of the course together i.e. linking business, health and safety, quality assurance with the running and management of an enterprise and its practices. Course organisation was analysed by using a typical example of how the course is organised as each college has a different dynamic. Describing a typical example of how the course is organised and how this impacts on the ability of a course to create space for learning opportunities (combining the analysis of module design – learning outcomes and assessment strategies) is a fundamental aspect of a student centred learning approach. Aspects of course organisation which were analysed as to their influence include the; timetabling of modules, the number of modules taken concurrently and in turn what impact this has on the timetabling of assessments.

7.4 Summary of key findings pertaining to each objective

Objective one – To investigate what aspects of the course students struggle to engage in and why?

The classroom observations in phase 1 together with the student focus groups enabled an objective and a more subjective view respectively to be gathered in relation to students' struggle to engage. The conventional approach taken in phase 1 predominantly targeted the cognitive domain of student engagement. For students to achieve authentic engagement (high levels of engagement) all dimensions of student engagement need to be targeted and in turn activated by the teaching approach taken. In particular, it was apparent from the observations that students struggled to engage the most with 'core modules'. Students expressed that large classes, less interesting subjects and a reliance on a lecture style were the main factors causing low engagement with 'Core Modules'. This led to the decision to implement a course redesign in phase 2 using a 'Core Module'.

Objective two – To establish the knowledge and attitudes of teaching staff in relation to what they believe affects student engagement in classroom settings.

This was targeted by a combination of a teacher focus group and classroom observations. The teacher focus group was conducted before any classroom observations and this allowed for preliminary analysis to highlight issues raised by teaching staff. In turn, classroom observations were able to evaluate the effect of these issues. These included the influence of the quality assurance process i.e. verification, the influence of learning outcomes and the subsequent assessment strategies that align with them. The most prominent themes which emerged from the teacher focus group were in relation to 'Course Design' with several other issues also raised.

Objective three – To analyse and compare the effects of the current teaching approach versus a more student centred learning approach on academic student engagement.

A comparison was carried out between the conventional teaching approach taken in phase 1 and phase 2 where a more student centred learning approach was taken. This showed, that the teaching approach in phase 2 was substantially more engaging (88% rated as 'High Engagement') versus the conventional approach taken in phase 1 (0% rated as 'High Engagement').

Objective four – To analyse the suitability of the current course design to implement a student centred learning approach.

Based on the findings from phase 1 and 2, phase 3 sought to investigate the barriers to implementing a student centred learning approach. This involved interviews with college management, a survey with teachers and a desk analysis of the Level 5 'Certificate in Agriculture'. Findings highlighted that the current course design does not constructively align with a student centred learning approach. This was due to a combination of module design, course structure and organisational issues which are discussed in chapter 6.

Objective five – To establish the implications for Teagasc Education to implement a student centred learning approach effectively.

Based on the findings in phase 3, there are a number of issues raised that need to be addressed to enable the use of a student centred learning approach. A number of short and longer term goals have been identified to help Teagasc Education. A short term goal that needs consideration is how the course is organised with a student's workload in mind; Timetabling how many modules are run at once and the timing/ schedule of assessments are important for engagement whether they are carried out using a teacher centred or student centred learning approach. Long term goals include the redesign of the course structure i.e. the number of modules, module design i.e. the quantity of learning outcomes and type of assessment strategies used with a consideration to align these with a student centred learning approach.

7.5 Discussion of research findings and implications

7.5.1 Students struggle to engage with 'Core Modules'

In phase 1, 'Core Modules' were identified as an area where students struggled to engage in the most (See Figure 7.1 below for description). There are a total of six core modules all of which students must complete therefore these classes have the largest number of students. This presents a challenge for teachers as they have a large class size which they may find

challenging to provide students with an authentically engaging learning experience. This is compounded by a lack of training for teachers as reported by Flannery et al. (2020) but also as this study has found, the current course design creates barriers to providing an authentically engaging learning experience, regardless of class size. 'Core modules' as described below (See figure 7.1) are subjects that are somewhat isolated from the practical farming context in an attempt for students to learn about the concepts within 'core modules'. This can be counterproductive as "core modules' deal with predominantly difficult concepts and students struggle to see their relevance which in turn can result in a lack of motivation for students to learn (Saeed & Zyngier, 2012). Students were willing to engage in other modules more readily as they were sometimes in smaller groups but more importantly these subjects were specific to a farming enterprise. This helped students to see the practical relevance of what they were covering which likely activated some intrinsic motivation (Deci & Ryan, 2008; Saeed & Zyngier, 2012) as all four types of modules typically had a very similar approach. In fact, one teacher taught both a core and specialised module using the same style of teaching but received higher levels of engagement in the specialised module. This can be attributed in part to the current course design as it segregates topics rather than providing opportunities for integration of content across the course that would give students a holistic overview of the curriculum (Kolb, 2013; Neary, 2002; O'Neill, 2015).

Figure 7.1: Below is a description of the four types of modules that were observed on the Level 5 Certificate in Agriculture

Descriptions of Core, Specialised, Supplementary training and transferable skills modules:
- Core Modules are mandatory and cover the basic principles of agricultural science, financial management, health and safety, the structure of Irish agriculture, policy and legislation.
- Specialised modules focus on the basic principles, knowledge and skills necessary for animal and crop husbandry associated with different farm enterprises.
- Supplementary training modules are also provided which are technical in nature as they focus on knowledge and skills ranging from maintenance of farm buildings to safe application of pesticides.
- Transferable skills module is mandatory and covers the principles and practice of a variety of personal skills for students to develop; Interpersonal skills, communication skills in a variety of formats, team work, research skills and time management. The purpose of this type of module is to focus on the competencies and skills which are transferable to a variety of scenarios which will be beneficial to students in their future careers.

7.5.2 How to adopt a student centred learning approach

Currently, there is a culture and encouragement to use a teacher centred approach arising from the current course design through the subsequent management and implementation of this design. Teachers can individually try to engage and/ or interact with students but in order to implement a true student centred learning approach, a number of changes are required to the course design. These were identified in phase 3 as; changes to the current course structure to help improve integration, changes to the module design on the course

i.e. learning outcomes and assessment strategies, and alignment of the course organisation with this approach i.e. consideration for the effect of organisation on a student's workload and academic student engagement. This incorporates the challenge of changing the culture within the organisation if a student centred learning approach is adopted. This is, as Bouhuijs (2011) and Schweisfurth (2011) describe, a challenge when implementing a student centred learning approach as teachers can be anxious about their role changing, changing how resources are utilised and the initial resources required to implement the change. Currently, there is an aim within Teagasc Education to implement student centred learning approaches such as Problem Based Learning. What is important from those in 'high power' positions is that they gain sufficient knowledge about these approaches, consider what changes are required and make a realistic plan of how to achieve this (Schweisfurth, 2011). For Teagasc Education, this study has found that several changes to the current course design are required as stated previously. In addition, a previous study conducted by Flannery et al. (2020) highlighted the need for pedagogical training for teaching staff delivering Teagasc courses. These two changes relate to the original four factors in the conceptual framework and the subsequent redesigned conceptual framework (See chapter 5 – Figure 8). These are both critical steps that need to be taken but would be substantially more beneficial were they to happen in unison. Any pedagogical training for teaching staff needs to be complemented by changes to the course design to support the use of student centred learning and other engaging approaches, otherwise, teachers will encounter barriers to implementing them. This would be counterproductive if one of these critical changes was prioritised over the other.

7.5.3 Enhancing academic student engagement with a more student centred learning approach through a course redesign

A change of teaching approach was made possible in phase 2 by the formation of a pilot module. This combined two modules together to integrate aspects of the course together. The pilot module used a 'Core Module', the type of module students struggled to engage in the most, and a 'Transferable Skills Module' as this had key attributes of a Problem Based Learning (PBL) approach (a student centred learning approach). This utilised extrinsic motivations for students to engage in the set learning activities and targeted all three dimensions of student engagement (Fredricks et al., 2016; Fredricks & McColskey, 2012; Groccia, 2018). The learning activities in PBL come in the form of real life problems and do not have a right or wrong answer per se, moreover are open to creative/ justifiable solutions. This can intrinsically motivate a student, challenge the students to achieve deeper levels of learning i.e. towards the creative aspect of Blooms taxonomy, and can be assessed with a strategy that constructively aligns with the approach (Biggs, 2003; Deci & Ryan, 2008, 2012; Krathwohl, 2002; Ryan & Deci, 2000; Saeed & Zyngier, 2012; Wijnia et al., 2011). The aim of

the pilot module was to implement PBL within the current overall course design. While this attempt to enhance engagement included learning activities which encouraged active learning, integrated areas of the course and had a balance of extrinsic and intrinsic motivations, it was not possible to change the assessment strategies. This was due to the current requirement that the 'Theory' learning outcomes (as part of the 'Core Module') had to be assessed by 'Theory Examination'. This was a barrier to constructively align the teaching approach with the assessment strategy which impacted on the student centeredness of the students learning experience. Phase 3 described students being asked questions which predominantly promote a surface learning approach for their 'Theory Examination' assessments. Assessment is an integral part of the current course design as in Teagasc Education, teachers follow the learning outcomes and assessment strategies set for them in a module. In turn, they are instructed and encouraged for quality assurance purposes and verification, to create questions that encourage surface learning. This surface learning approach is compounded by the fact that of the 12 modules in total that they take, nine have 'Theory Examinations' as an assessment strategy. When a student takes these modules they sit two exams for theory, resulting in a total of 18 'Theory Examinations' over the course of the academic year. Typically, these are then assessed within a set period of time i.e. 2-4 weeks. As this type of assessment accounts for 60% of the content covered on the course, consideration is required of how to cover this content more effectively by creating deeper learning opportunities for students (Ornstein & Hunkins, 2009). The root of this problem and issue comes from several aspects of the current course design.

7.5.4 Course structure, module design, and course organisation

To shift the teaching approach within Teagasc Education towards a student centred learning approach, there are three critical course design changes required. Changing the course structure is required to reduce the amount of segregation, create space for learning opportunities that integrates and links various aspects of the course together and in turn help to create real life tasks and encourage students to adopt a deeper learning approach. However, this would only create the foundation for implementing a student centred learning approach. In addition, how modules are designed needs to adapt and be capable of aligning with a student centred learning approach. This requires learning outcomes which promote valuable learning opportunities; this would mean reducing the number of learning outcomes but also changing how they are designed. It would also require the type of assessment strategies used to be capable of aligning with a student centred learning (SCL) approach. While assessment strategies such as projects, assignments, portfolios, presentations, essays and other similar assessment strategies are more compatible with SCL, how these strategies are used to align with the approach rather than simply just using these strategies is just as important (Biggs, 2003; O'Neill & McMahon, 2005). Course organisation needs to

work in tandem in order to create and timetable for the space to create these types of learning opportunities. While the course design could provide the foundation for a SCL approach, the course organisation could jeopardise this by overloading the student workload and thus take away from these learning opportunities. Staff responsible for the organisation of the course would benefit from considering a student's workload as it would allow students to engage with their work effectively as Zyngier (2008) reported a strong correlation with higher academic achievement of those students who are engaged. As described in chapter 6, there were four critical elements of course design which were analysed as part of phase 3 to establish what the barriers of the current course design are to implementing a student centred learning approach; 1) Course Aims & Outcomes 2) Module Design 3) Course Structure 4) Course Organisation. These were adapted from O'Neill (2015) who describes nine key elements to designing a course. Phase 3 chose to focus on four of these factors to establish how to adapt the current course design to be compatible with a student centred learning approach.

7.6 Recommendations

In order for Teagasc to enhance academic student engagement, the most effective teaching approach to enhance engagement is a student centred learning approach as it targets all dimensions of engagement (Fredricks et al., 2016; Fredricks & McColskey, 2012; Groccia, 2018). Student centred learning achieves this by allowing students to adopt active rather than passive learning; a deeper approach to learning; an increased responsibility; accountability and autonomy in their learning; interdependence and equality through a mutually respectful relationship between the teacher and learner; and a reflexive approach to the learning process on part of both the learner and teacher (Brandes & Ginnis, 1986; Lea et al., 2003). In order to implement a student centred learning (SCL) approach, a number of changes are required to the Level 5 'Certificate in Agriculture' course and if the same principals of course design underpin other Teagasc courses, they will also need to consider the following recommendations in order to implement a SCL approach;

- Student centred learning offers Teagasc Education opportunities to authentically engage students. This in turn could be utilised in subjects that they traditionally find difficult to engage with. This is when all dimensions of student engagement are targeted at once with the learning activities they undertake. This research has provided not only the theory and literature but also showed the 'proof of concept' in practice that a more student centred learning approach has enhanced academic student engagement substantially.
- In order to pursue a student centred learning approach a number of changes are required to the current course design. These revolve around the current; course structure, module

design and course organisation. A limitation within this study was the lack of flexibility to change assessment strategies for the pilot module so going forward this needs to change and align with a SCL approach.

- Some changes will be more complex and take longer than others. Therefore there are both short and long term targets which could be met;
 - **Short term:** A redesign of 'Theory Examinations' to allow this assessment strategy to align with a student centred learning approach. This is the most predominant assessment strategy as it accounts for 60% of the content covered in the course. Other assessment strategies could be utilised to align with student centred learning such as projects, assignments, presentations, written pieces and portfolios (O'Neill, 2015). These assessment strategies are compatible with a student centred learning approach, however, simply using these strategies will not constructively align them with a SCL approach. They also need to be designed to align with the teaching approach. To accompany changes to assessment strategies college management need to consider the effect of course organisation on academic student engagement. Timetabling of modules, resources and assessment strategies need to consider the students learning experience, environment and how it impacts on their engagement. The student workload can become bottlenecked and thus result in the promotion of surface learning rather than a deep learning experience for students. This comes from how the course is timetabled for students and its impact needs considerable thought.
 - **Long term:** In the longer term changes to the current course structure would be required. This is due to the segregation which the current course design encourages with the number of modules and how content is assessed. Attempting to integrate content across the current course structure could be achieved but is limited in the short term by the complexity and confusion it would cause. This is as a result of learning outcomes being transferred to other areas of the course and how these are assessed would have to be redesigned. This creates complexity in managing the course as it is manipulating how the course is currently designed so the preferable option would be to restructure the course to have a lower number of modules in order to create more opportunities for students to integrate various aspects of the course together in a more holistic approach. Module design would need to be reformed including reducing the number of learning outcomes and changing how these are written to enable constructive alignment with student centred learning approaches and assessment strategies.

- **Teacher training;** In order to launch the use of student centred learning approaches, once the course design can support it, pedagogically trained teachers would be extremely beneficial. This type of training could be launched when a clear picture of what the course design aligned with a student centred learning approach would be. Teaching staff hired are not required and predominantly do not have any pedagogical training when hired but they do have a technical qualification (Level 8 or higher degree in relation to Agricultural Science). Therefore, the development of pedagogical competencies would help teachers gain confidence to use a student centred learning approach.

7.7 Chapter Summary

This chapter has highlighted the key findings from the three phases of research in this study and integrated these findings to present recommendations for Teagasc Education. This chapter outlines the structure of this study and the design which it followed to achieve the findings that have been presented and helped to formulate the recommendations. These recommendations have the potential to not only help enhance engagement on the Level 5 'Certificate in Agriculture' delivered by Teagasc Education, but also all other courses that Teagasc deliver. The principals of the findings in this study lie within teaching and learning and not necessarily the type of education i.e. agriculture. Therefore, these principals can be transferred to all other agriculture, horticulture and equine courses that Teagasc deliver. This could represent the potential for further research to be conducted both on the continuous development of Teagasc Education but also the bigger story of the process it uses to achieve this. This study could have pursued a number of avenues but the data overwhelmingly pointed to the influence of 'Course Design'. All of the recommendations as part of this study would represent an opportunity for more research both individually and as part of the bigger picture that incorporates the process. This study was limited by the timeframe which it had to operate in but this presents an opportunity for Teagasc to pursue and enhance the number of publications it has in relation to how they deliver education and how they have enhanced it. The vocational (further education) sector in Ireland, specifically in relation to academic student engagement, has a relatively small footprint in terms of published research findings. Teagasc could capitalise and add to the organisations body of research by continuing to include research as part of the initiative to enhance its provision of education. While this study can be considered small scale and therefore its findings only representative of the course analysed as part of the study, it has the potential to trigger and inspire other vocational (further education) or higher education providers in Ireland and internationally to conduct similar research as part of initiatives to enhance academic student engagement. This could help to reinforce, disprove and/ or enhance the reliability of the findings presented in this study in relation to vocational and higher education.

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Appendices

Appendix 1: Classroom Observation Schedule Phase 1 & 2



Observation Record No: _____



Classroom Observation Framework for Student Engagement

Briefing with teacher to be completed before class:

Teacher and observer should establish between them:

- **Working Relationship:** For example should the observer be introduced, where should they sit? etc.
- **Purpose of observation:** The purpose of this observation is to identify what influences student engagement in classroom settings. It will help to identify what changes could be made to the course or what teaching methods are effective for engaging students in classroom settings.
- **Aims of the teacher for the session:** To carry out the class as they have planned to do so as the observer is there as a non-participant to observe what influences the behaviour of the student's in the classroom.
- **Learning Outcomes:** What does the teacher intend that the students will know, understand or be able to do as a result of the class?
- **Context:** How does the class relate to previous and subsequent classes?

Rationale: The rationale for this observation is to identify current teaching practices which work well with the students in theory settings and identify what additions a teacher could make to enhance their quality of teaching, learning and engagement with the students.

Feedback and reflection are central to this process as it can enhance teaching quality and inform staff of development needs. Both observer and observed can benefit through the sharing of good practice and they can jointly consider learning, teaching and assessment problems. This type of practice is currently carried out in Harper Adams University*, where it is considered a very useful exercise.

This guide sheet: The purpose of this guide sheet and record form is to provide the observer with a set of criteria against which classes can be compared. In the future this may be a useful tool for teachers to use for self-assessment. The observation exercise will be most useful if it involves three stages:

1. A briefing of the observer by the teacher in advance of the class.
2. Observation of the class.
3. Feedback and discussion at some time after the class is completed.

During the class the observer should be as unobtrusive as possible and sensitive to the possible nervousness and the professional standing of the teacher.

Teacher:	Observer: Kevin Cunningham
Age/ Gender/ Experience:	Pedagogical Training:
Course:	Level/Stage of Course:
Module:	Class Topic:
Classroom type:	Student numbers:
Date:	Time of day:
Length of Class:	Class start time:

1. Timeline of events during class

Introduction	
Beginning	
Middle	
Middle	
Wrap up/ End of class	
Additional Notes	

4. Observer's Comments: To be completed immediately or soon after the class.

The ratings below are divided into four distinct sections based on the conceptual framework for this study: 1) Course Design 2) Teacher 3) Environment 4) Student. There are several subsections which will be collated and the average of these ratings will represent the rating for the factor overall.

Ratings Scale: 1 – Very Low 2 - Low 3 - Medium 4 – High 5 – Very High	
Factors of Student Engagement	Observations
1 - COURSE DESIGN - CONTENT	Factor rating: 1 2 3 4 5
1.1 Relationship & Relevance of content	
1.2 Relates to aims and outcomes	
1.3 Appropriate to the length of the class	
1.4 Accurate – reflecting recent research	
1.5 Challenging students at the appropriate level	
2 - TEACHER – METHODS & DELIVERY	Factor rating: 1 2 3 4 5
2.1 Encourage student participation	
2.2 Teaching methods used – Appropriate & clear instructions are provided to the students	
2.3 Students response rates to teacher questions	
2.4 Teachers response rate of teacher to student question/ comments	
2.5 Praise/ Encouragement/ Use of students ideas/ Comments	
2.6 Class summarised & linked to other Classes/ Experiences/ Industry etc.	
2.7 Classroom management skills are displayed	
2.8 Clearness of Voice	
2.9 Pace is appropriate to audience	
2.10 Distracting mannerisms are avoided	
2.11 Teaching aids: Used to clarify and maintain attention (Q&A to check understanding)	

Ratings Scale: 1 – Very Low 2 - Low 3 - Medium 4 – High 5 – Very High	
Factors of Student Engagement	Observations
3 - ENVIRONMENT	Factor rating: 1 2 3 4 5
3.1 The resources available are adequate to the achievement of aims and outcome	
3.2 Does the teacher provide a positive atmosphere in which the students can engage	
3.3 Are the following elements the class to an acceptable standard for the purpose of the class: <ul style="list-style-type: none"> • Classroom temperature • Layout • Space • Seating 	
4 - STUDENTS - STUDENT ENGAGEMENT (BEHAVIOURAL & AFFECTIVE)	Factor rating: 1 2 3 4 5
Degree of Attention/ Curiosity/ Interest shown?	
Mutual respect between teachers and students	
Did students participate in activities/ Express their opinions?	
Did the students ask questions/ Enquire for more information/detail?	
Did students display any passion, enjoyment... / Bored, frustrated	

Total: /50

Appendix 2: Phase 1 – Teacher Focus Group Guide

Focus Group Guide

The focus group is a “non-standard” technique of information gathering, based on an apparently informal discussion among a group of people. The discussion is carried out in the presence of a moderator or facilitator whose task it is to facilitate the discussion amongst the participants and will be expected to guide each session but not to be too intrusive. They can generate a considerable amount of relevant in depth data for the researcher (Bryman, 2012 & Reid, 2005). The discussion focuses on a topic selected by the researcher, whose aim is to analyse it in detail. A focus group is considered a very innovative research method and is particularly suitable for pointing out unexpected aspects of a social phenomenon, as it concentrates more on the frames of reference of groups analysed, than on those of the researcher (Acocella, 2004 & Morgan, 1984). A focus group is considered capable of providing detailed information in a short amount of time and at a low cost (Bryman, 2012 & Acocella, 2004 & Bertrand et al. 1992).

In order to facilitate interaction, it is recommended that moderators/facilitators create a comfortable environment as this allows participants to feel free to express their opinions. It is also advisable that the discussion takes place among people who share similar interests and who feel equal to each other; even though this does not mean that they should have the same opinion on the topics discussed (Acocella, 2004 & Bryman, 2012). The most suitable option with regard to the group dynamic is to reach a balance between homogeneity and heterogeneity in relation to most important participants’ characteristics according to the research topic. Homogeneity in relation to some characteristics of participants will prevent inhibition; heterogeneity in relation to some other characteristics of participants which promotes a certain level of dynamism in discussion (Acocella, 2004).

In order to collect detailed and relevant information regarding the research topic, it is important that the participants are involved, comfortable, made welcome and contribute their beliefs/opinions to the discussion in a constructive manner as doing so will generate dynamics of opinions expressed in discussion (e.g. contrarities, contradictions, distinctions, specifications, examples etc.). The primary role of the moderator/facilitator is to encourage both cohesion and confrontation of opinions within the group. The interaction among participants is more important than the interaction between moderator/facilitator and participants as the informative source of the focus group lies in the former (Bryman, 2012 & Acocella, 2004 & Puchta, 2005). The moderator/facilitator must encourage a group discussion rather than a group interview in order to gather information on attitudes, motivations or individual experiences. The moderator/facilitator must prevent the development of “speaking in turns” and avoid any dynamic whereby participants feel obliged to intervene about every single aspect of the discussion. This research method allows the researcher to develop an understanding about why people feel the way they do.

It is important that the focus group's participants are able to discuss issues which they deem to be important and significant as the viewpoints of the participants are an important part of the data (Bryman, 2012 & Acocella, 2004). In the context of a focus group, participants will often argue with each other and challenge each other's views. The process of arguing may result in more realistic account of what participants think. The focus group session will work best if it is recorded and subsequently transcribed. This allows during the course of the focus group for the researcher to be interested in who expresses views within the group, such as certain individuals acting as opinion leaders or dominating the discussion. The researcher will also be interested in not just what people say but how they say it as it will give additional context to what is being said.

Socio-demographic factors such as age, gender, class, and so on may skew the data collected as the sample chosen may not be representative of a more widespread population (Bryman, 2012 & Acocella, 2004). (Bryman, 2012 & Acocella, 2004 & Morgan, 1998) suggests that the typical group size should be six to ten members. Participants may be anyone for whom the topic is relevant to. Questions posed to participants may be fairly general and designed to ensure that there was some comparability between the focus group sessions in terms of gauging participants' reactions or more specific questions may be used depending on the desired goals of the focus group. Moreover, there will be ample opportunity for moderators/facilitators to react to points made in the course of the sessions.

It is recommended that focus group sessions begin with an introduction, whereby the moderators/facilitators thank people for coming, introduce themselves, outline the goals of the research, the reasons for recording the session are given, and the format of the focus group session is sketched out (Bryman, 2012 & Acocella, 2004). It is also important to outline/set the ground rules of focus group participation, which can be done by participants and agreed at the start of the focus group, rules such as: only one person should speak at a time; that all data will be treated confidentially and anonymized; that the session is open, and everyone's views are important. Finally the time that will be taken up should be outlined. During the introduction, focus group researchers may ask participants to fill in forms providing basic sociodemographic information about them, such as age, gender, occupation, and where they are from. Participants should then be encouraged to introduce themselves and the focus group can begin.

At the end of the focus group, moderators/facilitators should thank the group members for their participation and explain very briefly what will happen to the data they have supplied. The participants should be reminded that everything said during the focus group is completely confidential, anonymous and no names will be used in the transcription.

Focus Group Details

Structure:

The group will consist of between 6-10 participants of agricultural teachers situated in Kildalton Agricultural College. The length of the Focus Group will be 1.5 hours and will take place in Kildalton Agricultural College.

Purpose:

The purpose of this focus group is to examine the experiences, issues and beliefs of agricultural teachers in relation to student engagement in classroom settings. It will be possible to collect a large amount of data in a short space of time. Another benefit of using focus groups is that participants may disagree, argue, and contradict each other which may bring out realistic ideas of how people feel about the topic. This allows for in depth data in relation to the themes or specific questions in the focus group and allows for probing at appropriate times.

Participants:

Agricultural teachers in Kildalton Agricultural College.

Location:

The focus group will take place in Kildalton Agricultural College. Once participants have agreed to participate a suitable time and room will be used and participants will be notified in advance about a time, date and venue for the focus group.

Letter of invitation:

Dear,

My name is Kevin Cunningham and I am a Walsh Fellowship Masters (MAIS) student. This fellowship is funded by Teagasc and run in association with University College Dublin. Some of you may know me and have a rough idea of my study but my study title is;

“Identification and evaluation of innovative teaching approaches which enhance agricultural student’s engagement in classroom settings”

As part of my study I aim to conduct a focus group with teachers around the topic of teaching approaches which enhance engagement in the classroom. I am writing to you to ask you to participate in the focus group as I feel that you can provide me with essential and unique perspectives on this topic. As I know that teachers have a very hectic schedule, I am writing in advance of the summer months to ask you the time which would suit you most to participate.

If you are willing to participate please click on the link below which will direct you to a Doodle poll and please select two weeks which you think will suit you the most to participate.

<http://doodle.com/poll/2zit4395uwf6ikmz>

Please reply via the Doodle poll to confirm the weeks which suit your schedule or reply with “Sorry I will be unable to participate” if you are not able to participate.

Thank you in advance and I look forward to

Kind Regards

Kevin Cunningham

Kildalton Agricultural College

Phone No: 051 – 644 416

Room Layout:

A U-shaped/Horseshoe shaped layout (See Figure 1) will be used in order to encourage discussion between participants as they can speak whilst facing each other. A table for the researcher will be used at the head of the room for resources which the researcher needs to use. A flip chart and projector will also be used to present information to the participants.

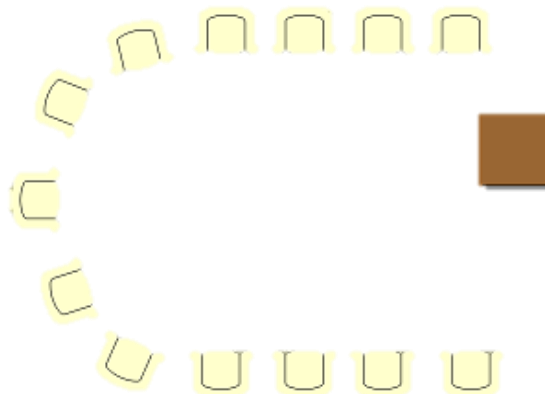


Figure 1: Above is an illustration of a U-shaped/horseshoe shaped layout which will be used for the focus group.

Group conditions:

- **Confidentiality:** The focus group will be recorded in order for the researcher to transcribe the conversations from the focus group. All discussions and comments made during the focus group are completely anonymous and no names will be mentioned in the transcription of the focus group.

Ground Rules:

- One person should speak at a time.
- There is no right or wrong answer.
- There is no order to who speaks when.

- You don't have to agree with each view but it is important to respect it.
- The group may be asked at the beginning of the focus group to come up with a set of ground rules for everyone to abide by.

Running the Focus Group:

Before: As participants arrive be sure to welcome them, introduce yourself and it is important to have something to offer the participants such as tea/coffee.

Opening session:

- Be sure to start on time.
- It is important to introduce yourself to the whole group.
- Stand up for a presentation and sit down for discussions.
- Explain the purpose of the group and the reasons they have been chosen to participate in the focus group.
- It is very important to record the conversation and also keep records such as flip chart sheets etc.

Main session:

- It is important to stick to a strict time frame and inform participants of the time.
- Ensure that all participants understand what they are doing.
- It is important that if participants are working in pairs or groups to check on their progress.
- Use techniques such as the "Parking Lot" i.e. leave a discussion in the parking lot to another time during the focus group in order to stay on topic but to keep the participants feeling their opinions matter and that they will be addressed.

Closing session:

- It is important to emphasise the key findings of the groups.
- Summarise what your understanding is of the main points in order to allow you to check with the group that you have interpreted it correctly.
- Address any questions the group might have.
- Finally thank the group for their participation in the focus group.

Research Questions to be answered:

- What are the links between the student, teacher, environment, course design and engagement
- What teaching methodologies can be implemented to further develop student engagement in theory settings?

Focus Group Plan

Time (Minutes)	Content	Method	Resources
2.5	<u>Introduction</u> <ul style="list-style-type: none"> Welcome everyone Introduce facilitator Introduce Topic 	Presentation	Presentation
2.5	<u>Ground Rules</u> <ul style="list-style-type: none"> Confidentiality One Person speaks at a time Participants come to agreement about rules. 	Presentation	Whiteboard
10	<u>Ice-Breaker</u>	Participants are put into pairs and ask each other's name, job title and how they take their tea/coffee then each group participant introduces there partner.	None
5	<u>Exercise</u> Group Exercise – Classroom Engagement	The same pairs are asked to write down what they believe classroom engagement is? And one/two examples of how they do it.	Post its Pens
10	<u>Discussion</u>	Group discussion on the main issues	
5	<u>Presentation</u>	Overview of some definitions of classroom engagement, teaching methodologies which have been shown to improve it and the statistics behind it.	PowerPoint
5	<u>Questions & Comments</u>	Address any question and comments from group participants about findings and definitions – Do they agree/disagree? What do they think it would work in the context of Agricultural Classroom	None
10	<u>Exercise</u> What should be done to help teachers improve classroom engagement?	The group participants are divided into big groups and asked to identify what would be the main tools/resources/training that would benefit teachers to help improve classroom engagement with agricultural students?	Flip Board Sheet Marker
10	<u>Group Feedback</u>	Group discusses the main findings/issues/considerations which the group feel must be addressed in order to improve classroom engagement for agricultural students?	None

10	<u>Handout & explanation</u>	Handout with a variety of teaching methodologies and how to construct/introduce them into their modules????	Handout
10	<u>Concluding Exercise</u>	Group discussion about the most important aspects of the days topic	Flipchart
5	<u>Conclusion</u> Thanks & where the study goes from here	Presentation	None

Write up of Focus Group:

It is important to when conducting the focus group that you take note of who sat where in the room (See Figure 2 below) as it will help when transcribing the focus group.

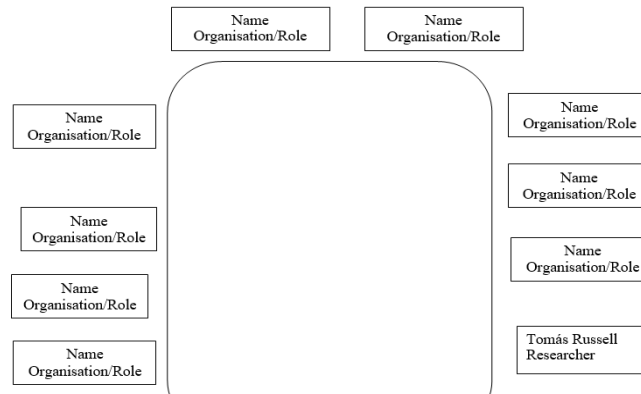


Figure 2: Above is a seating plan which will be used to take note of where participants sit in the room which can aid with transcription.

Structure of focus group write-up

Date: _____ **Venue:** _____

Participants: _____

Introduction: _____

Purpose of the group: _____

Explanation of how group was run: _____

Focus Group Discussion: _____

Transcript format i.e.

P1: The issue is

P2: Well I feel we should

Summary:

Summarise the key themes or questions of the focus group.

Analysis of the results:

- Don't write out the whole focus group transcript.
- The key findings from the focus group should be taken under themes or questions.
- When discussing these themes they can be then backed up with "Quotes" from the focus group.

The following are the main areas that will be covered in the focus group:

Participants will not be asked about staff or other students and we would ask that in the course of your participation you do not name any individual or provide any details on third parties that may be identifiable. The focus group will be recorded for transcription purposes only as the focus group is completely anonymous.

- 1. Student Engagement:** What is it? Definition? Are there any benefits from it? Should it be encouraged? If yes, how can it be encouraged?
- 2. Student engagement in classroom settings:** How do you get it? What encourages it? Do any particular teaching methods encourage it? Is it important to have it?
- 3. Environment:** What is the ideal environment in the classroom? Classroom layout? Classroom temperature? What influence does the teacher have on the environment i.e. Positive/Negative.
- 4. The Teacher:** How does the teacher influence student engagement in the classroom? Do teachers have any control over it? Can training i.e. In service training help improve it?
- 5. The Student:** What encourages students to participate? Is student engagement a positive thing in the classroom? Does the student learn more? What effect does it have on failure rates? What effect does it have on student's grades? What effect does it have on attendance? What effect does it have on student learning i.e. more applied knowledge? Deeper learning?
- 6. The Course Design:** What influence does the course design have on the delivery of a module i.e. Learning outcomes, syllabus content, assessments etc. What changes if any could be made to enhance the course design?

Student Engagement Definition;

- Student engagement is concerned with the interaction between the time, effort and other relevant resources invested by both students and their institutions intended to optimise the student experience and enhance the learning outcomes and development of students and the performance, and reputation of the institution (Trowler, 2010).
- By way of contrast, the body of work produced in the UK which could be said to address student engagement traces its roots back to other traditions, such as student feedback, student representation and student approaches to learning, and is less likely to be tagged as 'student engagement' in the authors'

keywords. Because of this, the literature flagged as 'student engagement' is heavily skewed towards the North American/Australasian tradition, with the exception of an emerging body of 'grey' literature from the UK concerned mainly with small, single case studies.

- For some students, engagement with the university experience is like engaging in a battle, a conflict. These are the students for whom the culture of the university is foreign and at times alienating and uninviting.

References:

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Appendix 3: Interview Guide for Educational Specialists - Phase 1

Interview Topic Guide (UCD, 2016 & Bryman, 2012)

The following are the main areas/questions that will be asked in the interview:

You will not be asked about staff or other students and we would ask that in the course of your participation you do not name any individual or provide any details on third parties that may be identifiable.

1. **Interviewee Background:** Give context to the views/opinions/beliefs/comments.
2. **Student Engagement:** What is it? Definitions/Key terms? Are there any benefits from it? Should it be encouraged? If yes, how can it be encouraged?
3. **Student engagement in classroom settings:** How do you get it? What encourages/discourages it? Teaching methods encourage it? Is it important to have it?
4. **Course Design:** What influence does the course design have on the delivery of a module i.e. Learning outcomes, syllabus content, assessments etc. What changes if any could be made to enhance the course design?
5. **Environment:** What is the ideal environment in the classroom? How do you deal with students in a lecture hall? Classroom layout? Classroom temperature? What influence does the teacher have on the environment i.e. Positivity/Negativity, openness.
6. **The Teacher:** How does the teacher influence student engagement in the classroom? Do teachers have any control over it? Openness of the teacher? Respect the students/get respect from students.....how? Effective teaching methods? Active Learning strategies? Can training i.e. In service training help improve it or would informal training be as effective?
7. **The Student:** What encourages students to participate? How do you get them to Buy in? Is student engagement a positive thing in the classroom? Does the student learn more? What effect does it have on failure rates? Does it have an effect on student's grades? What effect does it have on attendance? What effect does it have on student learning i.e. more applied knowledge? Deeper learning?
8. **Considerations:** For any of the above aspects?
9. **Other aspects:** Other aspects raised by interviewee – probe as to how, why, what needs to be done?

Overview of Interviews with Educational Specialists

Profile of interviewee 1

Interviewee 1 is an education specialist in a leading Irish university and has extensive experience within the area of teaching and learning. They have experience particularly with the implementation of teaching approaches and are very aware of what is required for this to be successful within many different programmes as a result of these experiences. This experience made this candidate a valuable person to interview in relation to this research project.

Profile of interviewee 2

Interviewee 2 is an education specialist from a leading Irish University and has an extensive experience of working with the design of courses both within their college, with staff, programme teams and in addition some more broader and large scale national research projects. This experience made this candidate a valuable person to interview in relation to this research project.

Profile of interviewee 3

Interviewee 3 is an education specialist from a leading Irish University and has extensive experience of working with staff in their college in develop and designing programmes. They are also involved with a national network which specialises in the area of teaching and learning. From the experience which this person has from working with staff in developing courses made this candidate a valuable person to interview in relation to this research project.

Profile of interviewee 4

Interviewee 4 is an educational specialist from a European University and has extensive experience of developing courses and has been involved in several research projects around this type of initiative. This experience and having a different perspective from outside of Ireland made this candidate a valuable person to interview in relation to this research project.

Student engagement in classroom settings

From all interviewees there was a recognition of the importance of this topic as it is an indication of the quality of teaching delivered within a college. From the discussion amongst all interviewee's they all overwhelmingly felt that the design of the course has a major role in creating an engaging learning environment for students:

"Your approaches to student engagement come from your course design"

The Course design factor

Due to their extensive experience of either: designing programmes to create an engaging learning experience for students, working with staff, working on research project initiatives, through the use of student centred learning approaches or adopting the principles of

universal design for learning into programmes, all interviewees highlighted the major importance of this factor. One interview made it clear that this factor is:

“... the major one because if you really think through the course design then the teaching and learning approaches actually follow that philosophy”

The importance of course design and its influence on the other factors within the conceptual framework were embodied by this quote from an interviewee:

“...If you get course design right then your teaching and learning approaches in the classroom and approaches to student engagement and how you construct the learning environment will all come from this”

In addition to this it was also highlighted by another interviewee that *“... Course design is ... something we can work with”* which is a very important consideration when you think about what education provider can do to enhance student engagement within their context. Then if the course design can facilitate an active and student centred learning approach, the education provider may also need to consider the ability of their teaching staff to adapt these types of approaches. This was also another key consideration discussed within this factor and the teacher factor. It is the combination of these two factors which is critical, essentially, you can't have one without the other and one interviewee highlighted this:

“You can come up with a list of approaches, an easy list in some ways, that make the classroom more active or engaged but from my experience I think some of the bigger problems come from the design of the course”

The Teacher factor

The influence of the teacher on student engagement is clear as they are in direct contact with the students and are responsible for the approach which they take to teaching. Again another key aspect of the discussion as part of this factor was the design of the course as teachers need the design of the course to give them flexibility in how they can teach on modules in order to create a more active and engaging learning environment. This revolves around the flexibility of: learning outcomes, assessments strategies and the physical classroom spaces available to a teacher. In addition to this was a discussion about a common theme in higher education at the moment of lecturers being trained pedagogically to become aware of other types of approaches they can adopt for more active learning and engagement. Key to this is that you need both the course design and training to help make this a reality and one cannot be prioritised over the other as both are required to help those teaching to optimise the level of engagement which they can achieve. As this interviewee outlined:

“... in the absence of being trained and exposed to teaching methods people teach the way that they were taught”

This was a key point to take from this interview but the researcher did outline that there was another doctorate study which commenced a year ahead of this study and was investigating the topic of pedagogical training within Teagasc. This was important for the researcher to be aware of but they also made the interviewee aware of this. The researcher allowed all

interviewees to discuss the topic of training but felt that it was important that they were aware of other research being conducted on this topic at the time.

The Environment factor

While this topic was discussed by the interviewee's, a couple of points which were already raised within the discussion of course design were also key here. Central to the environment is whether or not the design of the course enables the use of a variety of teaching approaches. This will dictate the type of learning environment. In addition to this, there was also discussion around the physical learning environments and in terms of classrooms/ lecture halls they discussed the importance of having flat floor spaces with roundtables/ tables that can be used for group work in order for this environment to become more active. The online learning environment was also discussed briefly and the type of environment created by the teacher in so far as, does a teacher or lecturer have an open attitude to questions, discussions etc. or do they prefer to dictate the class activities as this has a direct influence on whether students may engage or not.

The Student factor

The discussion around the student factor centred around issues such as a student's: personal motivation, external issues in their personal life which may be affecting their ability to engage, their own learning style and indeed if they have learning difficulties. This discussion talked about a lot of things which are somewhat outside of the control of a college and even a teacher. What a teacher and college can do is create an engaging learning environment and supports which can help to deal with or help to manage issues which students may have. These again are a key part of engagement in the broader perspective of student engagement but were outside the scope of looking at what affects student engagement in classroom settings which this research project was based on. What the course design can do is to embed appropriate supports for the student population in a given context which can aid in helping to manage these external influences which have the potential to negatively affect a student from engaging. If the design of the course also aims to have these students actively engage then the possibility of a student engaging is greatly enhanced due to both the learning environment and the student supports available to help, manage and/ or guide students in relation to student specific issues.

Other key issues raised

There were two key issues raised which were not fully outlined. Firstly is the issue of pedagogical training and how this can help staff to become more aware, familiar with the theory and indeed what a teaching approach means in practice. This comes from the development of knowledge of educational philosophies, exploring examples of these in practice and if an example can't be found in their discipline, creating and exploring what it would look like in their discipline with the intention of implementing this and evaluating it. As interviewee's outlined the design of the course is important here as staff need flexibility within a course in order to achieve this, which is not always the case in every context. Due to this, the interviewees highlighted the importance of evaluating this and in turn the importance of having pedagogical training available to staff.

A second issue which was mentioned in some capacity is having graduate attributes/ competency framework. This represents what the key: knowledge, skills and competencies

would have upon graduating from the course. This does not mean what the ideal or high achieving student would have, rather the minimum a student who graduates will achieve and this could potentially also outline what a high achieving student has developed in terms of knowledge, skills and competencies.

Summary

To summarise, the opportunity to interview each of these educational specialists was extremely valuable and the researcher would again like to thank those who contributed for volunteering their time, expertise and opinion in relation to the topic for this research project. This helped the researcher to enhance their awareness and knowledge of the topic and the influence of each of the factors on student engagement in classroom settings. This was extremely valuable and helped the researcher to maintain an open mind to the potential strategies which could be taken by an education provider in order to enhance academic student engagement.

Appendix 4: Student Focus Group Guide - Phase 1

Student Focus Group Guide

Considerations when conducting a Focus Group:

The focus group is a “non-standard” technique of information gathering, based on an apparently informal discussion among a group of people. The discussion is carried out in the presence of a facilitator whose task it is to facilitate the discussion amongst the participants and who is expected to guide each session but not to be too intrusive. They can generate a considerable amount of relevant in-depth data for the researcher (Bryman, 2012 & Reid, 2005). The discussion focuses on a topic selected by the researcher, whose aim is to analyse it in detail. A focus group is considered a very innovative research method and is particularly suitable for pointing out unexpected aspects of a social phenomenon, as it concentrates more on the frames of reference of groups analysed, than on those of the researcher (Acocella, 2004 & Morgan, 1984). A focus group is considered capable of providing detailed information in a short amount of time and at a low cost (Bryman, 2012 & Acocella, 2004 & Bertrand et al. 1992).

In order to facilitate interaction, it is recommended that facilitators create a comfortable environment as this allows participants to feel free to express their opinions. It is also advisable that the discussion takes place among people who share similar interests and who feel equal to each other; even though this does not mean that they should have the same opinion on the topics discussed (Acocella, 2004 & Bryman, 2012). The most suitable option with regard to the group dynamic is to reach a balance between homogeneity and heterogeneity in relation to most important participants' characteristics according to the research topic. Homogeneity in relation to some characteristics of participants will prevent inhibition; heterogeneity in relation to some other characteristics of participants will promote a certain level of dynamism in discussion (Acocella, 2004).

In order to collect detailed and relevant information regarding the research topic, it is important that the participants are involved, comfortable, made welcome and contribute their beliefs/opinions to the discussion in a constructive manner as doing so will generate dynamics of opinions expressed in discussion (e.g. contrarities, contradictions, distinctions, specifications, examples etc.). The primary role of the facilitator is to encourage both cohesion and confrontation of opinions within the group. The interaction among participants is more important than the interaction between facilitator and participants, as the informative source of the focus group lies in the former (Bryman, 2012 & Acocella, 2004 & Puchta 2005). The facilitator must encourage a group discussion rather than a group interview in order to gather information on attitudes, motivations or individual experiences. The facilitator must prevent the development of “speaking in turns” and avoid any dynamic whereby participants feel obliged to intervene about every single aspect of the discussion. This research method allows the researcher to develop an understanding about why people feel the way they do.

It is important that the focus group's participants are able to discuss issues which they deem to be important and significant as the viewpoints of the participants are an important part of the data (Bryman, 2012 & Acocella, 2004). In the context of a focus group, participants will often argue with each other and challenge each other's views. The process of arguing may result in more realistic account of what participants think. The focus group session will work best if it is recorded and subsequently transcribed. This allows during the course of the focus group for the researcher to be interested in who expresses views within the group, such as certain individuals acting as opinion leaders or dominating the discussion (Bryman, 2012 & Acocella, 2004). The researcher will also be interested in not just what people say but how they say it as it will give additional context to what is being said.

Socio-demographic factors such as age, gender, class, and so on may skew the data collected as the sample chosen may not be representative of a more widespread population (Bryman, 2012 & Acocella, 2004). (Bryman, 2012 & Acocella, 2004 & Morgan, 1988) suggests that the typical group size should be six to ten members. Participants may be anyone for whom the topic is relevant to (i.e. students who have completed the module). Questions posed to participants may be fairly general and designed to ensure that there was some comparability between the focus group sessions in terms of gauging participants' reactions or more specific questions may be used depending on the desired goals of the focus group. Moreover, there will be ample opportunity for moderators/facilitators to react to points made in the course of the sessions.

It is recommended that focus group sessions begin with an introduction, whereby the moderators/facilitators thank people for coming, introduce themselves, outline the goals of the research, the reasons for recording the session are given, and the format of the focus group session is sketched out (Bryman, 2012 & Acocella, 2004). It is also important to outline/set the ground rules of focus group participation, which can be done by participants and agreed at the start of the focus group, such as: only one person should speak at a time; that all data will be treated confidentially and anonymized; that the session is open, and everyone's views are important; and outline the amount of time that will be taken up. During the introduction, focus group researchers may ask participants to fill in forms providing basic sociodemographic information about them, such as age, gender, occupation, and where they are from. Participants should then be encouraged to introduce themselves and the focus group can begin.

At the end of the focus group, moderators/facilitators should thank the group members for their participation and explain very briefly what will happen to the data they have supplied. The participants should be reminded that everything said during the focus group is completely confidential, anonymous and no names will be used in the transcription.

Focus Group Details

Structure:

The group will consist of between 6-12 participants of agricultural students on the Level 5 Certificate in Agriculture course in Kildalton Agricultural College. The length of the Focus Group will be 1 hour and will take place in Kildalton Agricultural College.

Purpose:

The purpose of this focus group is to examine the experiences, issues and beliefs of agricultural students have in relation to the 3 key topics covered in modules of XXXX and XXXX. It will be possible to collect a large amount of data in a short space of time. Participants may disagree, argue, and contradict each other which may bring out realistic ideas of how people feel about the topic. This allows for in depth data in relation to the themes or specific questions in the focus group and allows for probing at appropriate times.

Participants:

Students who have completed modules on XXXX. 4 participants were asked to volunteer from the 3 different streams of courses (Drystock, Machinery & Tillage and Dairy Management). As female numbers are low across all courses the researcher did prioritise asking the females to get a representative number for the focus group. Students were told what the focus group was about, when it was and where. They were asked if they would like to volunteer after being informed of this information. 12 students agreed to participate.

Date & Time:

TBC

Duration:

1 hour

Location:

The focus group will take place in Kildalton Agricultural College. Once participants have agreed to participate a suitable time and room will be arranged for the focus group.

Room Layout:

A U-shaped/Horseshoe shaped layout (See Figure 1) will be used in the centre of the room for the introductory part and finish of the focus group. This will encourage discussion between participants as they can speak whilst facing each other. A table for the researcher will be used at the head of the room for resources which the

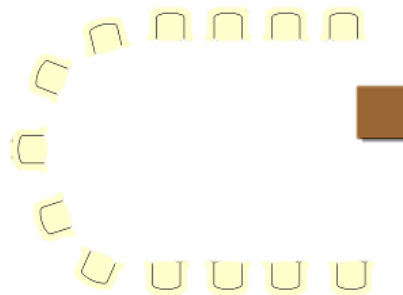
researcher needs to use. Four separate tables and chairs for 3-4 people will be used around the u-shaped chairs in the centre of the room. These will be used for the sub-group exercises during the course of the focus group. Flip charts will be provided at each groups table and a projector will also be used. Each station will be used to assess what students liked and disliked about each of the topics. One member of each group will stay at each station while the rest rotate around to each station. Students will be asked to tell and articulate what they liked and disliked about each subject area.



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Figure 1: The figure above is an illustration of the room layout which will be used for the focus group.

Each of these areas will be defined to avoid confusion as to what they should be talking about.

Group conditions:

- **Confidentiality:** The focus group will be recorded in order for the researcher to transcribe the conversations from the focus group. All discussions and comments made during the focus group are completely anonymous and no names will be mentioned in the transcription of the focus group.

Ground Rules – To be agreed upon by the group, suggestions below:

- One person should speak at a time.
- There is no right or wrong answer.

- There is no order to who speaks when as long as you don't speak over someone.
- You don't have to agree with each view but it is important to respect it.
- The group may be asked at the beginning of the focus group to come up with a set of ground rules for everyone to abide by.

Running the Focus Group:

Before: As participants arrive be sure to welcome them, introduce yourself and it is important to have something to offer the participants such as tea/coffee, snacks etc.

Opening session:

- Be sure to start on time.
- It is important to introduce yourself to the whole group.
- Stand up for a presentation and sit down for discussions.
- Explain the purpose of the group and the reasons they have been chosen to participate in the focus group.
- It is very important to record the conversation and also keep records such as flip chart sheets etc.

Main session:

- It is important to stick to a strict time frame and inform participants of the time.
- Ensure that all participants understand what they are doing.
- It is important that if participants are working in pairs or groups to check on their progress.
- Use techniques such as the "Parking Lot" i.e. leave a discussion in the parking lot to another time during the focus group in order to stay on topic but to keep the participants feeling their opinions matter and that they will be addressed.

Closing session:

- It is important to emphasise the key findings of the groups.
- Summarise what your understanding is of the main points in order to allow you to check with the group that you have interpreted it correctly.
- Address any questions the group might have.
- Finally thank the group for their participation in the focus group.

Focus Group Plan

Time (Minutes)	Content	Method	Resources
1.5	<p><u>Introduction</u></p> <ul style="list-style-type: none"> Welcome everyone Introduce facilitator Introduce Topic 	<p>Presentation</p> <p>Kevin Cunningham XXX & YYY</p>	<p>Pen & Shorthand Notebook for each participant</p> <p>Presentation</p>
2.5	<p><u>Ground Rules</u></p> <ul style="list-style-type: none"> Confidentiality Participants come to agreement about rules 	<p>Presentation</p> <p>To be agreed upon by participants, ask them to come up with the rules And have a list of suggestions as a back up</p>	<p>Whiteboard</p>
15	<p><u>Exercise</u></p> <p>Learning styles</p>	<p>Students will be asked for the approaches/ methods which they use to learn material for their exams, assessments, skills and assignments</p>	<p>Flip Board, sticky notes, Markers & Projector</p>
5-8 mins x 3 tables	<p><u>Flexible Brainstorming:</u></p> <p>In Groups of 3-4 →</p>	<p>Flexible Brainstorming:</p> <ul style="list-style-type: none"> Each group is given post it notes, markers and asked to write down what they like/ dislike about each subject/ topic in terms of the; Content, how it is delivered, aspects of the module, the teacher (Why?) etc. Groups spend 5-8 minutes at each station. One member of each group will be designated to stay at each table. Then the member who stayed at each station will summarise their station. Discussion about what came up at each station. 	<p>3x Flip charts, Sticky notes, Markers</p>
+			
15 mins discussion	<p>Everyone Discusses →</p> <p>Clustering suggestions</p>		
15	<p><u>Group Feedback</u></p> <p>Whole Group</p>	<p>Group discuss and clarify the main findings/issues/considerations which the group liked and disliked about the given subject areas?</p>	<p>Flipchart</p>
5	<p><u>Conclusion</u></p> <p>Thank participants & outline where the study goes from here</p>	<p>Focus group with students, interviews, observation and analysis</p>	<p>None</p>

Total time ~ 1 hour

Write up of Focus Group:

It is important when conducting the focus group to take note of who sat where in the room (See Figure 2 below) as it will help when transcribing the focus group.

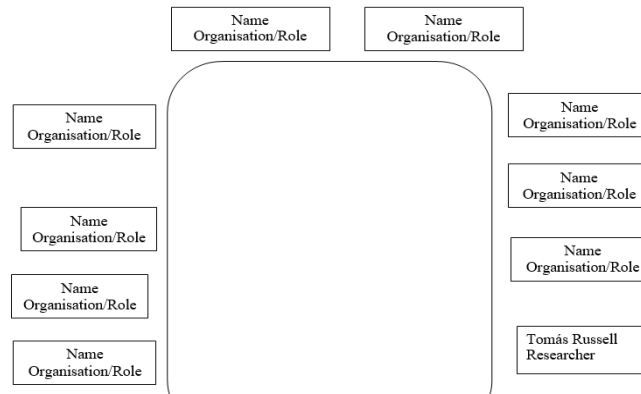


Figure 2: Above is a seating plan which will be used to take note of where participants sit in the room which can aid with transcription.

Structure of focus group write-up

Date: _____ **Venue:** _____

Participants: _____

Introduction: _____

Purpose of the group: _____

Explanation of how group was run: _____

Focus Group Discussion: _____

Transcript format i.e.

P1: The issue is

P2: Well I feel we should

Summary:

Summarise the key themes or questions of the focus group.

Analysis of the results:

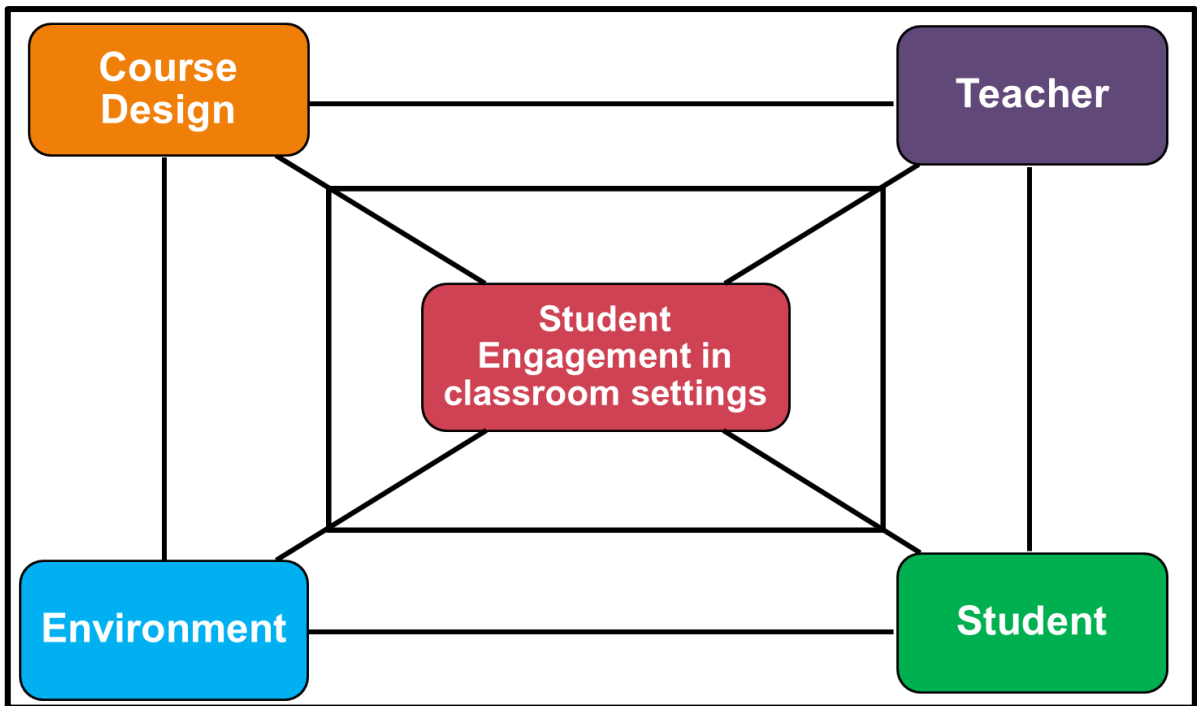
- Don't write out the whole focus group transcript.
- The key findings from the focus group should be taken under themes or questions.
- When discussing these themes they can be then backed up with "Quotes" from the focus group.

Appendix 5: Teacher Interview Guide – Post Pilot Module - Phase 2

Teacher Interview Guide

Topics for discussion:

- **Background of the interviewee** - Undergraduate degree, postgraduate, career etc, how many years of teaching experience, where.
- What is your understanding of the term **student engagement**? - To understand what the teachers think about it? **Do you think it is important? Why?**
 - a) In general what do students find **engaging** in the classroom?
- How did you find the **experience of teaching on the PBL module**? - Easy, Difficult, Like/ Dislike, Why? **How does it compare to teaching conventionally?**
- How did your students react to the **PBL approach**? In what ways did it affect their engagement in the classroom / with the subject? why?
 - a) How does it compare to conventional delivery approaches/ methods?
- Is there anything which you would **change about how the module was run? what? why?** Have you thought about how you could change it?
- How would you **rate PBL** as an approach to learning? good/ bad, why?
- Do you think that **Teagasc Education should pursue** the use of PBL in programmes they deliver? Benefits, Barriers? (Why? Why not? Which ones etc.?)
 - a) If yes, does **anything need to change** in Teagasc Education to use PBL effectively?
 - b) If yes, what **support** would you like to have as a **teacher/facilitator**?
- **Research** - What are your thoughts on the use of observations on this test/ pilot module? Intrusive? Beneficial?
- In your opinion, which of the **four cornerstones** do you think has the **biggest effect on student engagement** both positively or negatively
 - a) **Course Design** - Module specification, content, assessments, timetables, organisation - What effect do they have on student engagement?
 - b) **Teaching** - Approach or methods used to teach. What sized group you are teaching? Difficult or easy?
 - c) **Environment** - Classrooms used, resources available, how did this effect engagement?
 - d) **Student** - What do they do? Their attitude, application, motivations - What effect do they have on student engagement in the classroom



Appendix 6: Student Focus Group Guide – Post Pilot Module - Phase 2

Student Focus Group Guide

Considerations when conducting a Focus Group:

The focus group is a “non-standard” technique of information gathering, based on an apparently informal discussion among a group of people. The discussion is carried out in the presence of a facilitator whose task it is to facilitate the discussion amongst the participants and who is expected to guide each session but not to be too intrusive. They can generate a considerable amount of relevant in-depth data for the researcher (Bryman, 2012 & Reid, 2005). The discussion focuses on a topic selected by the researcher, whose aim is to analyse it in detail. A focus group is considered a very innovative research method and is particularly suitable for pointing out unexpected aspects of a social phenomenon, as it concentrates more on the frames of reference of groups analysed, than on those of the researcher (Acocella, 2004 & Morgan, 1984). A focus group is considered capable of providing detailed information in a short amount of time and at a low cost (Bryman, 2012 & Acocella, 2004 & Bertrand et al. 1992).

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In order to collect detailed and relevant information regarding the research topic, it is important that the participants are involved, comfortable, made welcome and contribute their beliefs/opinions to the discussion in a constructive manner as doing so will generate dynamics of opinions expressed in discussion (e.g. contrarities, contradictions, distinctions, specifications, examples etc.). The primary role of the facilitator is to encourage both cohesion and confrontation of opinions within the group. The interaction among participants is more important than the interaction between facilitator and participants, as the informative source of the focus group lies in the former (Bryman, 2012 & Acocella, 2004 & Puchta 2005). The facilitator must encourage a group discussion rather than a group interview in order to gather information on attitudes, motivations or individual experiences. The facilitator must prevent the development of “speaking in turns” and avoid any dynamic whereby participants feel obliged to intervene about every single aspect of the discussion. This research method allows the researcher to develop an understanding about why people feel the way they do.

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Focus Group Details

Structure:

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Purpose:

The purpose of this focus group is to examine the experiences, issues and beliefs of agricultural students have in relation to the 3 key topics covered in modules of XXXX and XXXX. It will be possible to collect a large amount of data in a short space of time. Participants may disagree, argue, and contradict each other which may bring out realistic ideas of how people feel about the topic. This allows for in depth data in relation to the themes or specific questions in the focus group and allows for probing at appropriate times.

Participants:

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Date & Time:

TBC

Duration:

1 hour

Location:

The focus group will take place in Kildalton Agricultural College. Once participants have agreed to participate a suitable time and room will be arranged for the focus group.

Room Layout:

A U-shaped/Horseshoe shaped layout (See Figure 1) will be used in the centre of the room for the introductory part and finish of the focus group. This will encourage discussion between participants as they can speak whilst facing each other. A table for the researcher will be used at the head of the room for resources which the

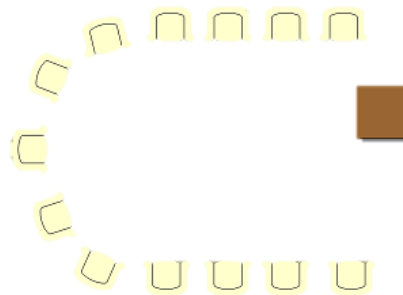
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Figure 1: The figure above is an illustration of the room layout which will be used for the focus group.

Each of these areas will be defined to avoid confusion as to what they should be talking about.

Group conditions:

- **Confidentiality:** The focus group will be recorded in order for the researcher to transcribe the conversations from the focus group. All discussions and comments made during the focus group are completely anonymous and no names will be mentioned in the transcription of the focus group.

Ground Rules – To be agreed upon by the group, suggestions below:

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Before: As participants arrive be sure to welcome them, introduce yourself and it is important to have something to offer the participants such as tea/coffee, snacks etc.

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- It is important that if participants are working in pairs or groups to check on their progress.
- Use techniques such as the "Parking Lot" i.e. leave a discussion in the parking lot to another time during the focus group in order to stay on topic but to keep the participants feeling their opinions matter and that they will be addressed.

Closing session:

- It is important to emphasise the key findings of the groups.
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Focus Group Plan

Time (Minutes)	Content	Method	Resources
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2.5	<p><u>Ground Rules</u></p> <ul style="list-style-type: none"> Confidentiality Participants come to agreement about rules 	<p>Presentation</p> <p>To be agreed upon by participants, ask them to come up with the rules And have a list of suggestions as a back up</p>	Whiteboard
15	<p><u>Exercise</u></p> <p>Learning styles</p>	Students will be asked for the approaches/ methods which they use to learn material for their exams, assessments, skills and assignments	Flip Board, sticky notes, Markers & Projector
5-8 mins x 3 tables	<p><u>Flexible Brainstorming:</u></p> <p>In Groups of 3-4 →</p>	<p>Flexible Brainstorming:</p> <ul style="list-style-type: none"> Each group is given post it notes, markers and asked to write down what they like/ dislike about each subject/ topic in terms of the; Content, how it is delivered, aspects of the module, the teacher (Why?) etc. Groups spend 5-8 minutes at each station. One member of each group will be designated to stay at each table. Then the member who stayed at each station will summarise their station. Discussion about what came up at each station. 	3x Flip charts, Sticky notes, Markers
+			
15 mins discussion	<p>Everyone Discusses →</p> <p>Clustering suggestions</p>		
15	<p><u>Group Feedback</u></p> <p>Whole Group</p>	Group discuss and clarify the main findings/issues/considerations which the group liked and disliked about the given subject areas?	Flipchart
5	<p><u>Conclusion</u></p> <p>Thank participants & outline where the study goes from here</p>	Focus group with students, interviews, observation and analysis	None

Total time ~ 1 hour

Write up of Focus Group:

It is important when conducting the focus group to take note of who sat where in the room (See Figure 2 below) as it will help when transcribing the focus group.

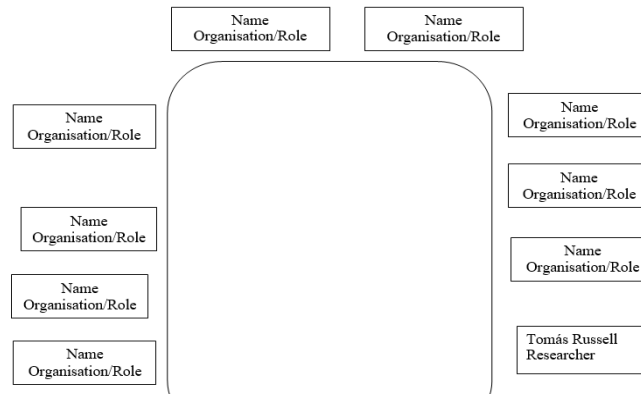


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Structure of focus group write-up

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Explanation of how group was run: _____

Focus Group Discussion: _____

Transcript format i.e.

P1: The issue is

P2: Well I feel we should

Summary:

Summarise the key themes or questions of the focus group.

Analysis of the results:

- Don't write out the whole focus group transcript.
- The key findings from the focus group should be taken under themes or questions.
- When discussing these themes they can be then backed up with "Quotes" from the focus group.

Appendix 7: Student Survey – Post Pilot Module - Phase 2

CIA Level 5 - Student Survey

XXXX Module: → Tick the box underneath your choice

a) How would you rate the **relevance** of the **content** in the module?

	Very Irrelevant	Irrelevant	Average	Relevant	Very Relevant
Module Content					

b) Was the delivery (i.e. **how the module was taught**) **effective** at helping you learn the content?

	Very ineffective	Ineffective	Average	Effective	Very Effective
Module Delivery					

c) How would you rate the **fairness** of the following **assessments** as part of module?

Assessments	Very unfair	Unfair	Average	Fair	Very Fair
Theory Examinations					
Assignment (Risk Assessment)					
Skills					
Overall rating of assessments					

d) For the overall module, give **2 aspects** which you found **engaging**:

1. _____

2. _____

e) For the overall module, give **2 aspects** which were **NOT engaging**:

1. _____

2. _____

XXXXX Module: → Tick the box underneath your choice

a) How would you rate the **relevance** of the **content** in the module?

	Very Irrelevant	Irrelevant	Average	Relevant	Very Relevant
Module Content					

b) Was the delivery (i.e. **how the module was taught**) **effective** at helping you learn the content?

	Very ineffective	Ineffective	Average	Effective	Very Effective
Module Delivery					

c) How would you rate the **fairness** of the following **assessments** as part of module?

Assessments	Very unfair	Unfair	Average	Fair	Very Fair
Collection of work					
Skills;					
- Group Work					
- Problem Solving					
- Meetings					
- Presentation					
Overall rating of assessments					

d) For the overall module, give **2 aspects** which you found **engaging**:

1. _____

2. _____

e) For the overall module, give **2 aspects** which were **NOT engaging**:

1. _____

2. _____

Appendix 8: College Management Interview Guide - Phase 3

Teagasc Education – Interview on Course Design

Q) Based on Teagasc Educations current Course Design, to what extent do you agree with the statements below in relation to students learning?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Knowledge is constructed by the student rather than transmitted to them	1	2	3	4	5
2. Knowledge construction is the unique combination of new knowledge and a learners individual prior knowledge	1	2	3	4	5
3. Educators do not know what learners need or want to learn so it is inappropriate to propose goals for them	1	2	3	4	5
4. All learning occurs in collaborative work groups	1	2	3	4	5
5. Learning whether in groups or individual interactions involves individuals working towards an agreement or understanding of the course material	1	2	3	4	5
6. Problems are used and presented in their full complexity early in the process instead of simplified for novice learners	1	2	3	4	5
7. Learning always occurs in a realistic setting	1	2	3	4	5
8. Assessment is integrated into the task not a separate activity	1	2	3	4	5
9. Learning has occurred when learners evidence the appropriate response	1	2	3	4	5
10. Learning is a series of transformations of information through several types of storage or memory	1	2	3	4	5
11. Independent learning can be assisted by a teacher or more knowledgeable peer	1	2	3	4	5
12. Control and choice in learning is shifted, as far as possible from the teacher to the student	1	2	3	4	5

1. Programmes Educational Philosophy:

Teagasc Educations Educational Philosophy:

This course is aimed at students who wish to develop the competencies to farm sustainably and/ or enable their progression to further and/ or higher education **(Purpose)**. We value and encourage our students to be competent in practical agricultural practices and personal development to make informed decisions to enable sustainable and profitable farming practices **(Values)**. We aim to equip students with the required technical knowledge and skills required for application in the agricultural sector. We aim to provide a learning environment which delivers the technical knowledge and features real life farming enterprises within our colleges. Skills are demonstrated by staff, students practice and are subsequently assessed on these practical skills. Application of these skills and experiential knowledge is gained through work experience. **(Nature of the learning environment)**. The programme uses teaching and learning approaches such as practical skills, lectures, tutorials and case studies of relevant farming scenarios. Students are assessed predominantly through theory examinations, practical skills, assignments and projects. The curriculum development and standards unit and stakeholder groups are involved in the design of the curriculum with college management and teaching faculty responsible for the delivery of the curriculum **(Teaching & Learning Approaches)**.

Q1. Based on this definition of Teagasc Educations Educational Philosophy rank how much you agree/disagree with this on the scale below (1-5) and explain your choice:

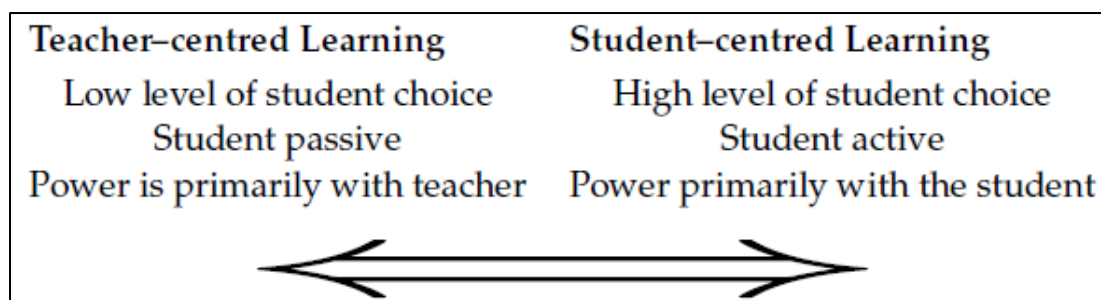
1	2	3	4	5
Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree

2. Curriculum Models:

Teacher-centred curriculum model: The focus is on the teacher transmitting knowledge, from the expert to the novice. The teacher is considered the knowledge holder and the student must learn this knowledge from the teacher i.e. Lectures to transmit knowledge (students passive), ask the expert (teacher) questions to get understanding and teacher is in charge of what is learned and how it is assessed.

Student-centred curriculum model: The learning is focused on the students' learning and '*what students do to achieve this, rather than what the teacher does*'. This definition emphasises the concept of the student 'doing' i.e. active learning, in depth learning and understanding, student responsibility for their learning (Autonomy) and a more reflexive approach to learning from both the teacher and student.

Figure 1: The teacher-centred and student-centred continuum



Q2. Based on the continuum above (Figure 1); on the scale below where would you rank Teagasc Education? (We will discuss this in further detail in the interview)

1	2	3	4	5
Completely Teacher-centred	Teacher-centred	A balance of both	Student-centred	Completely Student-centred

3. Programme Aims & Outcomes:

Teagasc Educations aims and outcomes:

Level 5 Certificate in Agriculture:

The purpose of this award is to enable the learner to work independently under direction on a commercial farm by preparing students to safely carry out farming operations independently in accordance with recommended good practice or to progress to further and/or higher education and training .

It develops student's competencies in the areas of;

- Train to the level of farm operatives,
- Focusing on best farming practice,
- Imparting technical farming knowledge,
- Training and updating students in key farming operative skills with an emphasis on safety, environmental protection, farm development, farm technology and an introduction to farm business.

It provides students with;

- The understanding of key animal and plant production processes.
- How to maintain appropriate physical and financial farm records for a farm business.
- How to comply with key regulations, obligations, and responsibilities under Irish and EU law.

Which of the following statements best describes how you feel about the aims and outcomes statement for the Level 5 Certificate in Agriculture course	Tick the statement which you agree with the most in relation to the level 5 aims and outcomes statement
This statement fully captures the level 5 programme aims and outcomes	
This statement partially captures the level 5 programme aims and outcomes	
This statement of aims and outcomes does not properly reflect what the level 5 programme achieves	

Level 6 Advanced Certificate in Agriculture:

Course Aims

This covers the following programmes:

- Dairy Herd Management (A6DH)
- Drystock Management (A6DM)
- Crops and Machinery Management (A6CM)
- Agricultural Mechanisation (A6AM)

It provides students with;

The training to the level of enterprise manager, and in the case of the A6AM programme to competently operate and maintain agricultural machinery, and manage farm services enterprise or to progress to further and/or higher education and training.

It aims to train the student focusing on best practice in commercial production aligned with environmental, cross compliance and health and safety requirements. Typical career paths include; Management of a farm enterprise, service provider to the Agri-food sector, employment with agricultural contractor, employment in Agri-services, products and sales.

At the end of this programme the student will be able to:

- **Knowledge** - Demonstrate an ability to manage a farming enterprise according to best safe farming practice and agriculture policy, by applying agricultural principles and theory, and utilising technology.
- **Skill** - Adapt and utilise a range of skills (personal, inter-personal, technical) to manage an agriculture enterprise
- **Competence** - Work effectively and safely in a supervisory capacity including delegating work and interacting with external third parties

Which of the following statements best describes how you feel about the aims and outcomes statement for the Level 6 Advanced Certificate in Agriculture course	Tick the statement which you agree with the most in relation to the level 6 aims and outcomes statement
This statement fully captures the level 6 programme aims and outcomes	
This statement partially captures the level 6 programme aims and outcomes	
This statement of aims and outcomes does not properly reflect what the level 6 programme achieves	

4. Programme Structure & Organisation:

a) Scope - Scope refers to the breadth and the depth of content in a curriculum. This content must include both the knowledge domain and other aspects, such as affective (values and attitudes) and where appropriate psychomotor (motor) skills. This includes discipline specific and generic knowledge and skills.

Q. Based on the current course, where would you rank the scope of the current course design?

1	2	3	4	5
Too Narrow	Narrow	A good scope	Broad	Too Broad

b) Sequence - The sequence in a curriculum focuses on the order in which things occur. One approach is based on the logic of the subject matter, another approach is based on the way individual's process knowledge (Ornstein and Hunkins, 2009).

Which of the following statements best describes the sequence in which students face the subject matter on their programme	Tick the one which you feel best describes the sequence in your college
Simple to complex learning	
Prerequisite Learning (particular aspects grasped before others)	
Whole to part (Inquiry/ problem-based /concept)	
Chronological learning (historical/ developmental)	

c) Continuity - Described as the vertical integration of the curriculum design

Continuity in a curriculum provides students opportunities to revisit knowledge and skills in more depth as they progress through the years.

Q. Do you feel that the current course/ curriculum design allows for continuity i.e. the vertical integration of knowledge and skills to be revisited in more depth?

1	2	3	4	5
Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree

d) Integration - Integration is concerned with the linkages of information in order for students to develop a holistic overview of the curriculum.

Q. Do you feel that the current course/ curriculum design integrates knowledge (information), competencies and skills?

1	2	3	4	5
Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree

e) Articulation - There is a need in a programme to articulate the horizontal and vertical relationship of a programme to the various stakeholders. The students should receive some indicator of how they will progress through the programme, i.e. in student handbooks, used in class, on web, etc. Mapping tools can be also used to achieve this.

Q. Do you feel that the currently all stakeholders (including students themselves) understand the process through which students will progress through the programme?

1	2	3	4	5
Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree

f) Balance - it is important in a programme to balance the discipline knowledge with other more generic skills and competencies. Anderson (2001) describes this divide as cognitive (**Knowledge**), affective (**Managing emotions - Motivations, feelings/ emotions and mentality/ attitude development**) and psycho-motor (**Skills**).

Q. Do you feel that the current course design can be balanced between these 3 domains; Cognitive, Affective and Psycho-motor

1	2	3	4	5
Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree

Q. Apart from the elements mentioned in a-f, are there any other structural or organisational aspects of Teagasc Educations current course design which you feel have an influence student engagement and learning?

5. Programme Teaching, Learning & Assessment strategies

Teaching & Learning strategies:

Q. Based on the current course design, do you think that it is flexible enough to incorporate student-centred learning approaches?

Rank your answer on the scale below

1	2	3	4	5
Very inflexible	Inflexible	Neither flexible nor inflexible	Flexible	Very Flexible

Assessment Strategies:

Q. Based on the current course design, do you think that the current assessment strategies are compatible with using student-centred learning approaches?

Rank your answer on the scale below

1	2	3	4	5
Completely incompatible	Incompatible	Neither compatible or incompatible	Compatible	Completely compatible

6. Module Design

The individual module design incorporates a number of elements from the:

- Programme module aims
- Learning outcomes (Including syllabus content)
- Assessment strategies/ modes (Chosen or prescribed)
- Resources available and allotted time (hours) based on the European Credit Transfer System (ECTS) associated with the module.

Q7. Do you think that these elements of the module design enable the use of student-centred learning in Teagasc Education, rank your answer below and discuss in interview

1	2	3	4	5
Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree

7. Student and staff supports

Q8. Do you believe that the current supports for students and staff are suitable for a student-centred learning approach? Why (Discuss in interview)?

1	2	3	4	5
Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree

8. Evaluation strategies

Q9. Do you believe that the current evaluation strategies are sufficient and help make improvements to Teagasc Education? Why (Discuss in interview)?

1	2	3	4	5
Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree

Appendix 9: Teacher Survey - Phase 3

Teagasc Education Course Design Survey

This survey has been created by Kevin Cunningham, PhD Walsh Fellow. This survey will ask you a series of questions in relation to the current 'Course Design' of agricultural programmes (Level 5 & 6) in Teagasc Education.

This survey will take approximately 20 minutes to complete. Please take time to read each question and think about your answer.

There are 24 questions in this survey.

Teagasc Education Course Design Survey

This is a survey of Teagasc Education teaching staff about the current "Course Design" for Agricultural courses

*

Geraldine O'Neill of Univeristy College Dublin Teaching and Learning Department has used these questions with those designing a course to help evaluate their course design. For the following statements in relation to current Course Design of Teagasc Education (Level 5 & 6 programmes), please rate your level agreement with them:

	Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree
1. Knowledge is constructed by the student rather than transmitted to them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Knowledge construction is the unique combination of new knowledge and a learners individual prior knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Educators do not know what learners need or want to learn so it is inappropriate to propose goals for them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. All learning occurs in collaborative work groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Learning whether in groups or individual interactions involves individuals working towards an agreement or understanding of the course material	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Problems are used and presented in their full complexity early in the process instead of simplified for novice learners	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Learning always occurs in a realistic setting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Assessment is integrated into the task not a separate activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Learning has occurred when learners evidence the appropriate response	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Learning is a series of transformations of information through several types of storage or memory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Independent learning can be assisted by a teacher or more knowledgeable peer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Control and choice in learning is shifted, as far as possible from the teacher to the student	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Programme Aims & Outcomes

This is a survey of Teagasc Education teaching staff about the current "Course Design" for Agricultural courses

*Teagasc Education - Aims and outcomes:

Level 5 Certificate in Agriculture:

The purpose of this award is to enable the learner to work independently under direction on a commercial farm by preparing students to safely carry out farming operations independently in accordance with recommended good practice or to progress to further and/or higher education and training .

It develops student's competencies in the areas of;

- Train to the level of farm operatives,
- Focusing on best farming practice,
- Imparting technical farming knowledge,
- Training and updating students in key farming operative skills with an emphasis on safety, environmental protection, farm development, farm technology and an introduction to farm business.

It provides students with;

- The understanding of key animal and plant production processes.
- How to maintain appropriate physical and financial farm records for a farm business.
- How to comply with key regulations, obligations, and responsibilities under Irish and EU law.

	This statement of aims and outcomes does not properly reflect what the level 5 programme achieves	This statement partially captures the level 5 programme aims and outcomes	This statement fully captures the level 5 programme aims and outcomes
Which of the following statements best describes how you feel about the aims and outcomes statement for the Level 5 Certificate in Agriculture course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you believe any aspect of this statement should be changed based on the current course/ programme, what would it be?

Teacher/ Student Centred

This is a survey of Teagasc Education teaching staff about the current "Course Design" for Agricultural courses

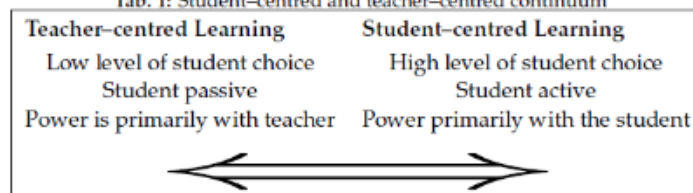
*

Teacher-centred and Student-centred continuum

Teacher centred: The focus is on the teacher transmitting knowledge, from the expert to the novice. The teacher is considered the knowledge holder and the student learns this knowledge from the teacher (transmit knowledge - students are passive), ask the expert (teacher) questions to get understanding and teacher is in charge of what is learned and how it is assessed.

Student Centred: The learning is focused on the students' learning and 'what students do to achieve this, rather than what the teacher does'. This definition emphasises the concept of the student 'doing' i.e. active learning, a deeper learning and understanding, student responsibility for their learning (Autonomy) and a more reflexive approach to learning from both the teacher and student.

Tab. 1: Student-centred and teacher-centred continuum



	Completely teacher-centred	Teacher-centred	A balance of both teacher-centred and student-centred	Student-centred	Completely student-centred
Based on the continuum above, on the scale below where would you rank the level 5 and 6 Agricultural programmes in Teagasc Education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Teacher-centred and Student-centred continuum

Describe why or include examples to help explain your rating

***Teagasc Education - Aims and outcomes:**

Level 6 Advanced Certificate in Agriculture:

This covers the following programmes:

- Dairy Herd Management (A6DH)
- Drystock Management (A6DM)
- Crops and Machinery Management (A6CM)
- Agricultural Mechanisation (A6AM)

It provides students with;

The training to the level of enterprise manager, and in the case of the A6AM programme to competently operate and maintain agricultural machinery, and manage farm services enterprise or to progress to further and/or higher education and training.

It aims to train the student focusing on best practice in commercial production aligned with environmental, cross compliance and health and safety requirements. Typical career paths include; Management of a farm enterprise, service provider to the Agri- food sector, employment with agricultural contractor, employment in Agri-services, products and sales.

At the end of this programme the student will be able to:

- **Knowledge** - Demonstrate an ability to manage a farming enterprise according to best safe farming practice and agriculture policy, by applying agricultural principles and theory, and utilising technology.
- **Skill** - Adapt and utilise a range of skills (personal, inter-personal, technical) to manage an agriculture enterprise
- **Competence** - Work effectively and safely in a supervisory capacity including delegating work and interacting with external third parties

	This statement of aims and outcomes does not properly reflect what the level 6 programme achieves	This statement partially captures the level 6 programme aims and outcomes	This statement fully captures the level 6 programme aims and outcomes
Which of the following statements best describes how you feel about the aims and outcomes statement for the Level 6 Advanced Certificate in Agriculture course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Is there anything which you would change or believe should be added to the aims for the Level 5 or 6 statement

Programme Structure & Organisation

This is a survey of Teagasc Education teaching staff about the current "Course Design" for Agricultural courses

The following 6 aspects are considered to be key aspects of a courses structure and organisation. Please read through the description for each element and rate your answer for each of the 6 sections.

Programme Structure & Organisation:**

A) Scope - Scope refers to the breadth and the depth of content in a curriculum. This content must include both the knowledge domain and other domains such as affective (values and attitudes) and where appropriate psychomotor (motor) skills. This includes discipline specific and generic knowledge and skills.

	Too Narrow	Narrow	A good scope	Broad	Too Broad
How would you rank the current curriculums scope?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Programme Structure & Organisation:**

B) Sequence - The sequence in a curriculum focuses on the order in which things occur. One approach is based on the logic of the subject matter, another approach is based on the way individual's process knowledge (Ornstein and Hunkins, 2009).

	Simple to complex learning	Prerequisite Learning (particular aspects grasped before others)	Whole to part (Inquiry/problem-based /concept)	Chronological learning (historical/developmental)
Which of the following statements best describes the sequence in which students face the subject matter on their programme	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Programme Structure & Organisation:**

C) Continuity - Described as the vertical integration of the course design

Continuity in a curriculum provides students opportunities to revisit knowledge and skills in more depth as they progress through the years.

	Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree
Do you feel that the current course design allows for continuity i.e. the vertical integration of knowledge and skills to be revisited in more depth?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** Programme Structure & Organisation:**

D) Integration - Integration is concerned with the linkages of information in order that students can develop a holistic overview of the curriculum.

	Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree
Do you feel that the current course design allows for integration of knowledge (information), competencies and skills across all modules?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** Programme Structure & Organisation:**

E) Articulation - There is a need in a programme to articulate the horizontal and vertical relationship of a programme to the various stakeholders. The students should receive some indicator of how they will progress through the programme, i.e. in student handbooks, used in class, on web, etc. Mapping tools can be also used to achieve this.

	Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree
Do you feel that the currently all stakeholders (including students themselves) understand the process through which students will progress through the programme?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** Programme Structure & Organisation:**

F) Balance - it is important in a programme to balance the discipline knowledge with other more generic skills and competencies. Anderson (2001) describes this divide as cognitive (**Knowledge**), affective (**Managing emotions - Motivations, feelings/ emotions and mentality/ attitude development**) and psycho-motor (**Skills**).

	Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree
Do you feel that the current course design is balanced between these 3 domains: Cognitive, Affective and Psycho-motor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Programme Structure & Organisation:

Apart from the elements mentioned in A-F, are there any other structural or organisational aspects of the agriculture course design which you feel have an influence on student engagement and learning?

Teaching & Learning Strategies

This is a survey of Teagasc Education teaching staff about the current "Course Design" for Agricultural courses

Teaching, Learning & Assessment strategies

Teaching & Learning strategies:

Based on your understanding of the teacher and student centred learning curriculum models (below) answer the question below.

- **Teacher-centred curriculum model:** The focus is on the teacher transmitting knowledge, from the expert to the novice. The teacher is considered the knowledge holder and the student must learn this knowledge from the teacher i.e. Lectures to transmit knowledge (students passive), ask the expert (teacher) questions to get understanding and teacher is in charge of what is learned and how it is assessed.
- **Student-centred curriculum model:** The learning is focused on the students' learning and '*what students do to achieve this, rather than what the teacher does*'. This definition emphasises the concept of the student 'doing' i.e. active learning, in depth learning and understanding, student responsibility for their learning (Autonomy) and a more reflexive approach to learning from both the teacher and student.

	Very inflexible	Inflexible	Neither flexible nor inflexible	Flexible	Very Flexible
Based on the current course design, do you think that it is flexible enough to incorporate student-centred learning approaches?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Programme Teaching, Learning & Assessment strategies:

Assessment Strategies:

Based on your understanding of teacher and student-centred learning (below), answer the question below in relation to the compatibility of assessment strategies within the current course design .

- **Teacher-centred curriculum model:** The focus is on the teacher transmitting knowledge, from the expert to the novice. The teacher is considered the knowledge holder and the student must learn this knowledge from the teacher i.e. Lectures to transmit knowledge (students passive), ask the expert (teacher) questions to get understanding and teacher is in charge of what is learned and how it is assessed.
- **Student-centred curriculum model:** The learning is focused on the students' learning and '*what students do to achieve this, rather than what the teacher does*'. This definition emphasises the concept of the student 'doing' i.e. active learning, in depth learning and understanding, student responsibility for their learning (Autonomy) and a more reflexive approach to learning from both the teacher and student.

	Completely incompatible	Incompatible	Neither compatible nor incompatible	Compatible	Completely compatible
Based on the current course design, do you think that the current assessment strategies are compatible with using student-centred learning approaches?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Is there anything that you believe should be changed in relation to teaching and learning practices or assessment strategies to enhance student engagement and learning? Please outline what you would change and why?

Student and Staff Supports

This is a survey of Teagasc Education teaching staff about the current "Course Design" for Agricultural courses

* *Student and staff supports*

	Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree
Do you believe that the current supports for students are suitable to implement approaches which can enhance engagement in classroom settings?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you believe that the current supports for staff are suitable to implement approaches which can enhance engagement in classroom settings?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Is there anything in relation to student or staff supports which you feel needs to be changed or improved?

Evaluation Strategies

This is a survey of Teagasc Education teaching staff about the current "Course Design" for Agricultural courses

* *Evaluation strategies*

	Completely Disagree	Disagree	Neither Agree nor Disagree	Agree	Completely Agree
Do you believe that the student satisfaction survey evaluation strategy helps make improvements to Teagasc Education?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you believe that external verification as an evaluation strategy helps make improvements to Teagasc Education?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Is there anything in relation to the current evaluation strategies which needs to be changed or have you any suggestions if additional evaluation strategies which could be used?

Appendix 10: Desk Analysis and Documents

Course Design Analysis

Level 5 Certificate in Agriculture

Comprised of a typical student who takes the following:

- 6x Core Modules
- 1x Transferable Skills Module
- 3x Specialised skills Modules
- *1x Supplementary training Module
- **A total of 11 modules**

Breakdown of marks according to assessment strategy:

Type of Assessment Strategy	Total marks in the programme	Percentage of the marks in the programme
Theory Examinations	500	45%
Skills	400	36%
Portfolio	90	8%
Learner Records	60	6%
Assignments	50	5%
Total Marks on Programme	1100	100%
Credit Equivalent	120*	

* Typically 125 credits is taken during level 5 i.e. 2x supplementary training modules

Breakdown of the number and type of learning outcomes in programme

Per module on Level 5 course	Learning outcomes	Knowledge (Theory) Learning Outcomes	No. of assessment strategies	No of Theory examinations
Total	157	91 (58%)	24	18
Average	13.08	8.27	2	1.63
Maximum	16	16	3	2
Minimum	10	0	1	0

The screenshot below shows the Microsoft Excel sheet which was used to analyse the Level 5 Certificate in Agriculture and establish the tables above.

Screenshot 1: Module and Marks breakdown of assessment strategies on the Level 5 Certificate in Agriculture

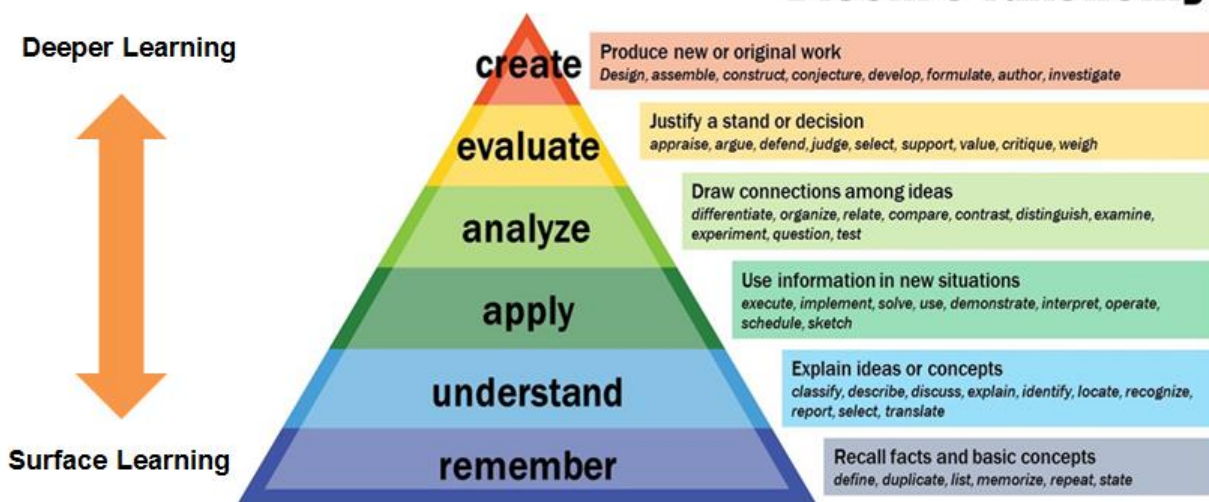
Level 5 Certificate in Agriculture (120 Credits)																	
Note - Each Assessment Type (Written Exam / Skills / Assignment / Project / Learner Record/ Portfolio of Work must be passed																	
Type	code	Teagasc Title	Credits	Mark Breakdown													
				Theory		Practical / Skills		Assignment		Project		Learner Record		Portfolio of Work			
				Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max		
Mandatory - All Modules to be completed	5N1433	Work Practice (Home Farm)	15											20	60	20	40
	5N20368	Principles of Agriculture	15	25	50	25	50										
	5N20371	Farm Safety and Farm Assurance	15	25	50	15	30	10	20								
	5N20374	Soils and the Environment	10	30	60	5	10	15	30								
	5N20377	Farm Business and Technology	10	25	50	25	50										
	5N20380	Safe Use of Pesticide Products	5	50	100	Note: 2nd part of exam based on sections 15 & 16 - learner must achieve 15 of the 30 marks to pass award											
Generic - One module to be chosen	5N0690	Communications	15			25	50									25	50
	5N0693	Constructive Thinking	15									20	40	30	60		
	5N1367	Team Working	15			20	40							30	60		
	5N1390	Personal Effectiveness	15			25	50							25	50		
	5N1418	Start Your Own Business	15							50	100						
	5N2985	Personal and Professional Developm	15											50	100		
Minimum of 20 Credits from the following component(s)	5N20385	Sheep Husbandry	10	25	50	25	50	Note: All 25 skills to be delivered. Minimum of 20 to be assessed. Marked out of the best 20 skills									
	5N20388	Beef Husbandry	10	25	50	25	50	Note: All 25 skills to be delivered. Minimum of 20 to be assessed. Marked out of the best 20 skills									
	5N20396	Dairy Husbandry	10	25	50	25	50	Note: All 25 skills to be delivered. Minimum of 20 to be assessed. Marked out of the best 20 skills									
	5N20399	Grass Production	10	25	50	25	50	Note: All 10 Skills are to be delivered and assessed.									
	5N20402	Tillage Crop Husbandry	10	25	50	25	50	Note: All skills to be delivered and assessed.									
	5N20405	Potato Production	10	30	60	10	20	10	20	Note: All skills to be delivered and assessed.							
	5N20408	Equipment for Crop Establishment	10	20	40	30	60	Note: All skills to be delivered and assessed.									
Minimum of 5 Credits from the following component(s)	5N1750	Chemical Fertiliser Application	5	20	40	30	60	Note: The Learner must achieve 40 of the 60 marks to pass the skills assessment									
	5N1752	All Terrain Vehicles Operations	5	20	40	30	60	Note: All skills to be delivered and assessed. The Learner must achieve 40 of the 60 marks to pass the skills assessment									
	5N20420	Farm Structures	5	20	40	15	30	15	30	Note: All Skills to be delivered. Skills 1A or 1B or 1A to be assessed. All skills 2 to 7 to be assessed							
	5N20423	Organic Farming Principles	5	20	40	10	20	20	40	Or							
	5N20426	Tractor Maintenance	5	20	40	30	60	Note: All skills to be delivered and assessed.									
	5N20429	Workshop Skills	5	20	40	30	60	Note: All skills to be delivered and assessed.									
	5N20432	Grassland Machinery	5	35	70	15	30	Note: All skills to be delivered and assessed.									
	5N20435	Mechanical Pesticide Application	5	10	20	40	80	Note: All skills to be delivered and assessed.									
	5N20438	Manual Pesticide Application	5	10	20	40	80	Note: All skills to be delivered and assessed.									
	5N20441	Organic Manure Handling	5	20	40	30	60	Note: All skills to be delivered and assessed.									
	5N20453	Farm Forestry	5	40	80			10	20								
Level 5 Certificate in Agriculture				Theory		Practical / Skills		Assignment		Learner Record		POW		Marks on course			
Total				120		500		400		50		60		90		1200	
				Theory		Practical / Skills		Assignment		Learner Record		Portfolio of Work		Total = 125 credits			
Percentage of the course				42%		33%		4%		5%		8%					
No of times Strategy is used				9		9		2		1		2					

Below is a screenshot of the excel sheet used to analyse a total of 18 Theory Examinations which students would take as part of the Level 5 Certificate in Agriculture. These are examples of examinations which have been verified i.e. passed through the quality assurance process. This was analysed using the cognitive domain of Blooms taxonomy which can be seen below screenshot 2. Each question was based on what type of answer the student was required to give i.e. a fact (Repeat/ State) = Remember, describe/ discuss/ explain something = Understanding, solve/ interpret = Apply etc.

Screenshot 3: A breakdown of the analysis of exam questions based on the cognitive domain of Bloom's taxonomy.

	A	B	C	D	E	F	G
1		Remember	Understand	Apply	Analyze	Evaluate	Create
2	% per Module						
3	Exam 1	84%	16%	0%	0%	0%	0%
4	Exam 2	89%	11%	0%	0%	0%	0%
5	Exam 3	70%	28%	0%	3%	0%	0%
6	Exam 4	84%	16%	0%	0%	0%	0%
7	Exam 5	79%	5%	0%	5%	0%	0%
8	Exam 6	79%	26%	0%	5%	0%	0%
9	Exam 7	58%	53%	0%	0%	0%	0%
10	Exam 8	78%	7%	0%	15%	0%	0%
11	Exam 9	85%	15%	0%	0%	0%	0%
12	Exam 10	55%	14%	32%	0%	0%	0%
13	Exam 11	55%	5%	40%	0%	0%	0%
14	Exam 12	95%	5%	0%	0%	0%	0%
15	Exam 13	85%	15%	0%	0%	0%	0%
16	Exam 14	85%	15%	0%	0%	0%	0%
17	Exam 15	85%	15%	0%	0%	0%	0%
18	Exam 16	100%	0%	0%	0%	0%	0%
19	Exam 17	83%	17%	0%	0%	0%	0%
20	Exam 18	80%	0%	5%	5%	10%	0%
21							
22							
23	Category Average	79%	15%	4%	2%	1%	0%
24	Minimum	55%	0%	0%	0%	0%	0%
25	Maximum	100%	53%	40%	15%	10%	0%

Bloom's Taxonomy



Appendix 11: Information Leaflet for participants - Phase 1, 2 & 3

Information Leaflet for Interview/ Focus Group/ Classroom Observation Participants

Title of Study:

“Engaging agriculture students in classroom settings: The influence of Course Design and the Teacher”

UCD Ethics Exemption reference no: LS-18-54

- You are being invited to participate in a research study. Thank you for taking time to read this information leaflet.

- **RESEARCH TEAM:** This research project is being led by Kevin Cunningham. His contact details are included at the end of this document. The supervisors for this project are Dr Monica Gorman of UCD and James Maher of Teagasc.

- **WHAT ARE THE OBJECTIVES OF THIS STUDY?** The purpose of the study is to improve agricultural student’s engagement in classroom settings. The broad aim of the proposed research is to identify what the biggest influences are on student engagement in the classroom.

- **WHY HAVE I BEEN INVITED TO TAKE PART?** You have been approached to participate in this research as you are considered someone who could provide worthy knowledge and experience of how to overcome issues in relation to the research topic.

- **WHAT WILL HAPPEN IF I VOLUNTEER?** Your participation is voluntary. Should you agree to participate, you will be invited to take part in an interview with Kevin Cunningham regarding your experience of being involved in the education sector. This interview/ focus group/ classroom observation* will be audio-recorded/ *recorded via a classroom observation schedule to facilitate analysis and will be completely anonymous. You will not be asked about specific students or staff and we would ask that in the course of your participation you do not name any individual or provide any details on third parties that may be identifiable.

- **CONFIDENTIALITY:** Kevin Cunningham will be responsible for overseeing the transcription and the anonymity of the interview/ focus group/ classroom observations. All information collected as part of the study will be stored securely on a password protected computer.

- **WHAT ARE THE BENEFITS OR RISKS ASSOCIATED WITH THE STUDY?** While there will be no direct benefit to you from the study, the findings have the potential to make a contribution to this research topic. As such, the findings from this study will be presented at university and national level. The findings will also be submitted for publication in peer-reviewed journals. However no individual participant will be identified in any publication or presentation and only anonymised quotes will be used in these reports and publications. There are no known risks associated with participation, other than some possibly inconvenience in conducting the interview.
- **RIGHT TO WITHDRAW:** You can decide to withdraw from the study at any point prior to the transcripts being anonymised without any consequence. You can contact the researchers to request this.
- **HOW WILL MY INFORMATION BE USED?** Your views will be combined with those of others and used to develop an understanding of how to improve agriculture student engagement in the classroom. In addition to informing this study we plan to maximise the learning from your involvement by archiving an anonymised version of the data for future research on this topic. Once the data has been anonymised it will not be possible to withdraw from the study.
- **NEXT STEPS:** If you are willing to take part in the study we would ask you to please return the attached consent form to Kevin.Cunningham@teagasc.ie (a scanned copy can be sent to the email address)
- **FURTHER INFORMATION & CONTACT DETAILS:** If you have any further questions about the research or would like information on the findings, you can contact
- **Kevin Cunningham @; Kevin.Cunningham@teagasc.ie**

Appendix 12: Participant Consent form - Phase 1, 2 & 3

PARTICIPANT CONSENT FORM

Title of study: “Engaging agriculture students in classroom settings: The influence of Course Design and the Teacher”

UCD Ethics Exemption reference no: LS-18-54

By signing and returning this consent form you are indicating your agreement with the following statements:

- I have read and understood the attached *Participant Information Leaflet* for this study.
- I have had the opportunity to ask questions and discuss the study. (Note you can contact Kevin.Cunningham@teagasc.ie).
- I have received satisfactory answers to all my questions, where I have had a query.
- I have received enough information about this study.
- I understand that the interview will be audio recorded.
- I understand I am free to withdraw from the study at any time until the transcripts are anonymised.
- I understand anonymised data will be archived for future research.
- I agree to take part in the study.

Participant’s Signature: _____

Date: ____/____/____

Participant’s Name in Print: _____

Contact Email: _____

RETURNING THE CONSENT FORM: We would ask you to please return the attached consent form to Kevin.Cunningham@teagasc.ie (a scanned copy can be sent to the email address below)

CONTACT DETAILS: You can contact Kevin Cunningham at Kevin.Cunningham@teagasc.ie