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An Exploration of the Professional Development Needs of Agricultural Teachers in their Role as Educators

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

By

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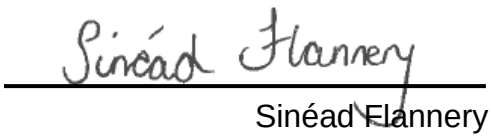
Declaration

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.



Sinéad Flannery

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Finally, I would like to dedicate this thesis to my family; my parents Eileen and Gerard, my brothers Brian, Seán, and Cathal, and my sisters Aisling and Niamh. My family deserve a special word of thanks for their continued support, help, and encouragement throughout my education, for always believing in me, and inspiring me to reach my true potential.

Thank you.

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Abbreviations

AEOS	Agri-Environmental Options Scheme
AKIS	Agricultural Knowledge and Information System
CAP	Common Agricultural Policy
CPD	Continuous Professional Development
DAFM	Department of Agriculture, Food, and the Marine
DES	Department of Education and Skills
EQF	European Qualifications Framework for Lifelong Learning
FÁS	Foras Áiseanna Saothair
FET	Further Education and Training
FETAC	Further Education and Training Awards Council
HETAC	Higher Education and Training Awards Council
MOOCs	Massive Open Online Courses
NFQ	National Framework of Qualifications
NGO	Non-Governmental Organisation
PCF	Pedagogical Competency Framework
QQI	Quality and Qualifications Ireland
REPS	Rural Environment Protection Scheme
SDT	Self-Determination Theory
SEC	State Examinations Committee
VARK	Visual, Aural, Read/Write, and Kinaesthetic
VEC	Vocational Education Committee
VET	Vocational Education and Training

Thesis Abstract

Agriculture is an important feature of the rural landscape contributing to the rural communities within which agricultural regions reside. Presently, there is increased pressure on farmers to promote sustainable farming practice in an effort to mitigate the impact of agricultural practices on climate change mitigation, flora and fauna, biodiversity, water, and air quality. Agricultural education has a fundamental role to play within this context given the education providers' role in developing the future generation of young farmers. Over the past number of years, agriculture has undergone significant change with regard to production and consideration for the landscape and the environment within which farming communities reside. Conversely, education has experienced paradigm shifts relating to education programme delivery, instructional techniques, and the role of the teacher within the educational context. The purpose of this thesis is to explore the professional development needs of the agricultural educators involved in the delivery of vocational agricultural education and training programmes to the future generation of young farmers. Much research has been conducted regarding learners' needs, the importance of vocational education and training programmes, and the learner experience within the vocational education and training sphere, however, little is known about the teachers' experience in the delivery of such programmes. In addressing this intellectual gap, the thesis employs a mixed methods research paradigm consisting of three distinct research phases. The first phase employs an explanatory sequential mixed methods research design process to identify the specific professional development needs of the agricultural teaching population within the vocational education and training sector. The second phase furthers conceptual understanding of agricultural teacher professional development needs through the use of an exploratory sequential mixed methods research design to develop a professional development tool appropriate to the needs of the agricultural teaching population. Finally, the third research phase contributes a nuanced understanding of the primary and secondary motivators influencing young peoples' further educational choice through the use of an in-depth exploratory research design. Findings from each phase in the data collection process are documented in the form of academic peer-reviewed paper publications developed based on findings

within this thesis. In conclusion, this thesis contributes to theoretical and conceptual understandings of the study phenomenon relating to agricultural teacher professional development needs. The influence of policy, both nationally and internationally, are considered throughout the thesis given the effect of young farmer intervention on agricultural education programmes and the recruitment of agricultural teachers within the vocational education and training context. Finally, findings from the three research phases combined contribute to conceptual understanding of the research objectives and the overall aim of the thesis in exploring the professional development needs of the agricultural teaching cohort within the vocational education and training sector.

Chapter 1: Introduction

1.1 Background

The farming sector is vital to Ireland's economy as its largest indigenous industry employing 8.6% of the working population (DAFM, 2018). A rapid increase in the global demand for food is resulting in agricultural expansion and growth. As the global population approaches nine billion there is an increased need for food production to remain sustainable; socially, environmentally and economically (Brennan *et al.*, 2016c). A major challenge associated with this increased need for food is the ability to produce more food with guaranteed safety while still maintaining the environment. The negative impacts on biodiversity, flora and fauna, water quality, air quality, and climatic factors associated with increased food production become greater where expansion occurs in the absence of best practice, knowledge, and innovation (Brennan *et al.*, 2016c). Consequently, there is a need to position agri-food systems within sustainable farming practice (Herrera-Reyes *et al.*, 2018) and agricultural education has an important developmental role to play within this context. However, the role of the educator in the delivery of agricultural education programmes at the vocational education and training (VET) level is less explored in the literature within the context of professional development despite the abundance of scholarly articles relating to pedagogy within the primary and post-primary educational setting. Therefore, this thesis sets out to explore the professional development needs of the cohort of agricultural teachers involved in the delivery of agricultural VET programmes within the Republic of Ireland. This is important given the fundamental role of the agri-food system within Ireland and the need to position agriculture within sustainable farming practice going forward.

1.2 Rationale for the Research

The world of farming has undergone significant change over the years. Major shifts in agricultural practices have occurred from a productivist era which encompasses a protectionist economic regime to the present neo-productivist era giving concern to climate change mitigation and sustainable development (Wilson, 2001; Wilson and Burton, 2015). Appropriately, farmers have been urged to identify new markets, pursue new opportunities, and to become more entrepreneurial (Kaberis and

Koutsouris, 2012) in their endeavour. Consequently, farmers not only require virtuous technical knowledge but an expertise in the area of business skills (Kilpatrick, 2000; Mattila *et al.*, 2007). The affirmative association between education, training, and farm business management with regard to productivity, profitability, and sustainability has been well documented in the literature (Kilpatrick, 2000; Kilpatrick and Johns, 2003; Ulimwengu and Badiane, 2010). Immense pressure is being exerted on the primary modes of production, trade, the food production industry, and the government by the global economy, competition, climate change, food security, and quality management in an effort to endorse sustainable agricultural development and land use change. Given the farmers role as a key actor within the agricultural sector, farmers are commanded within their profession to alter agricultural production systems in line with circumstances (Karbasioun *et al.*, 2008). A small proportion of farmers will benefit from access to export markets while a greater proportion of farmers will suffer income source threats such as low production prices, falling subsidies, competition from outside markets, altered availability of credit, reduced access to international markets, and high quality inputs (Leichenko and O'brien, 2002). Therefore, it becomes imperative for farmers to become systematic in their ability to compete with markets and overcome the challenges presented within their industry while giving consideration to the impact of agricultural practices employed on the environment and the rural community's quality of life as a result (Karbasioun *et al.*, 2008). Agricultural education providers and extension providers have a fundamental role to play within this context. The following three sections detail the rationale for this research by reviewing the importance of education to agricultural sustainability, the role of the teacher and the importance of professional development, and finally the influence of policy on the research agenda. The final section details the contribution of this study to the literature.

1.2.1 Agriculture, Education and Sustainability

Successful changes to farming practice can be achieved through education and training as it assists farmers in becoming more innovative and flexible in their approach to farming (Kaberis and Koutsouris, 2012; Kilpatrick and Johns, 2003). Innovation in agriculture is fundamental to increasing food production in an environmentally friendly manner and will play a pivotal role in addressing significant growth in global population and demand for food production in the face of growing

concerns relating to climate change and the reduction of agricultural-related emissions (McKillop *et al.*, 2018). The adoption of best practice in relation to management decisions on-farm are closely linked to education, capital, income, farm size, availability of information, attitude towards the environment and risk, availability of credit, labour, and engagement with social networks (McKillop *et al.*, 2018; Prokopy *et al.*, 2008). Edwards-Jones' (2006) study identified a number of additional factors which impact on technology adoption decisions. These factors include age, family lifecycle, the extent of pluriactivity, farm business structure, and the social environment (Edwards-Jones, 2006). Further studies have emphasised the significant importance of age on innovation adoption highlighting the positive effects associated with the younger farmer compared to the older farmer (Barham *et al.*, 2004; El-Osta and Morehart, 1999; Hyland *et al.*, 2018; Läpple *et al.*, 2015). In this context, the aging farmer population relating to the low number of young farmers across Europe becomes a case for concern. Additionally, young farmers are more likely to be innovative, apply greater intensity to farm practices, have larger holdings, and be better educated than their older counterparts (Prokopy *et al.*, 2008; Wilson *et al.*, 2014). Furthermore, young farmers generally exhibit increased adoption of technologies (Connolly and Woods, 2010; Solano *et al.*, 2003) and motivation for change (Koteva *et al.*, 2009; Van Passel *et al.*, 2007). Hence, education has a role to play in development and supporting sustainable farming practice.

Agricultural extension systems support the exchange of knowledge from the global and local knowledge base to farm level (Anderson and Feder, 2004), supporting farmer decision making in line with best practice. However, timing and accuracy of this advice is crucial to the success of the extension service. The Agricultural Knowledge and Information System (AKIS) comprise a range of actors responsible for the provision of information and advice to farmers within rural communities (Prager *et al.*, 2014) through research, advisory, and education services. In the context of this study, the agricultural education subsystem is of significant interest to this thesis as a centre for knowledge exchange. Within the education context, learners are exposed to new knowledge, skills and information, are afforded the opportunity to interact with experts within industry, and learn from group interaction with peers, facilitating change in values, attitudes, and beliefs (Kilpatrick, 2000). Therefore, it becomes important that agricultural educators have the capability to

create and promote opportunities for peer interaction and the sharing of prior knowledge and experience in addition to the new knowledge and skills learnt within a practical setting.

Agriculture is an important feature of rural communities as it accounts for a large proportion of the rural landscape and land use. Farmers' ability to manage and respond to social, economic, and environmental pressures associated with the rural has resulted in an increased need for knowledge-intensive farming. This requires farmers to have the capability to adopt new practices, both technical and managerial with regard to finances, resources, and markets (Kilpatrick and Falk, 2003). In this instance, learning has a role within rural community development as farming becomes an increasingly knowledge-rich activity (Lobley *et al.*, 2013). Facilitating learning, therefore, has the potential to support sustainable rural development, innovation, and adaptation to the multidimensional, complex agricultural changes occurring within the rural landscape (Darnhofer *et al.*, 2010a). The traditional, behaviouristic approach to teaching in which knowledge is transmitted to the learner is no longer adequate as the need to address rising global issues of sustainability emerge. Learners today must be encouraged to seek solutions to problems and to think critically in an effort to promote lifelong learning and self-regulation (Roth *et al.*, 2016; Steffens, 2015). Agricultural education is a social activity as learning is socially embedded and developmental occurring over a farmers' lifetime (Kilpatrick and Johns, 2003; Wenger, 2001).

The socio-cultural norm of the farm as a place of work and a home situated within the rural community creates an environment for informal learning, highlighting the importance of the formal and informal learning processes available to farmers, presenting opportunities for the development of education support networks which are crucial to the implementation of change (Kilpatrick and Falk, 2003). This encompasses the notion of the 'third space' associated with the in-between places of learning which create opportunities for authentic interaction (Bhabha, 2012; Timm-Bottos and Reilly, 2015). The 'first space' and 'second space' incorporate the formal and informal learning process respectively (Schuck *et al.,* 2017). The 'third space' creates an environment for self-directed learning, engaging with discussions and participating in cultural practices (Timm-Bottos and Reilly, 2015). Oldenburg (2001) describes these spaces as a neutral ground which is not home or work, it is an in-

between space which promotes social interactions, creating a contemporary learning environment (Schuck *et al.,* 2017). Participatory and collaborative learning opportunities also support the development of individual confidence, promote discussion, and encourage individuals to think critically about a phenomenon (Darnhofer *et al.*, 2010b; Marschke and Sinclair, 2009). Therefore, within the education context, learners can create support networks amongst peers, neighbours, and members of the local community, and those associated with the informal learning environment in addition to the support and guidance provided by the teachers for example. This supports the constructivist view of education and the importance of prior, existing knowledge and experiences to the success of the teaching and learning environment.

1.2.2 Teachers' Place and Professional Development

21st century learning agendas require students to have knowledge and ability to work in a rapidly changing environment with technologies that have yet to be discovered. Consequently, traditional models of education no longer support learners' needs and ways of thinking as education today requires cognitive abilities as well as social and emotional factors to thrive in a rapidly changing world (Kools and Louise, 2016). It is important that 21st century teachers influence student learning, giving consideration to interests, motivation, and overall well-being in the learning process (Dumont *et al.*, 2010). Excellent teachers can be referred to as those who can successfully motivate students, communicate notions, and assist students in the learning process (Kreber, 2002). However, good teaching requires more than good technique, it includes an ability to instil enthusiasm and interest amongst learners based on energy, compassion, curiosity, and concern (Benekos, 2016; Leblanc, 1998). The instructional techniques chosen by the educator assist in designing, developing, and delivering subject matter in an effort to engage students (Benekos, 2016), but that is just one aspect of teaching. Incorporating the student voice and involving learners in educational decisions (Baroutsis *et al.*, 2016), giving consideration to individual learning styles (Pashler *et al.*, 2008), constructively aligning learning outcomes with instructional techniques (Biggs, 1996; 2014), assessment of and for learning (Husbands and Pearce, 2012), are additional educational aspects of significant equal importance to the teaching and learning process. This highlights the complex, multifaceted dimensions of the classroom and the importance of successful

pedagogy in achieving effective learning environments. Thus, it provides grounds for the reference of pedagogy which James and Pollard (2011) refer to as the practice and theory of teaching. Therefore, teaching is more than the instructional techniques and must be considered in conjunction with learning theories and individual learning styles. 'Deep' as opposed to 'surface' learning must be promoted in the classroom supporting and encouraging learners to think for themselves. Consequently, the learning process needs to be participative, engaging, challenging, and thought-provoking (Revell and Wainwright, 2009).

Constructing learning is challenging as it relies on the knowledge, expertise and capability of the teacher. Barber and Mourshed (2007) argue that the success of an education system depends on the quality of the teaching. The growing pressures of the rapidly evolving environment places increased pressure on the educator to remain conversant with new challenges and opportunities to ensure learners can succeed in present and future environments (Kools and Louise, 2016; Stoll, 2009; Stoll and Earl, 2003). Thus, teacher professional development is an important aspect of educational quality cultivation (Borko and Putnam, 1995; Coe *et al.*, 2014; Desimone, 2009; Hattie, 2012). High quality teaching that contributes to increased student engagement should be the outcome of all professional development opportunities, supporting focused planning of instructional techniques in a bid to enhance learner experience and engagement (Gess-Newsome *et al.*, 2019). Several studies have been conducted surrounding the characteristics which support successful professional development. Such studies have highlighted the importance of developing subject matter and pedagogical content knowledge which is delivered using active, inquiry-focused actions disseminated over a prolonged period of time, supporting a collegial working relationship amid colleagues (Desimone, 2009; Putnam and Borko, 2000; Thurlings and den Brok, 2017; Van Veen *et al.*, 2012). Change is complex and so professional development creates a forum for change and corroboration of existing practice in an effort to promote improvements in both practice and outcomes (Darling-Hammond and McLaughlin, 2011). Within the education context, professional development opportunities can be formal, informal, collaborative, or individual (Desimone, 2011). Whilst individual teachers must take responsibility for their own professional development needs, the success of professional development and teacher learning is strongly influenced by the

educational environment (DiPaola and Wagner, 2018). There is a need for education institutes to provide effective professional development opportunities, support professional development initiatives through the provision of funding, and create a positive, growth-promoting culture surrounding professional development needs and requirements (Patton *et al.*, 2015). The importance of the self, self-identity, and how self is integrated into the teaching and learning process (Benekos, 2016) is also important as a teacher brings masses of prior knowledge and experience when entering professional development as a self-directed learner. Consequently, willingness to engage and collaborate with teaching colleagues collectively in the professional development process becomes imperative, extending across human, social, and decisional capital (Hargreaves and Fullan, 2012; Tannehill, 2014).

Supporting teachers in developing and achieving personal professional development goals within a collegial environment will help form the basis for professional development (Cochran-Smith and Lytle, 1999; Patton *et al.*, 2013). Consequently, a shift towards encouraging teachers to rethink their practice (Darling-Hammond and McLaughlin, 2011), surpassing the acquisition of knowledge and skills alone (Vescio *et al.*, 2008) is required. Professional development opportunities grounded in social learning (Hord and Tobia, 2012), logical (Desimone *et al.*, 2002), content matter focused (Garet *et al.*, 2001), relating to instructional practice (Borko, 2004), and continued over an extended period of time result in changes to instructional practice and student achievement. Effective professional development of educators requires teachers to be active in the construction of meaning and understanding through reflection and collaborative engagement (O'Sullivan and Deglau, 2006; Patton *et al.*, 2015). Therefore, there is place for commitment to the praxis of reflective practice. Teacher learning is a continuum which requires on-going reflective practice, contributing to the growing knowledge of the self and the students while augmenting knowledge on the theory of teaching (Biggs, 2003). This supports teachers in gaining an understanding of more than just what they do, but why they do it. Reflective practice supports teachers on their learning journey, co-constructing knowledge based on learner needs and requirements (Su and Wood, 2012), paving the way for transformation. Consequently, effective professional development encourages and supports teachers in making changes to the teaching and learning process based on an evaluation of teacher and students' performance.

1.2.3 Policy Influence

Rural and regional economic developments are fundamental to the enhancement of life in rural areas, small towns, and villages. Rural development policy supports rural areas in combating 21st century economic, environmental, and societal challenges presented to rural communities. Rural development policy is a key component of Pillar II CAP (Common Agricultural Policy) payments which complements direct aid provision for farmers available under Pillar I (ENRD, 2019a). EU rural development policy implementation is based on six priorities of which two priorities include knowledge transfer and innovation, and farm viability and competitiveness (ENRD, 2019b). Lifelong learning and vocational education and training (VET) within the agri-food sector as well as supporting the entry of skilled farmers into the farming industry in an attempt to address generational renewal are key aspects of both priorities. Knowledge and innovation must be key drivers of future economic growth which can be achieved through quality education, greater research performance, endorsement of innovation and knowledge transfer to create growth and employment in addressing national and international societal issues (European Commission, 2010). At a European level, sustainable growth and development are key components of the *Europe 2020 Strategy* regarding competitiveness, meeting climate goals, and engaging with clean and efficient energy going forward (European Commission, 2010). Nationally, the *Action Plan for Rural Development* (Government of Ireland, 2017) supports the development and delivery of education and training programmes for farmers to ensure the appropriate knowledge and skillsets necessary for the sustainable development of farming enterprises are present. Additionally, upskilling opportunities for farmers as employers are a key aspect of the national plan. Teagasc are the Irish state body given responsibility for the provision of such services. Within this context, education has an important role in the provision of upskilling, educational opportunities for young farmers, new entrants, and farmers as employers. Positively, rural communities benefit from a relatively unspoilt environment (Government of Ireland, 2017) which emphasises the significant importance of farmers behaving in an environmentally sustainable manner to protect the natural habitats in which their industry resides. New rural development policy currently being developed by the Department of Rural and Community Development in Ireland will span over a five-year time period (2020-2025), focusing on

strengthening rural communities. Within the agricultural context, this policy will place increasing focus on climate change mitigation and diversification of the agri-food sector in line with European policy requirements (Government of Ireland, 2019).

The European Commission has identified a significant shortage in the number of new, young farmers entering the farming industry (DGIP, 2012) due to older farmers failing to pass on farms to the younger generation. This poses significant concern for the future of European agriculture as young farmers are the future of the industry. Consequently, European policy supporting young farmer entry to the industry was introduced in the form of increased financial aid for young farmers. Since 2015, all eligible young farmers entering the sector receive additional direct payments under Pillar I of the CAP (European Commission, 2013a). Each member state was given flexibility regarding implementation of the direct payments. In the Irish case, to be eligible for the additional payment, young farmers must possess an NFQ (National Framework of Qualifications) Level 6 agricultural qualification. As a consequence of the mandatory requirement to possess a Level 6 agricultural qualification, numbers enrolling in agricultural colleges across Ireland began to surge. This placed increasing pressure on agricultural education providers, in particular, the educators involved in the delivery of such programmes, due to the diverse student population and increasing student numbers entering agricultural programmes. It is within this context that this study was extremely important in terms of developing instructors of agricultural education programmes and addressing their professional development needs. Teagasc, as the main provider of agricultural education programmes within the Republic of Ireland, produced an *Education Vision Report* based on the educational needs of the agri-food land-based sector (Teagasc, 2018a). A total of six core requirements were identified as part of the vision process. Goal six under the sixth core requirement of the vision document aimed at prioritising the professional development of education staff within the organisation to ensure teaching and learning practices employed by educators are in line with innovative best practice (Teagasc, 2018a). Within the education vision report, Teagasc made a commitment to prioritising teacher professional development. This will involve identifying professional development programmes and opportunities suitable to the cohort of agricultural educators within the organisation in addition to placing an onus on individuals to obtain a pedagogical qualification within a designated period. It is

within this context then that the identification of agricultural teacher training needs and the development of a pedagogical tool to address individual educator's needs is imperative.

National agricultural visions including *Food Harvest 2020* and *Food Wise 2025* have had a significant influence on the development of the agri-food sector nationally. Environmental sustainability is fundamental to food production systems of the 21st century, a notion *Food Wise 2025* recognised as imperative, stating that increased agricultural production could not occur in the absence of consideration for its environmental impact on the depletion of resources and climate change (DAFM, 2015). Subsequently, a skills and knowledge base which provides stability for the continued development of the sector is required in a global environment which is facing increasing concern as a result of increased demand for food, increasing constraints on natural resources, and the embryonic challenges of climate change. This emphasises the importance of education and skills development in an era where agriculture is becoming more knowledge intensive. Consequently, retention of current, high quality, experienced individuals and attraction of new, ambitious, educated and motivated individuals to the sector becomes imperative to the future development of the agri-food sector (DAFM, 2015). *Food Harvest 2020* alluded to the crucial role of Teagasc in the generation and distribution of new knowledge to ensure profitable and sustainable development of the agri-food sector (DAFM, 2010). Therefore, agricultural colleges nationally and internationally have a fundamental role in the promotion and development of sustainable farming practice and in disseminating this information to the future holders within the agri-food sector. However, the role of the teacher in this context and their professional development needs are less well explored, highlighting the significant importance of this study and the potential implications of the findings at policy level in terms of guiding future agricultural agendas.

Finally, Zagata and Sutherland (2015) call for a more nuanced understanding of young people within agriculture that goes beyond the basic agricultural facts and provides an in-depth understanding of their needs within the sector. This study aims to address this research agenda through an in-depth exploration of the motivational factors influencing young peoples' further educational choice. This helps shed light on the priorities and requirements of young people within further education and their

future career aspirations based on motivations. This concept is important given the aging farmer population across Europe, as mentioned previously, and the need to encourage and entice more young people into the farming sector. From an agricultural provider point a view, an understanding of the primary motivators and learners' reasons for pursuing an agricultural qualification are vital to the promotion and marketing of agricultural programmes. Personal motivators will also impact on the success of the teaching and learning environment and so knowledge of student motivators assist teachers in instructional design and delivery of an agricultural programme. Therefore, such findings will be beneficial at the policy and instructional level.

1.2.4 Contribution to the Literature

The elusive nature of agricultural education and the gap relating to the professional development needs of the agricultural VET teacher in the delivery of agricultural education programmes drives the need for this study. Much of the rationale for this research comes from rural, agricultural, and educational policies at a national and European level regarding sustainable farming practice and rural community development. Findings in the literature also highlight the importance of professional development opportunities to successful pedagogy and the implementation of a successful teaching and learning environment which promotes increased student engagement. Much is known about the importance of pedagogy, pedagogical-content knowledge, professional development needs and opportunities, etc. within the primary and post-primary sector, and somewhat within the VET sector; however, the role of the teacher in the delivery of agricultural VET programmes in particular and their professional development needs is currently lacking in academic literature, highlighting the intellectual gap that exists between VET and the professional development needs of the agricultural educators involved in the delivery of agricultural VET programmes. This thesis aims to address these disparities by examining the literature and developing a conceptual framework for the study of the professional development needs of agricultural teachers in their role as educators and by incorporating a mixed methods research design to the primary data collection process.

The multidimensional, complex nature of agriculture and the increasing pressures facing the agricultural sector as a result of climate change mitigation and the need to ensure sustainability of the sector are presenting significant challenges to the rural farming community. Agricultural extension, in particular education, given the context of this study, has an important developmental role within rural communities as it equips learners with the knowledge, skills, and capability to farm in an environmentally sustainable manner. However, several research studies have investigated the impacts of education and training on the sector (Brennan *et al.*, 2016b; Heanue and O'Donoghue, 2014; Howley *et al.*, 2017; Leonard *et al.*, 2017) and the learner experience (Alkhasawneh *et al.*, 2008; Anthony Jr, 2008; Biggs, 1999), but little research has been conducted on the role of the teacher within that context. The complex and multifaceted nature of the classroom in a rapidly changing technological environment requires teachers that can support student learning in the 21st century. This requires a shift towards a constructivist view of education as learners are required to think critically and become self-directed, self-regulated, lifelong learners. The role of the teacher and their ability to support student learning in the exchange of technical knowledge and information becomes crucial to the sustainability of the agricultural sector. Therefore, successful pedagogy and an ability to promote higher order thinking skills become imperative. In this context, professional development of agricultural teachers has an important developmental role, establishing a foundation for the provision of high-quality education systems and effective teaching and learning processes within a technically-driven environment.

This study employs an explanatory and exploratory sequential mixed methods design process alongside an in-depth qualitative exploration of the research phenomenon. It is expected that integration of both qualitative and quantitative research methods will contribute to a comprehensive understanding of the research objectives, grounded in the views and opinions of the participants for this study. Findings will contribute to existing theoretical debate surrounding education and professional development while addressing the intellectual gap that exists within the agricultural education context. The methodology employed is expected to further the understanding of mixed methods as a research paradigm, contributing to existing literature on mixed methods research designs. In summary, this thesis will contribute

to political and theoretical debate in the context of agricultural education. The next section details the research objectives for the study based on policy intervention and academic configuration.

1.3 Research Objectives

An exploration of the professional development needs of agricultural teachers in their role as educators is the primary aim of this thesis. This will be addressed by identifying the professional development needs of agricultural teachers, developing a tool to address agricultural teacher professional development needs, and exploring the motivational factors influencing a young persons' further educational choice. The following sub-sections detail the three specific research objectives identified for the thesis based on this overall objective.

1.3.1 Agricultural Teacher Professional Development Needs

Little research regarding agricultural educators' professional development needs at the VET level are documented in the literature. An abundance of literature on the professional development needs of pre-service teachers within the primary and post-primary educational setting is available (Cochran-Smith *et al.*, 2016; Darling-Hammond, 2017; Evagorou *et al.*, 2015; Gelfuso and Dennis, 2014), however a dearth of research surrounding professional development needs of VET educators, in particular, agricultural teachers, exists. Additionally, in the Irish case, the recruitment of agricultural teachers into VET agricultural colleges is based on technical expertise alone resulting in the selection of educators who more often than not lack a pedagogical qualification. Therefore, there is a need to investigate the professional development needs of this cohort of educators, particularly within the agricultural setting, given the socio-cultural norms associated with farming, the technical environment within which VET education occurs, and the recruitment policy employed at this level.

Objective 1: To investigate the continuous professional development needs of agricultural teachers in their role as educators at the vocational education and training level

This research objective will be addressed using an explanatory sequential mixed methods design process. This involves a quantitative survey instrument followed by

two qualitative methods, i.e. focus groups (QUANT-qual). This methodology will support an in-depth investigation of current training available to agricultural teachers at the VET level which will help identify future professional development needs of this cohort as a result. The data collected will be analysed thematically, using an inductive approach, to identify specific professional development needs of the agricultural teaching population.

1.3.2 Professional Development Tool for Agricultural Teachers

The findings obtained based on the previous objective (agricultural teacher professional development needs) will be used to identify the area of professional development agricultural teachers seek most support. A tool will be developed to address the major professional development need of the agricultural teaching population. As stated previously, little is known about the professional development needs of teachers within the VET setting, particularly the agricultural VET setting, and so a tool developed to address their professional development needs will be beneficial in terms of fostering academic qualifications and training programmes to support agricultural teachers' training needs.

Objective 2: To develop a professional development tool suitable for supporting agricultural teachers' training needs within the vocational education and training sector

This objective will be addressed using an exploratory sequential mixed methods design process. This will involve a QUAL-quant-qual research process in the development of the professional development tool. Qualitative semi-structured interviews will be conducted initially, followed by a quantitative survey instrument to reach a larger sample population, followed by two qualitative focus groups to finalise the professional development tool created. This methodology will support an in-depth exploration of the research phenomenon which is extremely important given the lack of research conducted in this area. Each phase in the sequential design process will be used to inform the next to ensure the findings are grounded in the views and opinions of the study participants. This is particularly important given that the participants of the study will be the end-users of the tool developed and the tool will have a significant impact on their experience as educators going forward following adoption at policy level.

1.3.3 Young Peoples' Motivators within Agricultural Education

As an educator it is important to understand what motivates students to pursue a given qualification as this will impact on the teacher's ability to secure student engagement. Within the agricultural context, what motivates students to pursue an agricultural qualification can be complex and heterogeneous given the socio-cultural norms associated with the family farming unit. There is much research conducted on the socio-cultural impacts of farming from an agricultural/farming point-of-view, however little research from an agricultural education perspective has been conducted. Consequently, this research objective and findings from this phase of the study will provide an additional lens through which to investigate the socio-cultural norms of farming. Additionally, young peoples' motivators regarding further educational choice is important for marketing and promotion campaigns at the college level as well as influencing instructional technique and design of the teaching and learning process at ground level. Finally, findings from this phase will link back in with the first two objectives concerned with teacher professional development needs as they will help inform the professional development process.

Objective 3: To investigate the motivational factors influencing young people's further educational choice within farming itself at the vocational education and training level

The motivational factors influencing young peoples' further educational choice within farming itself will be investigated using an in-depth exploratory case study approach in the form of semi-structured interviews. Lack of research regarding agricultural motivators supports the need for an in-depth case study which provides depth of understanding to the research phenomenon. The qualitative data will be analysed thematically using an inductive approach.

1.3.4 Summary Remarks

The three identified research objectives will explore and support the professional development needs of agricultural teachers in their role as educators inside the VET sector within the context of the literature review in Chapter 2. The fulfilment of these objectives will contribute to the intellectual gap regarding teacher professional development within the VET sector, particularly from the agricultural perspective. An additional lens through which socio-cultural norms within the farming context will be used to identify further educational choice motivators contributing to existing national

and international rural studies literature around cultural and familial norms associated with the family farm. In one sense, agricultural education and in particular the recruitment of agricultural teachers in Ireland is unique within the European context, as set out in Chapter 3, however the findings will still contribute to the European VET system given the commonality between the technically-driven VET scenario and the purpose of the education programmes at the VET level. Consequently, the findings will contribute to the existing body of literature concerning teacher professional development within the primary and post-primary divisions and will build upon the current lack of literature regarding professional development within the VET context. Utilisation of an explanatory and exploratory sequential mixed methods research design process alongside a qualitative case study will help ensure the findings are grounded in participants' thoughts and opinions, increasing the applicability of the findings to the cohort in question. This is of significant importance given the dearth of research in the area of VET professional development needs and the great focus towards the practical skills obtained as a result of such a qualification.

1.4 Structure of the Thesis

Chapter 1 provides a rational for the study making reference to its expected key contributions to the literature. The overall objective and specific research objectives for the study are outlined in detail prior to concluding with summary remarks.

The purpose of **Chapter 2** is to set the context for the study of the professional development needs of agricultural teachers within the VET sector in addition to providing an understanding relating to agricultural change processes, educational paradigm shifts, the purpose and importance of pedagogy, the importance of professional development opportunities to the teaching and learning process, and the role of education within the rural development domain. This chapter supports a critical assessment and application of literature and findings from other academic studies which assists in the identification of key research issues which are investigated in the remaining chapters. This chapter sets the research context and assists in understanding the factors which influence teacher professional development needs and opportunities. The literature review results in the development of the conceptual framework for the study.

Chapter 3 sets the context for the study by providing an in-depth explanation of the VET sector within Ireland, particularly the agricultural VET sector given its position under the umbrella of the Department of Agriculture, Food, and the Marine. This section details information surrounding national and international education frameworks, the history of agricultural education in Ireland, and the recruitment of agricultural teachers nationally compared to the international context. This chapter therefore assists in setting the scene for the subsequent chapters to follow.

Chapter 4 details the methodologies used to carry out primary data collection for this thesis. A mixed methods explanatory and exploratory sequential design alongside a qualitative case study approach were used in the collection of data. Three distinct phases were identified for the collection of data to address each of the research objectives. Each research phase combined provides a comprehensive understanding of the research phenomenon.

Chapter 5, Chapter 6, and **Chapter 7** detail the findings from this thesis in the form of submitted peer-reviewed academic papers. Each paper presented as a separate chapter provides an in-depth exploration of each research objective relating to an individual phase within the research process. Consequently, all three papers combined contribute to the conceptual understanding of the professional development needs of agricultural teachers in their role as educators.

Chapter 5 extensively highlights the importance of professional development within the education sector, detailing the professional development needs of the agricultural teaching population within Ireland in line with international best practice. Thus, this chapter identifies the professional development needs of the agricultural teaching population in Ireland.

Chapter 6 provides a transnational, theoretical perspective to the development of a pedagogical tool to address agricultural teachers' professional development needs. The chapter describes in detail the complex, multi-method process involved in the development of the pedagogical tool for agricultural teachers. This chapter addresses the specific professional development needs of the agricultural teaching population as identified in Chapter 5.

Chapter 7 comprehensively explores the motivational factors influencing further educational choice within farming itself. Both primary and secondary motivators are identified as key motivational factors affecting young peoples' decision to pursue an agricultural qualification. This chapter provides a nuanced understanding to the intrinsic and extrinsic motivators at play.

Finally, **Chapter 8** synthesises the findings from the three peer-reviewed academic papers presented in the previous three chapters. The overall findings from each of the research phases are combined to provide a comprehensive understanding of the multifaceted, complex nature of agricultural education and the professional development requirements of VET teachers within this context. Policy implications and future research questions are also outlined within this section.

Chapter 2: Literature Review

2.1 Introduction

The education concept and its importance to society have been well documented in both academic and policy-related literature. Education promotes critical thinking skills and abilities encouraging learners to be autonomous, self-regulated individuals who acquire the necessary skills, knowledge, and competence to become lifelong learners. Embarking on an education journey presents opportunities and challenges to both the student and the teacher within the learning process as pedagogical competence, motivations, and professional development contribute to the success or failure of the educational environment. The purpose of this chapter is to contextualise teacher professional development needs within the international literature giving consideration to the pedagogy of education in the context of learner and teacher requirements. The first section discusses agricultural change and its impact on the farming sector and rural communities over a period of decades encompassing shifts from productivism to post-productivism to multifunctional agriculture to neo-productivism. The important role of education to the sustainable development of rural communities is discussed under the umbrella of agricultural change. The second section details the significant change in education regarding the learning process in the context of learning theories and learning styles and the influence of motivations within education. The importance of teacher professionalism and the influence of identity and professional competence on the learning process are documented. The third section explores the professional development needs of teachers and the significance of continuous professional development (CPD) opportunities to the teaching and learning process. This section provides a theoretical understanding of the concepts underpinning behavioural change and how adults learn in an effort to provide a foundation for the development of CPD programmes or opportunities based on findings in the literature. The final section merges the findings from the three previous sections in the form of a conceptual framework, bringing together the three broad concepts of agricultural change, pedagogy, and professional development in a single graphic, providing a conceptual foundation for the thesis.

2.2 Agricultural Change

Challenging theoretical debates over the past decades have been generated in relation to the nature, changes, and future trajectories of agricultural and rural systems from an economic, social, political, and environmental perspective (Wilson, 2009). An important debate within rural studies has orbited the probable shift from 'productivism' to 'post-productivism' to multifunctional agriculture and differentiated rural spaces (Wilson and Burton, 2015). Critics including Lowe *et al.,* (1993), Marsden *et al.,* (1993), and Ward (1993) hypothesised a transition from an agriculture epitomised by globalisation, profit-maximisation, and intensification (i.e. the productivist era) to an agriculture formed by relocalisation, conservation, and extensification (i.e. the post-productivist era).

Agricultural productivism has been conceptualised as 'a commitment to an intensive, industrially driven and expansionist agriculture with state support based primarily on output and increased productivity' (Lowe *et al.*, 1993). Post World War II, the aim of rural policy was to increase food production from domestic sources through the utilisation of more intensive farming techniques and biochemical inputs (Ilbery, 1991; Ward, 1993). This resulted in the confluence of input suppliers, financial institutions, research and development centres, etc. to facilitate the expansion of agricultural production (Wilson, 2001). Productivist agricultural regime positioned agriculture in a dominant position within rural society, creating an unchallenged philosophical security for agricultural actors and institutions (Marsden *et al.*, 1993). Productivist philosophies suggested farmers were the greatest protectors of the countryside, which coupled with the notion of the rural as idyllic, proposed urban and industrial developments outside of agriculture itself were posing as leading threats to the countryside (Halfacree and Boyle, 1998; Woods, 2005). The productivist era resulted in repercussions for agricultural production due to the industrialisation of agriculture. The emergence of large agri-businesses scantily embedded in rural communities (Whatmore, 1995) and the commercialisation of agricultural holdings entrenched in practice of production and profit maximisation (Ward, 1993) resulted in mass consumption of agricultural commodities and growth of world food trade (Wilson, 2001). The fundamental goal was to maximise production in an attempt to secure national self-sufficiency for agricultural commodities. However, this led to environmentally harmful intensification (Potter, 1998) and surplus production as a

result of governmental encouragement. Increased production initiatives were closely linked to strong financial state support via farm subsidies, price guarantees, and protectionist and interventionist policies resulting in artificially inflated prices for agricultural products, creating a false sense of financial security for the farmer (Fennell, 1979; Pelucha and Kveton, 2017; Ritson and Harvey, 1997; Wilson, 2001; Wilson and Burton, 2015). This productivist era highlights governments' ability to engineer agricultural regeneration through state intervention, albeit in the absence of consideration for the environment. This era afforded farmers the opportunity to increase production without consideration of the implications associated with land-use management practices. As a consequence, farmers adopted farming techniques associated with increased mechanisation and increased use of biochemical inputs which are irreconcilable with sustainable farming practices (Knickel, 1990; Mannion, 1995).

New reforms established within the Common Agricultural Policy in the mid-to-late 1990s aimed at reducing subsidies coupled to production in an attempt to encourage environmentally beneficial farming practices (Ward *et al.*, 2008). Concerns regarding food security and self-sufficiency were replaced with concerns regarding the management and disposal of surplus food production, the outlay associated with farm subsidies, and the environmental difficulties connected to intensive farming systems resulting in the post-productivist era. However, the notion of a transition from one era (productivist) to another (post-productivist) has been the subject of several debates as there continues to be a lack of harmony as to whether the productivist era superseded the post-productivist era. Post-productivism captures a fundamental change in post-war agriculture where agricultural policies moved beyond supporting increased levels of intensive agricultural production, meaning farmers could no longer expect financial support for all food produced and must begin considering the rural space within which they operate. Thus, this era captured the implications of land-use planning, rural development, and the social and economic change associated with both on-farm and off-farm practices (Evans *et al.*, 2002). Changing public attitudes and media representations of the rural alongside the fundamental changes to the notion of the countryside as idyllic placed agriculture as a threat to the countryside. The corporate relationship between agricultural ministries and farming lobby groups weakened (Marsden *et al.*, 1993) during this era

resulting in the introduction of ‘green’ ideas into agricultural policies empowered by actors such as environmental NGOs (Non-Governmental Organisations). Equally, the social and economic restructuring of the countryside and the reconstruction of rural spaces as a result of urban-rural migration are believed to contribute to the creation of the post-productivist countryside (Halfacree and Boyle, 1998; Wilson, 2001). This change to the ‘traditional’ countryside therefore resulted in farmers facing new challenges with regard to on-farm pollution, access disputes, and environmental management practices (Ward, 1995) as new actors create an image of the rural (usually urban). Policy change during the mid-1980s is seen as a key factor in the shift toward post-productivism (Ilbery and Bowler, 1998; Marsden *et al.*, 1993) with the introduction of the MacSharry Reforms and the agri-environmental package in Agenda 2000. Thus, in policy terms, the post-productivist era is characterised by a reduction in state subsidies accompanied by increased regulation of agricultural practices through voluntary agri-environmental schemes such as REPs (Rural Environmental Protection Scheme) and AEOS (Agri-Environmental Options Scheme) to encourage farmers to farm in a more environmentally sustainable manner. There is a strong theoretical association between post-productivism and the move towards environmentally sustainable agricultural practices and the replacement of physical inputs with knowledge inputs on-farm (Altieri and Rosset, 1996; Higgins *et al.*, 2017; Winter, 1997).

The productivist era continued from about the Second World War to the mid-1980s (Ilbery and Bowler, 1998; Lowe *et al.*, 1993) before the breakdown in the productivist food regime in the late 1970s (Marsden *et al.*, 1993) which was viewed as the initial transition to post-productivism. With regard to agricultural holdings, post-productivist farms have gone through productivism and through the adoption of environmentally friendly farming practices, reduced intensity and productivity, have become more horizontally embedded within a rural community. On the contrary, productivist farms continue to farm intensively, increasing agricultural production and becoming increasingly integrated within the capitalist market resulting in little horizontal integration within rural communities (Wilson, 2001). The geographical component of territorialisation between productivism and post-productivism has been well documented in the literature (Buller, 1998; Tilzey and Potter, 2016; Ward, 1993) typically positioned around the argument that fertile lowlands are more likely to

remain productivist while marginal upland areas are more likely to adopt the post-productivist notion. Thus, in the European context, post-productivism has occurred simultaneously with productivism spatially as well as temporally (Wilson, 2001) creating the notion of the multifunctional agricultural regime. The notion of the multifunctional agricultural regime enables multidimensional coexistence of productivist and post-productivist engagement and belief, providing a greater understanding of the multi-layered nature of rural and agricultural change. Thus, the notions of productivist and post-productivist agriculture extend further than agriculture itself encapsulating issues greater than agriculture alone. From a human geography perspective, multifuntionality should take account of territorial expression rooted within specific localities, which is the farmed landscape in this context (Brenner, 2001). Thus, within the agricultural context, Peterson *et al.* (2002) argued that policies aimed at addressing the multifuntionality of agriculture must be managed at the local, regional, and sub-national level given the spatial diversity of the agricultural landscape. Inside the farm gate, productivist and post-productivist regimes can lie in close vicinity as the farmer may apply specific farming practices related to productivism to one part of the farm while on other parts a post-productivist strategy may be implemented (Wilson and Hart, 2001). Therefore, farm level multifuntionality encompasses the physical basis of food and fibre production as well as the farmers' thought and engagement within the decision making process. At the local level, multifuntionality is likely in areas where farmers look beyond their own farm boundaries and recognise that chosen agricultural practices have implications for the rural community as a whole in terms of landscape protection and environmental sustainability. At the national level, policy results in the formation of multifunctional agriculture (Wilson, 2009). Thus, regional and rural communities are important intermediaries for the transmission of national multifunctional philosophies to the farm level and vice versa.

In the 2000s, a new conceptual notion of 'neo-productivism' emerged and built on the aforementioned debates around contemporary agricultural pathways. This suggests that agricultural change continues to be multifaceted and the theoretical assumptions surrounding agricultural change developed in the 1990s may no longer adequately support explanations of agricultural processes within a rapidly globalising world (Wilson and Burton, 2015). Global agricultural systems are becoming subject

to increasing pressure as a result of climate change, rising demand for alternative food types, and the continuing pressures on wildlife conservation and habitat protection associated with agricultural expansion. Within neo-productivism, agriculture is understood to be the main instrument in the reduction of the impacts of climate change, strengthening green growth and supporting sustainable agricultural production through the implementation of the bio-economy, food safety, biofuels, etc. Thus, the neo-productivist regimes main focus is in relation to sustainable intensification of agricultural processes (Pelucha and Kveton, 2017). However, it must be understood that the environmental, social, economic, and political pillars associated with sustainable development present significant challenges to the neo-productivist regime (Kerselaers *et al.*, 2013; Marsden, 2013; Price and Evans, 2009; Rogge *et al.*, 2011). Environmentally, achieving a balance between increased food production and environmental sustainability with regard to ecosystems and sustainable intensification is challenging. Socially, farming is a meaningful occupation from which farmers seek socio-psychological satisfaction from the occupation. Finally, economically and politically, the industrialisation of farm holdings and the regulatory frameworks present significant challenges to agricultural production systems.

2.2.1 Education and Rural Development

Policymakers and those who populate rural areas worldwide remain concerned with rural education in these areas. A familiar feature within rural communities is the focal social, institutional, and economic role of the school, functioning as the nucleus of a community (Schafft, 2016). Rural schools often serve as important sites for local community engagement imparting a strong sense of local identity and shared purpose within the community (Bauch, 2001; Budge, 2010; Cummings *et al.*, 2011; Schafft and Biddle, 2013). This school-community relationship is strong in rural areas compared to urban districts as rural parents are more inclined to offer support and services in a voluntary capacity compared to their urban friends. Furthermore, Provasnik *et al.* (2007) reported increased job satisfaction and fewer behavioural problems among learners amid rural teachers. The school or education system is often a significant employer within rural communities with evidence available to suggest that property prices are greater, employment rates are higher, and increased numbers of entrepreneurs are associated with rural communities in the

presence of an education centre (Brasington, 2004; Lyson, 2002). However, that said, other studies argue that education is resulting in the out-migration of highly qualified, valuable young people resulting in a brain drain (Brown and Schafft, 2011; Carr and Kefalas, 2009).

The development of communities relies on the ability of individuals to collaborate and work closely towards a common goal which has the community's best interests at heart. In this context, rural schools play a fundamental integrative and interactive role within communities as they represent the community, taking accountability for educational policy contexts (Schafft, 2010). In this context, consideration needs to be given to the relationship that exists between rural education and development in an effort to augment the school-community linkage with a view to creating greater, new, exciting opportunities within rural areas. Young people are crucial to community development and the sustainability of rural areas, accentuated by strong connections and attachment to place (Schafft, 2016). Education centres represent a primary source of employment within rural areas making them an obvious option for rural youth intending to remain on the land within their home community. This is of significant importance to the agricultural context given the socio-cultural emotions associated with farming and agricultural practices and the significant contributions of agricultural colleges as education centres to the learners, the employees, the employers, and the wider local community as a whole. Thus, in conclusion, education has a role to play within rural communities, presenting opportunities to contribute to rural development, and so becomes an important aspect of rural development policy at the national and international level.

Rennie and Billing (2015) documented opportunities for long-term sustainability of rural communities in Scotland detailing the potential to generate independent sources of income as a way of improving the level of resilience in rural communities and reconceptualising rural sustainability. As Nic Gabhainn and McGrath (2007) note, 'young people have an astute awareness of the communities within which they live, despite their lack of voice at a political level.' The implications of the close integration of community and family life have significant implications for young peoples' experience and regard for the places in which they live (Nic Gabhainn and McGrath, 2007). Young people value place and community with regard to the friendships made, the independence, the escape, the opportunity to explore,

adventure, and its contribution to their overall wellbeing (Morrow, 2000; O'Brien *et al.*, 2000; Panelli *et al.*, 2002). In an agricultural context, the genealogical linkages to land and to place contribute to the multidimensional relationship that exists (Cheshire *et al.*, 2013; Hildenbrand and Hennon, 2005) within rural communities. It is within this context that rural education has a significant role to play in the contribution of knowledge, information, and best practice to young people interested in a career in farming. A collegial relationship between farm, place, and community will help contribute to rural sustainability and the development of rural communities.

2.2.2 The Role of Agricultural Education

A rapid increase in the global demand for food is resulting in agricultural expansion and growth. As the global population approaches nine billion there is an increased need for food production to remain sustainable; socially, environmentally and economically (Brennan *et al.*, 2016c). A major challenge associated with this increased need for food is the ability to produce more food with guaranteed safety while still maintaining the environment. The negative impacts on biodiversity, flora and fauna, water quality, air quality, and climatic factors associated with increased food production become greater where expansion occurs in the absence of best practice, knowledge, and innovation (Brennan *et al.*, 2016c). Consequently, there is a need to position agri-food systems within sustainable farming practice (Herrera-Reyes *et al.*, 2018) and agricultural education has a significant developmental role to play within this context.

Farmers are responsible for the management of soil resources, buildings and equipment and need to be proficient in a variety of manual, operational, and managerial skills to utilise these resources. A successful career in farming requires proficiency in these skills which can be attained through agricultural education and training. Knowledge of modern farming practice and the scientific principles that underlie such practice become appreciated as a result of an education in agriculture (ACOT, 1981). Agricultural education and farm advisory systems have a pivotal role to play in terms of sustainable development and the provision of knowledge, research, and innovative technologies (EU SCAR, 2012) as farmer knowledge can be encouraged and nurtured through agricultural extension and education (Uaiene *et al.*, 2009; Weir and Knight, 2004). Such services can support farmers ability to

problem solve, make decisions, and improve their management skills (Vanclay and Leach, 2011). In the context of education, agricultural colleges create an optimal environment for social learning as students interact and learn from each other through the sharing of ideas and information. Within farming communities, a valuable resource that can evolve agricultural farming practices and encourage more sustainable and resilient agricultural pathways is farmers' and local knowledge (Šūmane *et al.*, 2018). Thus, young farmers gain knowledge and information through both formal and informal learning processes.

There is widespread and long-standing agreement that agricultural education is of significant importance within a rapidly changing technological and economic environment (Heanue and O'Donoghue, 2014). A study conducted by Heanue and O'Donoghue (2014) highlights the significant importance of a formal agricultural qualification in benefiting higher economic returns. Farmers with a formal agricultural qualification have larger farms, increased family farm incomes, and greater gross margins per hectare than their non-educated counterparts (Heanue and O'Donoghue, 2014). Therefore, there is a place for agricultural education in terms of economic, social and sustainable development. In addition, educated farmers are more likely to adopt technology (Cotching *et al.*, 2009; O'Callaghan *et al.*, 2016) and so can support and encourage the diffusion of new technologies within farming communities as they set an example for less educated farmers. Farmer discussion groups are one method of agricultural extension which supports the social learning process (O'Callaghan *et al.*, 2016) in an informal way as farmers learn from each other and their more productive counterparts (Weir and Knight, 2004).

Over the last decade agricultural land use has changed considerably across Europe (van Vliet *et al.*, 2015). Agricultural land follows development trajectories and is continually changing as mountain areas encounter land abandonment (MacDonald *et al.*, 2000), societal demands influence peri-urban areas (Zasada, 2011), and technological developments drive yield increases (Olesen *et al.*, 2011). Agricultural areas are responsible for the provision of a wide variety of goods and services such as food, feed, and fibre but also incorporate biodiversity preservation (Young *et al.*, 2007) and climate change mitigation (Freibauer *et al.*, 2004; van Vliet *et al.*, 2015). At a European level, policy measures and regulations directly influence the impact of

agricultural land use on the environment (van Vliet *et al.*, 2015). Two significant drivers of agricultural land use change include population expansion and dietary changes of the expanding population. An increased need for food, fuel, and shelter is encountered as global population rises (Foley *et al.*, 2011). Additionally, increased wealth within population clusters causes a shift in food consumption patterns towards commodities that are more land intensive to supply, such as meat products (Alexander *et al.*, 2015; Delgado *et al.*, 2001; Godfray *et al.*, 2010; Kearney, 2010; Keyzer *et al.*, 2005; Tilman *et al.*, 2011; Weinzettel *et al.*, 2013). Agricultural intensification and expansion can help meet the increased demand for agricultural commodities by improving yield through the use of increased inputs such as fertiliser, pesticide, water, and changes to management practices (Cassman, 1999; Johnson *et al.*, 2014; Tilman *et al.*, 2011). However, land use change or agricultural intensification can have negative environmental impacts in terms of greenhouse gas emissions, soil quality deterioration, scarce water resources utilisation, and biodiversity loss (Alexander *et al.*, 2015; Smith *et al.*, 2013). Thus, agricultural education and the professional development of farmers has a fundamental role to play in terms of educating farmers on the impact of farming on the environment and the need to ensure sustainable farming practices are employed within a rapidly expanding sector.

Economic performance of the agri-food sector and social sustainability within rural areas are dependent on a diverse farming population in terms of skill, age, and gender (Cush and Macken-Walsh, 2016). Young people will play a pivotal role in developing new, environmentally friendly, and highly productive farming practices through the use of innovation, energy, and creativity. This cohort represents a highly skilled labour force in terms of technical expertise and farm productivity (Cush and Macken-Walsh, 2016). Therefore, young people's agricultural participation in formal education programmes and at farm level becomes crucial for the sustainability of the sector and to help maintain social life in rural communities. Currently, the farming population is ageing with a significant number of farmers over the age of fifty-five (52.7%) in Ireland. Only 5.9% of the farming population in Ireland are under thirty-five years of age (DAFM, 2018) despite efforts made to introduce policies and extension programmes targeted at increasing ownership amongst young farmers. Several barriers prevent the entry of young farmers into the sector; the culture of

succession and inheritance, capital investment required to enter farming, and land mobility issues, to name but a few. However, new entrants define and shape the industry's structure and are needed within the agricultural sector as a consequence.

2.2.3 Summary Remarks

The shift from productivism to post-productivism to multifunctional agriculture to neo-productivism has broader implications for the understanding of agricultural change and rural society as a whole, highlighting the multifaceted, complex relationships surrounding agricultural processes. The need to increase food production to meet rising global populations, while giving consideration to the environment and ensuring sustainable farming practices, signifies the importance of the establishment of new 'isms' with regard to contemporary agricultural pathways within a rapidly globalising world. Both education and professional development have a significant role to play in this context given that farmers' and local knowledge are imperative to the development of sustainable and resilient agricultural pathways. Young people are key actors within rural communities in terms of building and maintaining rural environments and protecting the local countryside. Consequently, education is an important aspect of national and international policy given the social, institutional, and economic role education centres play within rural communities functioning as knowledge bases for the local and wider rural communities. The next section discusses agricultural education change within the context of learning providing a theoretical basis for the important role and function of the teacher and the student within the education context.

2.3 Education Learning Theories: A Paradigm Shift

Teaching comprises the transmission of knowledge. However, the theories of teaching need to be sympathetic of learner needs in relation to how they obtain knowledge and how students learn (Fernando and Marikar, 2017). All learning consists of three dimensions: (i) the content dimension; (ii) the incentive dimension; and (iii) the interactive dimension, given that learning generally encompasses cognitive, emotional, and social factors (Illeris, 2018). Learning theories provide a foundation for the selection and validation of instructional techniques (Ertmer and Newby, 1993; Ertmer and Newby, 2013); therefore it is important to relate learning theories to instructional technique to ensure greater integration of the teaching

strategy, the context, and the learner (Khalil and Elkhider, 2016). Three principal learning theories; behaviourism, cognitivism, and constructivism, are well documented in the literature (Illeris, 2018; Khalil and Elkhider, 2016; Robinson *et al.*, 2016; Torre *et al.*, 2006), illustrating educational change with regard to the learners' responsibility and the teachers' role over the years. The three theories provide distinct definitions of learning which result in altering learner function and responsibility while shaping the instructional techniques employed in the learning process.

Within education systems globally, the objectivist approach to learning is to the fore despite the fact that research suggests the constructivist approach is far superior (Bada and Olusegun, 2015; Khalil and Elkhider, 2016; Löbler, 2006). Robinsons' *et al.* (2016) study suggests this is as a result of behaviourism within educational psychology. Behaviourist theories are based on the work of the educationists Pavlov, Watson, and Skinner which have resulted in the provision of beneficial acumens for teacher training and learning within education (Bitterman, 2006; Tomic, 1993). The theory describes how behaviour can be conditioned within particular environments through stimuli in the form of classical conditioning, and through reward and consequence in the form of operant conditioning (Kaplan, 2018). It takes a mechanist stance on the learning process only giving consideration to what can be measured and observed, excluding mental constructs (Robinson *et al.*, 2016). As a consequence, this learning theory results in a passive learning environment which promotes reproduction of knowledge and extrinsic motivation of students. Thus, in this context, an impersonal, de-contextualised learning site concerned with the transmission of knowledge to learners is created (Robinson *et al.*, 2016).

Within cognitive psychology, the information processing model is an established theory taking account of three different types of memory: sensory, working, and long-term memory. Each of these memories interrelates in the process of information coding. All information received by the sensory memory as a result of learner attention passes to the working memory (Khalil and Elkhider, 2016). Information processed in the working memory results in knowledge retention, however, the working memory has limited capacity (Baddeley and Hitch, 2017; Kane *et al.*, 2007). As a teacher then, it is important to give consideration to the limited nature of the working memory when designing instructional techniques. Within the working

memory, learners use two types of rehearsal in processing the information; maintenance and elaborative rehearsal. Maintenance rehearsal refers to surface learning as the learner revisits the material multiple times while elaborative rehearsal encompasses deep learning as the learner processes the information to give it meaning (Khalil and Elkhider, 2016). Elaborative learning is required to transfer new knowledge to long-term memory where the information is permanently retained. Learning has not been fully achieved until information is retained within long-term memory (Okano *et al.*, 2000). Therefore, within this contextual environment, the aim is to promote active learner engagement in the acquisition of knowledge by employing instructional techniques which encourage deep learning and the mastery of knowledge as opposed to memorisation. This cognitivist revolution replaced behaviourism in the 1960s as the dominant paradigm, positioning the learner at the centre of the learning process, replacing the passive dimension of instruction and learning associated with behaviourism.

Importantly, teacher education is not restricted to the transmission of knowledge, but incorporates the need for learners to actively construct knowledge themselves. This resulted in the evolution of the constructivist theory of learning, deeply rooted in the historic work of Dewy, Bruner, Vygotsky, and Piaget. Inside this learning environment, learners become active agents in the generation and acquisition of new knowledge. Constructivism is a product of the synthesis of multiple theories combined to produce one learning model (Amineh and Asl, 2015). The integration of behaviouristic and cognitivist theories resulted in the constructivist theory of learning. Previously, the learner was an object of education, but now is an education subject (Juvova *et al.*, 2015) who self-regulates their learning, positioning the teacher in a facilitator role. Constructivism is based on Piaget's concept of cognition with regard to the 'mental construction' of the information received (Bada and Olusegun, 2015; Juvova *et al.*, 2015) and other educational theorists views in relation to the influence of the environment on the learning process as constructionists believe learning is influenced by the environment and the learners' attitudes and beliefs (Bada and Olusegun, 2015). With this educational theory in mind, it is important for teachers to give consideration to learners' prior knowledge and to incorporate this knowledge in the classroom (Mvududu and Thiel-Burgess, 2012). In constructionism, learning is characterised by a constructive process in which the learner becomes an active

participant in the learning process, establishing a personal representation of knowledge built on the foundations of previous experiences (Amineh and Asl, 2015; Bada and Olusegun, 2015). Two notions encircle the simple idea of constructed knowledge. The first notion refers to the influence of previous learner experience on the construction of new knowledge and information as the learner uses this knowledge as a foundation to the development of new knowledge and information. The second notion is the active as opposed to passive learning environment. Within a new learning environment learners challenge understanding based on previous experiences. In a situation where new knowledge or information is paradoxical with previous understanding and experiences the learners understanding becomes altered to accommodate new experience and knowledge (Amineh and Asl, 2015; Bada and Olusegun, 2015; Phillips, 1995). This approach to learning results in more meaningful learning as the learner negotiates, questions, and seeks answers themselves (Cook, 1992). Assimilation and accommodation are two key concepts of constructivism. Assimilation results in the integration of new knowledge with old experiences while accommodation reframes new experiences where expectation does not meet reality (Bada and Olusegun, 2015). Therefore, the implications of this learning theory on teaching practices are significant as the teacher must create a space which challenges learners' assumptions. It requires a shift away from the traditional, transmissive role of the teacher to a constructivist and transactional role (Amineh and Asl, 2015), supporting the subjective nature of the construction of knowledge (Fernando and Marikar, 2017). Thus, the student-centred learning environment is possibly the most significant contribution of constructivism to theory and practice in education.

Education has experienced a paradigm shift in instructional design which can be portrayed as a shift from behaviourism to cognitivism initially, followed by a shift from cognitivism to constructivism. This paradigm shift represents a significant change within the field of education with regard to student learning and the circumstances which promote superlative education. This further represents a paradigm shift in the epistemology of knowledge and the theory of learning (Amineh and Asl, 2015; Cooper, 1993). The expeditious scientific and technological advances across modern society have resulted in an exponential increase in the availability of knowledge and ever incessant changing and emerging technologies. This has

created an array of opportunities in the creation of new forms of communication and knowledge internally and externally within educational institutions (Goldie, 2016). Within these knowledge societies the need for lifelong learning is increasingly recognised (Cheston *et al.*, 2013; Flynn *et al.*, 2015; Steffens, 2015) as individuals require the skillset and competence to access relevant information and evaluate resources (Goldie, 2016; Rennie and Mason, 2004). Consequently, an additional learning theory, connectivism, has been established to conceptualise learning in a technological context (Flynn *et al.*, 2015), a unique learning theory as it integrates how people work, learn, and operate within a technological era (Siemens, 2005). Connectivism as an educational theory has a role within agricultural education given the connections between the farm, the family, the place, and the local and wider community associated with farming. It helps capture the tacit, as well as explicit, knowledge base associated with agriculture and farming. The connectivist theory acknowledges that learning is no longer an individualistic activity as external connections affect the learning process (Mattar, 2018). In this instance, learning is no longer an internal construction of knowledge alone; it encompasses the external networks learners can procure (AlDahdouh *et al.*, 2015). Siemens (2006) describes connectivism as a conceptual framework which understands learning to be a network phenomenon predisposed to technology and socialisation. Within the connectivist model, the learning community is expressed as a node which is a member of a broader network which consists of two or more interrelated nodes (Goldie, 2016). The learner is positioned as a researcher becoming a content generator as opposed to a content consumer inspiring learners to ask questions to form connections in an effort to solve a problem (AlDahdouh *et al.*, 2015). Thus, connectivism captures the complexity of learning associated with technology-enhanced learning environments, a nuance that behaviourism, cognitivism, and constructivism were unable to capture. Consequently, connectivism is one of the most significant learning theories established for e-learning environments (Goldie, 2016) as it acknowledges the learning network is not static. Massive open online courses (MOOCs) are the main pedagogical method associated with connectivism, providing an immense network of connections between people and resources that learners can access and use to lead and manage their learning (Goldie, 2016). Such technologies are used to illustrate learning content in a format favourable to learning in the 21st century affording those that are curious and eager to learn the opportunity to increase knowledge and

enhance skillsets (Steffens, 2015). The integration of technology within the teaching and learning process has transformed the traditional mode of practice (Banoor *et al.*, 2018) meaning the learner can experience learning at anytime, anywhere, regardless of education style (Rennie, 2019).

2.3.1 The Science of Instruction and Assessment

The application of science to educational practice results in educational psychology which creates the science of instruction (Mayer, 2018). The science of instruction is concerned with the development of instructional design strategies based on how individuals learn. Appropriate instructional design strategies promote cognitive processes and successful achievement of learning outcomes (Khalil and Elkhider, 2016). Merrill (2002) identified five principles of instruction: (i) learners are engaged with solving real world problems; (ii) new knowledge is generated based on the foundations of prior knowledge; (iii) new knowledge is explained to the learner; (iv) new knowledge is applied by the learner; and (v) new knowledge becomes integrated in the learners' world. The teacher must select appropriate instructional techniques which lead to the creation of an effective learning environment that will result in the acquisition of all five principles. Based on each of the principles the teacher must create real-life learning experiences successfully achieved using problem based learning. The problems must be relevant, interesting, and participative (Jonassen, 1999), positioned on a progression continuum which affords learners the opportunity to move from less complex to more complex problems (Hung, 2009; Reigeluth, 1999). Learners' prior knowledge and experience and the construction of relevant examples are crucial for building the foundations of new knowledge and experiences (Khalil *et al.*, 2010). This is often neglected by teachers as the assumption that all learners have similar backgrounds is made.

Successful instructional design is based on the inclusion of five distinct phases: analysis, design, development, implementation, and evaluation. Integration of the five phases results in a systematic approach to the design and creation of learning experiences (Khalil and Elkhider, 2016). A conscious knowledge of the prior knowledge and experience of the learners in the class is required to enable the teacher to determine the objectives for the lesson prior to the class. This step plays a crucial role in the choice of instructional strategy and is part of the analysis phase of

instructional design. Analysis of the learning process supports the teacher in designing a learning process specific to and capable of supporting the learners being taught. This supports the teacher's choice of instructional and assessment technique based on low cognitive and high mental cognitive levels of instruction chosen (Khalil and Elkhider, 2016). Targeted content can subsequently be developed and delivered based on the analysis and design phase enabling the teacher to arrange communication and dissemination pathways for the information being exchanged. Finally, evaluation, both formative and summative, is imperative to the design and development phase as they enhance instruction and learning materials as the teacher reflects on the teaching and learning process, ensuring both teaching and assessment are in line with learning goals and objectives.

Biggs (1999) documents the importance of constructive alignment which refers to the successful alignment of instructional techniques with learning outcomes and assessment in an effort to support learners in constructing new knowledge (Biggs, 2003). Successful alignment of the curriculum and learning outcomes with instructional and assessment techniques are fundamental to the achievement of professional competence. A well-integrated educational system will promote deep learning and use of higher order thinking skills, subsequently enhancing the effective achievement of professional competence (Biggs, 1996; 2003; 2014). An active, student-centred learning environment supports constructive alignment, requiring the teacher to state the learning outcomes, build an environment which supports learners as constructivists, and choose assessment techniques appropriate to the learning outcomes being assessed (Biggs, 2003). Educational psychology has contributed to the science of assessment through the development of assessment techniques: (i) learning outcomes; (ii) learning processes; and (iii) learner characteristics (Khalil and Elkhider, 2016). Psychologists including Thorndike and Binet created a shift away from cognitive intellect to positioning intellect as an ability based on knowledge acquisition (Mayer, 2003). Bloom's taxonomy (Bloom *et al.*, 1956) signifies an important phase in building taxonomy of learning outcomes that could support specific assessments. Presently, determining learners' existing knowledge, skills, and competences are to the fore of cognitive assessments (Krathwohl, 2002; Pellegrino *et al.*, 2001) resulting in the need for both formative and summative assessment techniques. In particular, formative assessment is

embedded in the teaching and learning process, providing an incessant feedback continuum for both the teacher and the student which Hattie (2012) refers to as visible learning. Incessant monitoring of learners' knowledge, motivation, affect, and meta-cognition aids teachers in the adaptation of instructional technique as a result of feedback obtained (Mayer, 2018).

2.3.2 Learning Styles

The concept of learning style offering valuable insights into learning for both the student and the teacher is a highly contested notion. Learning style theory alludes to the notion that individuals learn in different ways (Pashler *et al.*, 2008; Truong, 2016; Willingham *et al.*, 2015). Researchers and educators have gained increasing interest in learning styles over the period of 30 years with Coffield *et al.* (2004) reporting the development of over 70 theories during that period. As a consequence, there are several widely accepted definitions of learning styles, however one of the most accepted definitions in the literature is provided by Keefe (1979) as a combination of multiple cognitive, affective, and physiological traits that act as stable indicators of how learners perceive, interact with, and react to learning environments. It is widely acknowledged by many researchers that optimal learning occurs in an environment where instructional practices recognise disparate learning styles (Cheng and Chau, 2016; Pashler *et al.*, 2008; Willingham *et al.*, 2015). In this context, learning styles afford teachers the opportunity to gain insight into learner preferences and styles which subsequently supports the design and implementation of instructional techniques tailored to individual learner needs. For learners, it enables them to gain confidence in learning and to optimise learning pathways applicable to their needs (Truong, 2016) as it assists students in the construction of knowledge and understanding with regard to how their learning process works (Feldman *et al.*, 2015). Within education then, based on acceptance of the learning style theory, learning styles have an important developmental role pertaining to the enhancement of learner performance, motivation, increased satisfaction, and a reduction in learning time (Popescu, 2009). Consequently, learning styles contribute to performance and achievement of learning outcomes. Assessment is also considered an important determinant which impacts on student learning consequentially impacting on learning outcomes (Liew *et al.*, 2015; Ramsden, 1985) within this

context, given that learners often adapt their learning approaches in line with demands of assessment (Harris and Bell, 2013).

Learning style models categorise learners in accordance to a scale which reflects the way in which the learner receives and processes information (Felder and Silverman, 1988). Collectively, these models provide a basis for the design and implementation of instructional design as they assist educational practitioners in the identification of individual learner needs (Feldman *et al.*, 2015). Learning style models differ based on model flexibility. On one extreme, learning styles are deemed constitutionally based and fixed compared to the other extreme which acknowledges that behaviour can change over time depending on the circumstance (Truong, 2016). Kolb's learning style model is based on the experiential learning theory (Kolb, 1984) which explains theory as a learning process in which reflection and observation result in concrete experience (Feldman *et al.*, 2015). Kolb's learning theory is a two dimensional model incorporating four learning styles: accommodators, divergers, convergers, and assimilators. The model is developed along two axes; the vertical axis represents learner comprehension of information through experimentation and reflection, while the horizontal axis represents individual learner information processing preferences including concrete observation and abstract conceptualisation (Kolb, 1984). Felder's learning style was developed based on the concept of Kolb's learning style theory consisting of four dimensions which include two opposite learning styles. The first dimension, processing, refers to the way in which information is received and processed to form knowledge. The learner either takes an active or passive stance within this dimension of learning. The second dimension, perception, relates to the type of information the learner requires and includes sensitive and intuitive learning styles. The third dimension, input, refers to learner preferences regarding reception of external information whether it is visual or verbal. Finally, the fourth dimension, understanding, refers to the pathway to understanding which can be sequential or global (Feldman *et al.*, 2015). Consequently, the ultimate aim is to guide learners through various learning style dimensions supporting them in the discovery of their own preferred learning style (Felder and Silverman, 1988). Gardner's theory of multiple intelligences provides another learning style framework which acknowledges several intelligences, suggesting individual learners use two multiple intelligences to maximise learning

(Feldman *et al.*, 2015). Gardner proposed eight forms of intelligence which individuals possess: logical-mathematical, visual-spatial, verbal-linguistic, bodily-kinaesthetic, interpersonal, intrapersonal, musical, and naturalistic (Gardner, 1993). Intelligences are unipolar referring to what individuals can do. In contrast, learning styles are bipolar referring to how individuals like to do things. Therefore, learning styles assist education systems in identifying preferred learning styles whereas intelligence supports the identification of prior knowledge and experience (Feldman *et al.*, 2015). Finally, VARK, a learning style developed by Fleming at Lincoln University, New Zealand, takes account of audio, visual, reading/writing, and kinaesthetic learners. Thus, VARK inventory categorises learners based on their sensory modality preferences which reflect their experiences (Marcy, 2001). In this instance, VARK is a very useful inventory for educational practice as it assists in the selection of a variety of instructional techniques for classroom delivery.

However, the existence of learning styles is a common 'neuromyth' which is widely contested in the literature. Currently, there is no empirical evidence to support the matching of instructional technique with supposed learning styles (Cuevas and Dawson, 2018; Newton, 2015; Pashler *et al.,* 2008; Rohrer and Pashler, 2012), yet within the education sphere, the application of learning styles to instructional technique is a frequent occurrence. Given that the literature fails to provide sufficient evidence to support learning style theory, educators should focus instead on the dissemination of knowledge and information via a range of effective instructional techniques which support successful student learning (Newton, 2015; Rohrer and Pashler, 2012). Therefore, the main focus should be engagement with experience, activities, and challenges that enhance learning for all learners (Pashler *et al.,* 2008) as opposed to focusing on individual learning styles. Learning styles should be disregarded in favour of instructional techniques that are proven to enhance and benefit learning (Cuevas and Dawson, 2018).

2.3.3 Motivation in the Education Context

Education in the 21st century encourages learners to gain knowledge of the past, an ability to interrogate the present, and imagine the future through learner engagement and empowerment to self-regulate learning. As Liu *et al.* (2016) states: 'education is the lighting of a fire, motivation is the torch that lights and sustains the fire' (p. 1).

Motivation is a stimulus which guides the achievement of a result, goal, or action (Gibson, 2018) which is generally defined as the energy, direction, and persistence of behaviour (Howard *et al.*, 2016; Pinder, 1998). A knowledge and understanding of the role of motivation in human behaviour is of particular importance to the education context as teachers promote and encourage self-direction and lifelong learners who can champion the learning process (Liu *et al.*, 2016). Learners' self-related beliefs, cognitions, goals, and experiences form and shape engagement and learning (Linnenbrink-Garcia *et al.*, 2016). Thus, motivation is vital for learners' engagement and support (Pekrun and Linnenbrink-Garcia, 2012).

Value-related constructs help explain why an individual decides to engage in a task with value taking various forms: utility value, attainment value, intrinsic value, and cost (Linnenbrink-Garcia *et al.*, 2016). Academic outcomes, including persistence, performance, and task choice can be predicted using value beliefs (Wigfield and Cambria, 2010). Expectancy-value theory identified two behavioural change indicators: (i) expectancy value, which refers to how successful the individual believes they will be; and (ii) task value, which refers to the degree to which the task will benefit them personally as regards intrinsic interest (Cook and Artino Jr, 2016). Interest in and values for science are supported through activities which guide autonomy, link curriculum to real-life, and generate a connection between theory and practice (Linnenbrink-Garcia *et al.*, 2016). Intrinsic and extrinsic motivations have a close relationship with value and belief in terms of motivation. Intrinsic motivation, where behaviour is driven by internal rewards, and extrinsic motivation, where behaviour is driven by external rewards, influences the achievement of an outcome (Gibson, 2018). Psychologists have discovered that individuals who are intrinsically motivated experience greater interest, enthusiasm, and self-confidence leading to greater performance, persistence, and creativity (Deci and Ryan, 1991; Säfvenbom *et al.*, 2015) in addition to an increased feeling of vitality (Nix *et al.*, 1999; Ste-Marie *et al.*, 2016) plus self-esteem (Deci and Ryan, 1995; Tamir, 2016). These factors combined generally result in an augmented feeling of well-being (Bailey and Phillips, 2016; Benedetti *et al.*, 2015; Ryan *et al.*, 1995). Consequently, the individuals' perception of achieving a result, goal, or action is key in terms of establishing and maintaining engagement (Ryan *et al.*, 1997).

Self-determination theory (SDT) is an approach to motivation which suggests that individuals experience distinct and diverse types of motivations (Howard *et al.*, 2016). This theory uses interactions with the environment to understand actions and circumstances that stimulate activities of individuals, groups and communities (Gibson, 2018; Ryan and Deci, 2000). SDT accounts for peoples psychological needs of autonomy, competence, and relatedness (Gibson, 2018) as intrinsic motivators which accommodate psychological well-being when supported (Jang *et al.*, 2016; Ryan and Deci, 2000). Autonomy is achieved in an environment where individuals' self-direct activities in accordance with their inherent beliefs. Competence is achieved when individuals experience satisfaction as a result of outcomes created under their control. Finally, relatedness is achieved once individuals feel close and connected to significant others in their life (Gibson, 2018; Reis *et al.*, 2000). The SDT is applicable to agricultural education in this context as students achieve autonomy through the teaching and learning process which results in students taking responsibility for their learning within a student-centred learning environment. Students on formal agricultural education programmes are afforded the opportunity to collaborate with fellow students in the form of group activities and project work in addition to educational farm visits and participation in the professional work experience aspect of vocational agricultural education courses. Competence is achieved as a result of the new knowledge and skills learnt and developed through participation on an agricultural programme. Finally, relatedness is highly applicable to the agricultural context given the traditions associated with farming in terms of attachment to place, generational renewal, and the area of succession and inheritance (Baldwin *et al.*, 2017; Grubbström *et al.*, 2014; Lange *et al.*, 2011). Additionally, participation on an agricultural programme affords students the opportunity to build communities of practice as they interact and engage with like-minded people.

When SDT is applied to the classroom context, a teachers motivating style is often influenced by whether teachers support or control individual student's needs (Jang *et al.*, 2016; Reeve, 2009). Thus, teachers' motivating style can have an influence on what, how, and why a teacher teaches the way they do, subsequently influencing instructional techniques chosen by the teacher. The level of satisfaction experienced across the psychological needs will influence whether individuals are intrinsically or

extrinsically motivated (Bauer *et al.*, 2019) as the greater the sense of satisfaction the more likely individuals are to be motivated by internal sources (Deci and Ryan, 1995) viewing themselves as autonomously organised as opposed to externally controlled (Ryan and Deci, 2004). It is also important to note that individuals differ greatly in relation to what generates meaning in their lives (Bauer *et al.*, 2019) and so individuals reap greater reward when they obey their inherent voice (Bauer *et al.*, 2019; Rogers, 2004). Therefore, it is important to consider student participation motivators as each individual student will be motivated by different stimuli. It also becomes important for the teacher to understand what motivates their students in an effort to achieve increased student engagement.

2.3.4 Teacher Professionalism

A decade ago, teachers' professional practice and identity were shaped by different factors compared to the moral and political responsibility placed on teachers to actively profile their professional existence today (Sachs, 2016). Present reasoning and deliberations now surround professional learning as it is widely accepted that the top-down approach to teacher development is not effective resulting in the need for a different form of professionalism (British Educational Research Association, 2014). Professional learning is recognised as a mandatory requirement of the organisation to provide opportunities for improving learner outcomes (Donaldson, 2011), supporting the teacher on a continuous journey in which they take responsibility for their own learning (Watson and Michael, 2016). Similar to any other profession, teachers must consign to continuous professional development, building professionalism at the individual and collaborative level as communities of practice evolve (Seddon, 2008). This is of significant importance given the close association between professional learning opportunities and improved student learning as a result of effective teaching (Hattie, 2012). Teaching has become a complex profession as a result of the expeditious changes in the fields of educational policies and practices (Hargreaves and Goodson, 2002) requiring teachers to have the confidence to experiment with teaching strategies and ideas in their pedagogic work (Nolan and Molla, 2017).

The teacher plays an important role in policy processes given their position in enacting educational policy (Ball *et al.*, 2012). The purpose of education is

multidimensional given its function with regard to particular domains. Biesta (2009) suggested three domains: (i) qualification; (ii) socialisation; and (iii) subjectification. Whilst qualification refers to the acquisition of knowledge, skills, and competencies, education encompasses more than that as it represents individual learner traditions such as cultural, political, professional, and religious traditions, which produce the socialisation domain. In addition, the educational experience has a negative or positive impact on the learner which is captured in the subjectification domain. Although it is possible to provide a clear distinction between each of these domains they cannot be separated as one domain influences another. For example, in the exchange of knowledge to learners the teacher also impact on their learning experience (Biesta, 2015). Given that all three domains are important to the development of the learner, emphasis on academic achievement alone can come at a high price. In the context of this study, the emphasis the Department of Agriculture places on an agricultural qualification to qualify for European grants and funds has potentially had a knock-on effect on student motivation for further education. Positively, it has resulted in a surge in numbers pursuing an agricultural qualification; however, negatively it has impacted on student interest levels within the classroom.

Teachers have a responsibility, not only towards the students they teach, but also towards government and employers with regard to the implementation of policy processes and procedures. Accountability and standards co-exist as a tool for managing and overseeing accountability (Sachs, 2016). Standards are often viewed as an opportunity to control educational contexts through the rigid requirements of student learning outcomes and the need for teachers to constructively align teaching practice with the specified learning outcomes. Mockler (2005) documented concern over the rigid nature of such policies and regulations as they do not build on the nuance of teaching practice, more often resulting in professional objectivity. Therefore, where the focus is on regulation and accountability, the developmental aspect becomes neglected resulting in short, medium, and long term effects (Sachs, 2016). Such circumstances result in an education system which is constantly answering to government sanction which subsequently results in teachers who teach to the curriculum and the final exam, which in the long-term results in a teacher who focuses on technical competence forgetting about the bigger picture. In this instance, the opportunity for teacher professional development in relation to teaching practice

and enhancing pedagogical systems becomes limited as teachers are perceived as technical instructors and implementers of technical knowledge alone (Sachs, 2016). In the case of this study and the context of agricultural education at the vocational level in Ireland, the agricultural teachers within this setting are a product of such objectivity. Hence, this study aims to understand the professional development needs of the agricultural teaching population followed by the development of a professional development tool to support this cohort of educators.

2.3.5 Summary Remarks

Learning theories are fundamental to the development of sound pedagogy as knowledge and comprehension of educational learning theories assists the educator in selecting appropriate instructional techniques that will guide the student towards the desired learning outcomes (Flynn *et al.*, 2015). This is of significant importance given the selection of one instructional technique on its own will limit the learning process and perhaps have a negative impact on learning outcomes (Khalil and Elkhider, 2016). The notion of learning styles having a fundamental role within the education context in terms of guiding and supporting the learner and the teacher on a journey to becoming more self-aware of their strengths and weaknesses as learners (Feldman *et al.*, 2015) is a highly contested notion within the literature. There is a lack of empirical evidence to suggest that learning styles capture individual attitudes and behaviours. However, many still believe learning styles offer teachers the opportunity to provide valuable support and guidance within the learning process. Consequently, a shift in focus towards instructional techniques proven to support effective learning is required. Constructive alignment as documented by Biggs (1999) is important within this instance as the teacher strives to achieve an active as opposed to passive learning environment which promotes deep learning and supports higher order thinking skills. Additionally, a knowledge and understanding of the role of motivation in the teaching and learning process is vital for learner engagement and support as each learner is motivated by different stimuli.

Education is fundamental to national and international policy given that high educational standards are a principal component of competitiveness. As a consequence, greater consideration needs to be given to learning styles and

theories in the planning and designing of educational reforms (Illeris, 2018) to establish and promote better, effective learning opportunities. Furthermore, for effective teaching, an extensive knowledge base, skillset, and ability are essential requirements of the teacher (Juvova *et al.*, 2015). Teacher professionalism has an important role to play within this context as professional identity and practice influence pedagogical competence. Professional development and the opportunity to build professionalism at the individual and collaborative level are fundamental. Subsequently, the next section explores the professional development of teachers, giving consideration to the factors which impact on the success or failure of professional development programmes and opportunities.

2.4 Professional Development of Teachers

Within education, teacher professional development is gaining increasing attention as a support tool for student learning at the vocational level. 21st century skills include a deep mastery of challenging content, an ability to think critically, problem solve, communicate effectively, collaborate and self-direct learning. Sequentially, teachers require the ability to learn and further the pedagogies required to teach these skills (Darling-Hammond *et al.*, 2017). The increasing complexity of the educators workload is as a result of greater societal expectations, lower societal recognition, increased accountability to policy makers, increased rate of pedagogical and curriculum changes, greater need for technological competence, increased student diversity, and increased administrative workload (Dussault *et al.*, 1999; Goodlad, 1984; Hargreaves, 1994; Le Maistre and Paré, 2010).

The importance of CPD in changing teaching practice is widely acknowledged within the literature. Kelchtermans (2004) defines CPD as “a learning process resulting from meaningful interaction within the context (both in time and space) and eventually leading to changes in teachers’ professional practice (actions) and in their thinking about that practice” (p220). Middlewood *et al.* (2005) defines professional development as a continuous process of reflection and review which aligns itself with developmental needs that meet corporate, departmental and individual needs. It also incorporates learning as a process of self-development which lends itself to personal growth incorporating skills and knowledge that aid in the education of the youth (Middlewood *et al.*, 2005). Professional development also incorporates both formal

and informal developmental processes occurring both inside and outside the workplace (Dall'Alba and Sandberg, 2006; National Forum For The Enhancement of Teaching And Learning In Higher Education, 2015). Engaging in professional development activities enhances professional skills, builds on professional knowledge, and contributes to the clarification of professional values which further enhance the student learning experience (Bolam, 2000). However, it is important to note it is not just the professional knowledge attained that is important but the context within which it is attained and subsequently used that assists in providing an understanding of the nature of that knowledge (Kennedy, 2005). Professional knowledge is attained within three major contexts; (i) the academic context; (ii) institutional discussion of policy and practice; and (iii) practice itself (Eraut, 2002; Kennedy, 2005). Hence, there are different potential knowledge acquisition sites within professional development.

It is widely recognised that CPD has an important role in both improving and changing educators teaching practice. Whilst CPD involves meaningful interaction with the context (Kelchtermans, 2004), it is also known that shorter-term CPD programmes can have a significant impact on the individuals involved (Lydon and King, 2009; Van den Bergh *et al.*, 2014). Teacher professional development encompasses a personal and professional journey requiring engagement with new and differing ideas about education, experimenting with teaching practice and evolving classroom practice, in an environment where emotional and personal beliefs are challenged (Day and Sachs, 2004; Girvan *et al.*, 2016). Traditional, teacher-centred models of professional development concentrate on the transmission of knowledge to teachers as it is assumed that teachers' learning is an individual process that results in a direct change in teaching practice and ability (Bausmith and Barry, 2011). However, in practice, several research studies have proven this is not possible in practice and is not the case (Guskey, 2002; Pickering, 2007). While approaches to professional development such as one off events, increases in salaries as a result of graduate qualifications, and time off in-lieu, can help motivate teachers to participate in CPD (Guskey, 2002), they are outdated and do not foster learning, often hindering holistic teacher development (Boyle *et al.*, 2004; Girvan *et al.*, 2016). Recognition of the need to embed teacher learning within teacher's professional practice and educational setting (Borko, 2004; Timperley and

Alton-Lee, 2008) is imperative given that teaching and learning to teach are contextually situated (Girvan *et al.*, 2016). Therefore, CPD needs to build on teachers' principles and knowledge of classroom practices taking account of the classroom, the communities of teachers and students, and the education environment within which the teacher operates (Borko, 2004; Voogt *et al.*, 2015).

There is also huge debate around whether good teachers are born or made. Many people believe that anyone can teach once they know the subject matter well enough or that teaching is better learned through the process of trial and error while on the job (Darling-Hammond, 2000). However, research contradicts such notions showing evidence that teachers with knowledge of teaching and learning are better equipped to become effective teachers. Pedagogically educated teachers have a greater ability to understand their students and to reach out to difficult students or students with learning difficulties for example (Altan and Lane, 2018; Brouwer and Korthagen, 2005; Darling-Hammond, 2000; Hogan *et al.*, 2003; Musset, 2010; Talbert-Johnson, 2006; Winch, 2017). Furthermore, the new pedagogy of realistic teacher education assists teachers in becoming good teachers who have an understanding of oneself at both a personal and professional level as opposed to teaching teachers to know a lot about teaching (Schepens *et al.*, 2009). Consequently, teacher education need not only focus on behaviour, competencies or beliefs, but also incorporate individual teacher's identity and their goal as an educator. Such change will be influenced by the environment, individual educator behaviour, capacities or competencies, beliefs, identity and mission (Dilts, 1990; Schepens *et al.*, 2009). The professional identity of an educator can determine how teachers teach, their professional development, and their attitude towards educational change (Schepens *et al.*, 2009). Therefore, it is important to consider how teacher education might contribute to the development of teachers' professional identity (Beijaard *et al.*, 2004; Korthagen, 2004; Schepens *et al.*, 2009). Moreover, education involves bringing about change in people, in what they know, think and do which is influenced by educators own intrinsic beliefs as these can alter educator's expectation of students within the classroom (Scott and Dinham, 2008). Thus, teacher identity is not static and involves changing perceptions as a result of exposure to who, where, and how they work (Olsen, 2008). Teachers' self-efficacy and professional development along with their ability and readiness to cope with

educational change and to apply innovations in their teaching practice are influenced by the teacher's perception of their professional identity (Beijaard *et al.*, 2000). Consequently, a key feature of a professional development programme would be facilitating teachers in exploring their professional role to conceptualise new understandings of themselves as practitioners.

2.4.1 Aspects of Professional Learning

Teachers' workplace learning activities have been well documented in the literature (Geeraerts *et al.*, 2018; Meirink *et al.*, 2009; Van Eekelen *et al.*, 2005) including learning by experimentation, interaction, use of external sources, and self-reflection (van den Bergh *et al.*, 2015). Learning activities can occur individually or collaboratively resulting in differing learning outcomes as individual thinking processes differ (Bakkenes *et al.*, 2010). The thinking processes that guide teachers' learning activities are referred to in the literature as 'regulation processes' (Butler *et al.*, 2004; van den Bergh *et al.*, 2015). Endedijk *et al.* (2012) discovered two dimensions of teachers' regulation of learning; the active-passive dimension and the prospective-retrospective dimension. Teachers regulate individual learning within the active-passive domain with passive regulators portraying reduced self-regulation when compared to the active regulators who seek information and knowledge to steer their learning. The second dimension explains the variation in regulatory focus. The prospective domain takes account of the planning and goal-setting phase while the retrospective regulation domain considers the monitoring, reflection, and evaluation phases within the learning process (van den Bergh *et al.*, 2015). Many studies detail the significance of the informal learning process in regulating teachers' learning in the workplace (Lourenco and Ferreira, 2019; Roth *et al.*, 2016; Van Eekelen *et al.*, 2006), however formal learning opportunities are equally important given that teachers' goals within the workplace are focused around ensuring student learning and success, often ignoring their own learning as teachers (van den Bergh *et al.*, 2015). Thus clear professional development goals are needed alongside the unplanned, ad hoc learning activities associated with informal learning. Additionally, planned, organised learning environments often result in greater learning and achievement of outcomes when compared to informal learning (Bakkenes *et al.*, 2010; Hoekstra and Korthagen, 2011).

The learning pattern encompasses teachers' learning and regulation activities by giving attention to the learning activities employed, beliefs about learning, and learning motivation (Vermunt and Endedijk, 2011). Van den Bergh's *et al.* (2015) study identified three different types of learning patterns: (i) an immediate performance directed pattern; (ii) a meaning directed pattern; and (iii) an undirected pattern. Firstly, the immediate performance directed pattern refers to the immediate aim to improve performance in the classroom. Secondly, the meaning directed pattern comprises those who intend to gain a knowledge and understanding of the underlying principles of teaching practice and thirdly, the undirected pattern encompasses those who avoid learning as a result of a negative experience in the implementation of educational innovation (Vermunt and Endedijk, 2011). In this context the third learning pattern dimension can also be found in student learning where consideration is given to a lack of regulation and not knowing how to learn effectively while second guessing their own capabilities (Donche and Van Petegem, 2009). Contextual and personal factors impact on the learning patterns employed as external stimuli and support within the workplace as well as personality traits and existing knowledge, beliefs, and attitudes (Clarke and Hollingsworth, 2002; Van Petegem *et al.*, 2005) influence such patterns. An additional personal factor, important as a prerequisite for professional learning, is willingness to learn, given that some teachers don't see the point in learning and others depict great enthusiasm to learn (Van Eekelen *et al.*, 2006).

As alluded to in section 2.4, professional development is an ongoing process of reflection and self-evaluation, embarking on a developmental journey that meets organisational, departmental, and individual needs. Learning on the other hand is an ongoing process of self-development and personal growth resulting in the acquisition and advancement of skills and knowledge necessary to facilitate educational instruction and learning (Fraser *et al.*, 2007; Middlewood *et al.*, 2005). Therefore, the professional development and learning journey is complex as it encompasses the inter-related aspects of the personal, social, and occupational qualities of the individual, the organisation, and the department. Bell and Gilbert (1996) suggest individual desire for professional development to accommodate change originates within the personal aspects of professional learning. Subsequently, in England and Scotland for example, giving teachers choice and control of learning opportunities is

deemed important (Dillon *et al.*, 2000; Institute for Science Education in Scotland, 2005). Additionally, professional development opportunities should take account of learners' prior knowledge, experience, and expertise (Clarke and Hollingsworth, 2002) given that learning integrates theory and practice (Fraser *et al.*, 2007). Individuals learn through a multitude of modes which Reid's quadrants acknowledge. Reid's quadrants of learning consist of two dimensions, the formal-informal and the planned-incidental (McKinney *et al.*, 2005). On one axis, formal opportunities are created by external parties and not the individual whereas informal opportunities are generally sought and created by the individual. On the other axis, planned opportunities can be both formal and informal but tend to be pre-arranged whereas incidental opportunities are unplanned and changeable. Thus, Reid's quadrants represent polarised positions which integrate the learning opportunities available to teachers.

2.4.2 Adult Learning Theories

The science of adult education is referred to as the theory of andragogy, developed by Knowles to generate educational philosophies centred around the needs of adult learners encompassing both life and career experiences in the learning context (McCall *et al.*, 2018). The nexus of adult education is the learner-centred approach to development as the teaching process focuses on the learner needs (Moore and Shemberger, 2019). It is a constructivist approach to learning as it facilitates prior knowledge and experience of the group being taught creating an opportunity for new learning (Cox, 2015). Knowles *et al.* (2005) identified six andragogical assumptions: (i) learners need to know; (ii) learner's self-concept; (iii) learner's prior experience; (iv) readiness to learn; (v) orientation to learning; and (vi) motivation to learn. These assumptions are appropriate for adult learners given the requisite to address adult learner needs. The assumption that adult learners need to know prior to partaking in a learning environment is a distinguishable feature of the mature learner. Disparate to the pedagogical learners' need to know which is driven by what they need to know to pass an examination, the adults' need to know is stimulated by the desire to learn relative to their personal and professional lives (Ferreira *et al.*, 2018). The introduction of technology has impacted education resulting in the need for teachers to change their instructional technique (Horsley, 2010). Adult learning techniques have evolved beyond the passive learner to an environment which supports active

learning (Turcsányi-Szabó, 2012). This transformation of roles requires educationalists to consider andragogical assumptions in their theory and practice. However, the transformation of theory to practice can be challenging, which positions transformational theory, and an understanding of same, at the nucleus of adult learning theories.

Within contemporary societies, an understanding of the meaning of experience and the ability to interpret experiences, as opposed to act on them, is the fundamental goal of adult learning (Mezirow, 1997). Encouraging learners to become autonomous thinkers with the ability to critically evaluate meanings, values, and purposes is the ultimate goal. Transformative learning stimulates a shift in thinking with regard to frames of reference – associations, concepts, values, feelings, and conditioned responses – frames of reference which define an individual's existence. Critical reflection and changing habits and points of view contribute to transformations (Mezirow, 1997; 2000) through a constructionist philosophy within a social context (Cox, 2015). Mezirow (1990) suggested individuals experience several phases of transformation including self-examination, critical assessment of assumptions, exploring options, planning a course of action, reintegrating, and critical reflection. Within teaching, emancipatory transformative learning is fostered through critical reflection, by engaging a facilitation approach to teaching, and establishing a positive student-teacher relationship equally shared between both parties (Taylor, 2008). In an environment where learning is secure within the existing frames of reference does not result in transformative change. Thus, critical reflection is required to encourage individuals to challenge assumptions and the taken-for-granted frames of reference. Consequently, new information is merely a resource for adult learners as they endeavour to form meaningful learning by incorporating new information with the particular symbolic frames of reference (Mezirow, 1997). Therefore, transformative learning in the adult context is very different to the pedagogical context. Adult learning research continues to investigate the theory of transformational learning resulting in considerable implications for teaching practice. The dominant theory of andragogy within the literature is being challenged and replaced almost by the theory of transformational change (Taylor, 2008) as scholars are challenged to explore transformative learning beyond the definition provided by Mezirow in the 90s. New insights and perspectives within adult education literature highlight the complex

nature of the philosophy of transformative learning explaining it is more than a series of instructional techniques employed in the teaching of adults (Bernard, 2019; Flierl and Hamer, 2019).

Experiential learning theory is grounded in the experimental work of Dewey, Lewin, Piaget, Freire, Rogers, and others. The experiential learning process centres experience around learning, offering an holistic learning environment where interactions occur between individuals and the environment, merging experience, perception, cognition, and behaviour (Kolb and Kolb, 2009; McCarthy, 2010). The theory is constructed around six propositions: firstly, learning is best conceived as a process and not linear; secondly, all learning is relearning and facilitation of the learning process, drawing on the knowledge, experiences, beliefs, and values of the learners is optimal; thirdly, learning requires the resolution of conflicts, as the greatest learning occurs in an environment where conflicts, differences, and disagreements occur; fourthly, learning is an holistic process comprising of cognitive as well as social and personal processes; fifthly, learning is the outcome of positive interaction with the person and the environment; and finally, learning is a process of knowledge creation. Thus the transmissive stance of the passive learner is replaced with the constructivist theory of knowledge creation (Kolb and Kolb, 2005). The experiential learning theory refers to the process of knowledge creation through transformative experience (Kolb, 1984). The model is a cyclical process of learning, portraying two dialectically related modes of comprehending experience – concrete experience and abstract conceptualisation – and two dialectically related modes of transforming experience – reflective observation and active experimentation (Kolb and Kolb, 2009). The experiential process of constructing knowledge within this context requires creative tension among the four learning modes (Kolb and Kolb, 2009; McCarthy, 2010). Learning is regarded as a four stage cycle where the learner must embark on each stage, touching all bases – experiencing, reflecting, thinking, and acting – within a contextual environment. Concrete experiences are the product of observation and reflection, while abstract concepts are the product of new information and knowledge generated. However, it is important to mention the learner can enter the cycle at any stage (Kolb and Kolb, 2009; Kolb, 1984; McCarthy, 2010).

There is a long history of experiential learning within the education and management training field as experiential learning is a key actor in human development and the way individual learning shapes professional development (Kolb and Kolb, 2009). The traditional teacher professional development approach has diminished internationally resulting in a new focus towards teachers becoming active participants in both their personal and professional development roles whereby learning is encouraged through reflective practice techniques (Clarke and Hollingsworth, 2002). This growth in professional development and the participant as an active, reflective being has resulted in professional development becoming underpinned by experiential learning (Girvan *et al.*, 2016). As detailed in the previous paragraph, experiential learning promotes inquiry-based, problem solving learning techniques, however the focus still remains on the lived experience and the ability to reflect, think and act. Therefore, comparable to professional development, experiential learning encompasses the process of change within an individual. Within professional development, it has been documented that this approach to learning often results in teachers experimenting with new practices and causing changes to practical reality (Darling-Hammond and McLaughlin, 2011). Thus, reflection enables teachers to learn from their experiences in a conscious and systematic manner (Korthagen, 2017).

The way in which people learn is evolving (Blaschke and Hase, 2014), resulting in a shift in the education and training of learners. The skills required to be an effective learner in the 21st Century have progressed towards that of an active as opposed to passive position as learners become analysts and synthesisers of information (Blaschke and Hase, 2016, p26). Within the education context, this results in the teacher assuming the facilitator role in contrast to claiming the expert role within an educational environment. The technological revolution has transformed how people access and share information, knowledge, and skills, challenging education providers to adopt teaching and learning techniques which maximise technological affordances (Blaschke and Hase, 2019). Given the complex and rapidly changing contexts within which educators function, competence alone is not sufficient as people also require capability within unknown contexts which extends beyond competence (Mann *et al.,* 2017). A recent contribution to learning theory is heutagogy, which is defined as the study of self-determined learning (Blaschke and Hase, 2019), acting as an extension of andragogy (Blaschke, 2012) and building on

learning theories such as constructivism and connectivism. In contrast to andragogy, heutagogy supports the learner in becoming an agent for their own learning based on personal experiences (Hase and Kenyon, 2007, p112). The learner and teacher engage collaboratively in the learning process, allowing the learner to determine what will be learned and how (Blaschke, 2000; Blaschke and Hase, 2016), placing the learner at the centre of the learning process. This approach is of significance to the training of educators given the complex and multifaceted environment within which they function, requiring the capability and competence to work within a rapidly changing educational environment. Consequently, heutagogy presents the opportunity for more self-directed learning which supports the establishment of learning experiences influenced by individual educator's professional practice. Within this context, learners are expected to heutagogically advance towards full, personal understanding of a concept or phenomenon (Smith, 2017). Within heutagogy, self-reflection is a key concept characterised by single- and double-loop learning, where the learner not only reflects on what is taught (single-loop) but on why and how it is taught (double-loop) and the influence this new knowledge has on individual values and beliefs (Blaschke and Brindley, 2011; Blaschke and Hase, 2019). Thus, heutagogy supports learners in formulating new knowledge and understanding, with Smith (2017) concluding that enabling adults to learn for themselves results in more effective learning and better teaching. Heutagogy presents informal learning opportunities, in addition to formal, as learner's progress towards capability, representing the learner's ability to demonstrate competence in unique and unfamiliar contexts (Blaschke and Hase, 2019). Therefore, in summary, heutagogy theorises the positive effects of learner agency in encouraging learner self-efficacy and capability, through the application of cognitive and metacognitive skills such as critical thinking and self-reflection, in the development of educators as reflective practitioners and lifelong learners.

2.4.3 Continuous Professional Development Models

Teacher professional development opportunities take a variety of forms with implications for various stakeholders. CPD models tend to fall on a continuum of adaptability (Borko *et al.*, 2011; Koellner and Jacobs, 2015) ranging from highly adaptive to highly specified. Highly adaptive CPD models respond to the goals, resources, and circumstances relative to the professional development context.

Highly specified CPD models propose specific content, activities, and materials resulting in predetermined professional development experiences. Thus, there are a variety of CPD models which lie at a point on the continuum of adaptability which subsequently influences the professional development experience, encompassing both the top-down and bottom-up approach to professional learning and development activities. This section discusses a range of CPD models and their potential contribution to the professional development needs of teachers.

The Training Model

The Training Model of CPD is widely understood and arguably a dominant force in the professional development of teachers. This model supports teachers in the development of technical skills required to teach and demonstrate professional competence. A traditional, top-down approach is typically applied in the delivery of content from the 'expert' instructor to the 'novice' learner with the learner taking a passive stance within the development process. This type of training is typically delivered in a neutral setting outside the school/college environment (Kennedy, 2005). This presents challenges in terms of the 'problem of enactment' as teachers learn new concepts and ideas outside the classroom but yet enact differently within the classroom as a result of habit and the lack of connection to the classroom context (Kennedy, 2016). Consequently, this CPD model portrays a narrow view of teaching and education as the standards-based view of professional development conceals the need for teachers to be proactive in recognising and fulfilling their individual professional development needs.

The Award-Bearing Model

The Award-Bearing Model places significance on the attainment of a qualification validated by a university typically. Generally, award-bearing professional development programmes happen over one academic year (King *et al.*, 2018) with the aim of developing teachers content knowledge (Brigham *et al.*, 2011) and classroom practice (Desimone, 2009). Such programmes tend to facilitate active and inquiry-based learning which promotes effective pedagogical change (Desimone, 2009; Vermunt and Endedijk, 2011).

The Deficit Model

The Deficit Model is a professional development programme specifically designed to address the CPD needs of the teaching cohort. This model encompasses performance management (Kennedy, 2005) which requires an individual who accepts responsibility for the evaluation and management of teacher performance. Importantly, both organisational and management practices as well as the individual can impact on teacher performance (Rhodes and Beneicke, 2003) and so it is important to consider individual CPD needs within the context of the environment they are working in.

The Cascade Model

The Cascade Model includes teachers who have attended training events and subsequently exchange knowledge obtained with colleagues (Kennedy, 2005). This type of CPD model is often employed within organisations where resources are limited as it enables the widespread exchange of knowledge across an organisation without the need for significant investment in individuals. On the downside, such professional development programmes tend to focus on knowledge and skills, excluding values (Solomon and Tresman, 1999), and so failing to incorporate the why, what, and how of teaching (Nieto, 2003). Therefore, the learning styles and preferences of the learner within the cultural context of their working environment are not considered.

The Standards-Based Model

The Standards-Based Model represents a teacher system which embodies the connections between teacher effectiveness and student learning (Beyer, 2002). This model does not give consideration to the socio-cultural or context-specific environment within which teaching and learning takes place. Thus, the framework does not support critical enquiry or reflective practice, discouraging teachers from taking responsibility for their own professional development needs (Kennedy, 2005; Smyth, 1991).

The Coaching / Mentoring Model

The distinguishing feature of this model is the significance of the one-to-one interaction between teachers in supporting professional development (Kennedy, 2005). Teacher coaching has a deep history in educational practice dating back to

the 1980s (Joyce and Showers, 1982; Showers, 1985) as a feature of professional development which supports the teachers ability to apply theory to practice (Joyce and Showers, 2002; Kraft *et al.*, 2018). Mentoring is a tool often used to support beginning teachers as they embark on their journey as educationalists (Strong, 2009; Wang, 2019). Mentoring and coaching both represent a collegial relationship between colleagues which requires strong interpersonal skills to ensure its success (Rhodes and Beneicke, 2003). Mentoring and coaching can be positioned within a transmissive or transformative professional development space depending on the type of interaction occurring (Kennedy, 2005). Therefore, both mentoring and coaching have a role to play within the professional development of early career and advanced educationalists.

The Community of Practice Model

The CPD model of mentoring and coaching is closely linked to the Community of Practice Model as both professional development frameworks orbit the connections and relationships developed between colleagues (Kennedy, 2005). The value of learning in this context is situated in the powerful interactions of several individuals' knowledge and experience which contribute to the generation of new knowledge (Boreham, 2000) within a community of practice. Within education, there is ample opportunity to create communities of practice and incorporate them into the professional development strategy of an education system as they create powerful sites for transformation, where individual knowledge and experience are combined through collective endeavour (Kennedy, 2005).

The Action Research Model

Action Research refers to the social situation involving all participants as researchers working together to enhance the quality of action (Day, 2002; Norton, 2018). Teaching and research activities should co-exist (Schapper and Mayson, 2010) as one compliments the other. In this context, it includes a community of practice as the whole community engages in the research; however, this is not to say that a community of practice must exist for action research to occur.

The Transformative Model

The Transformative CPD Model is not distinctly definable (Kennedy, 2005) as it combines practices and circumstances relative to the other models discussed in this

section. Thus, this type of professional development model integrates the range of models discussed in an attempt to realise transformative practice. Mezirow discovered the transformative learning theory, stating that adult learners learn experientially, making meaning of their experiences. The theory also details how the social environment and other structures have an impact on the learning experience and how the dynamics involved in change alter learners' perception of learning (Christie *et al.*, 2015; Mezirow, 1991). Therefore, the transformative CPD model approaches a teacher-centred, context-specific model of professional development as it takes account of inquiry-based learning within communities of practice giving consideration to the influence of power and accountability. The multifaceted blend of CPD models within the transformative model offers flexibility with regard to the professional development of skills and competencies.

2.4.4 Behavioural Change Theories

Behavioural change theories provide a theoretical basis which underpin and help explain changes in behaviour. The application of such theories in the area of health, education, criminology, international development, etc. have gained increasing interest over the past number of years in an attempt to contribute to the understanding of behavioural change and enhance services within these areas. A number of different behavioural change theories are documented in the literature but this section discusses the most predominant theories of social learning and social cognition, theory of reasoned action, and the theory of planned behaviour as they relate to teacher education and the professional development of this cohort.

Human behaviour is frequently described in terms of unidirectional causation where behaviour is controlled and shaped by the environment and inherent personalities (Bandura, 2009). Social cognitive theory provides an agentic conceptual framework which helps explain human thought, affect, and action as individuals are self-organising, proactive, self-reflecting, and self-regulating agents (Bandura, 1999; 2009). Therefore, both personal and behavioural elements shape experience as well as environmental events. Individuals use motor, sensory, and cerebral systems in accomplishing tasks and goals that provide meaning and direction (Harré and Gillett, 1994). These conjoint dispositions of human functioning suggest that individuals contribute to their own wellbeing through emotional, cognitive, and motivational

practices resulting in increased behavioural competence and changed environmental conditions (Schunk and DiBenedetto, 2016). Cognitive factors regulate the observation of environmental events, the interpretations, the lasting effects, the emotional impact, and the motivational power. The cognitive processing at each stage will impact the individuals' preconception of meaning, form, and continuity of experiences (Bandura, 2009). Within the education context, teachers can use social cognitive theory to influence students' emotional, behavioural, and environmental stance (Schunk and DiBenedetto, 2016) as social factors influence cognitive functioning (Bandura, 2009). Fundamental to the theory of social cognition is self-efficacy (Mailey *et al.*, 2016) as individuals are self-reactors with an ability to self-direct (Bandura, 2009). Self-efficacy has an impact on individuals' interests, efforts, and expected outcomes as a result of interaction with the environment and one's self (Joët *et al.*, 2011; Moos and Azevedo, 2009). Within an educational context, it influences the choices people make (Patall, 2012) and teacher self-efficacy refers to a teachers' belief about their proficiency to assist student learning (Klassen *et al.*, 2011; Woolfolk Hoy *et al.*, 2009). The greater the teachers' self-efficacy the more likely the teacher is to adopt challenging activities and contribute to enhanced student learning (Schunk and DiBenedetto, 2016). Collaborative self-efficacy also has a role within the educational context given that teachers form part of a team, working collegially towards a shared common objective. Within this environment, teachers have the opportunity to learn from each other, look up to role models or more experienced teachers, and to receive encouragement and support from others within the team. This helps alleviate stress and supports teachers in managing challenging difficulties (Henson, 2002; Schunk *et al.*, 2008).

Fishbein and Ajzen (1975) developed the theory of reasoned action to contribute to the explanation of behavioural intentions. Behaviour was considered a fundamental predictor of human intentions (Ajzen and Fishbein, 1980) as humans take a systematic approach to the processing of available information (Zhikun and Fungfai, 2009). An individual's intention to engage in a behaviour is central to the principle of the theory of reasoned action (Paul *et al.*, 2016) as social psychologists attempt to understand what, why, and how individual behaviour changes over time (Otieno *et al.*, 2016). The theory of reasoned action has been extensively studied within social psychology (Eagly and Chaiken, 1983; Malhotra and McCort, 2001) which

documents successful implementation of the theory in the prediction of behavioural intentions across disciplines including marketing and consumer behaviours (Choo *et al.*, 2004; Lam and Hsu, 2004), dieting, condom use, consumption of genetically engineered foods, and limiting sun exposure (Hoffmann *et al.*, 1999; Otieno *et al.*, 2016). The theory can be extended to the education field in an attempt to understand why, what, and how teachers change their approach to teaching and learning and use knowledge of theory and practice to guide their teaching philosophy for the betterment of student learning. The concepts of behavioural intention, attitude, and subjective norm contribute to the formulation of the theory of reasoned action. An individual's behaviour is governed by their intention to implement a behaviour while intention refers to the individual's attitude towards the behaviour (Otieno *et al.*, 2016). Therefore, behavioural intention determines the individual's likelihood to implement a given behaviour while giving consideration to the motivators and attitudinal factors at play (Ajzen, 1991; Otieno *et al.*, 2016). Subjective norm refers to an amalgamation of the perceived expectations associated with the consequences of implementing the behaviour (Fishbein and Ajzen, 1975; Otieno *et al.*, 2016). Thus, behavioural intention is the product of the combination of attitudes and subjective norms which help predict actual behaviour. Success of the theory in explaining behaviour is contingent to the level of volitional control and so perceived behavioural control was added to the theory of reasoned action to include factors outside the individual's control that has an impact on behaviour. This resulted in the creation of the theory of planned behaviour (Montano and Kasprzyk, 2015). Hence, the theory of planned behaviour is an extension of the theory of reasoned action.

Attitude towards a behaviour refers to the perception of the behaviour in the individuals' eyes as they evaluate the situation (Ajzen, 1991) and consider the consequences of engaging in the behaviour (Leonard *et al.*, 2004; Ramayah *et al.*, 2010). Attitude refers to the psychological emotion embedded in the evaluation of the behavioural circumstance where positive psychological emotion often results in positive behavioural intentions (Chen and Tung, 2014). The subjective norm encompasses the influences of external parties on the individual's decision to engage in a behaviour, capturing social pressure (Paul *et al.*, 2016). Finally, perceived behavioural control captures past experiences, predicted challenges, and perception of the level of difficulty associated with the behaviour. This incorporates

the concept of self-efficacy as discussed previously within social cognitive theory, given that ability to perform a behaviour is closely linked to the individual's confidence in their ability to implement the behaviour (Abraham and Sheeran, 2017; Cooke *et al.*, 2016; Madden *et al.*, 1992). Thus, behavioural intention and subjective norm are two constant factors within the theory of planned behaviour, however perceived behavioural control is a changeable factor influenced by the individual's perception of capability (Montano and Kasprzyk, 2015). Consequently, the theory of planned behaviour broadens the applicability of the concept of the theory of reasoned action (Conner and Sparks, 2005) as it is used as a tool to predict the probability of behavioural change. Individuals' behavioural beliefs, normative beliefs, and control beliefs influence attitudes, subjective norms, and perceived behavioural control assisting in the prediction of the probability of behavioural change occurring (Anton and Lawrence, 2016). Within a positive environment, the likelihood of achieving behavioural change is increased. Therefore, it can be said that according to the theory of planned behaviour the potential for behavioural change within an education context is greater within a positive cultural context.

2.4.5 Summary Remarks

As the complexity of the teachers' workload heightens in line with greater societal expectations, the need for appropriate, relevant, and context-specific CPD opportunities intensifies. Behavioural change and adult learning theories help shed light on the factors that contribute to successful CPD opportunities, influencing teacher behaviour from a theoretical and practical perspective. The teachers' learning process is both complex and dynamic (Hoban, 2007; Jörg, 2011) given the multifaceted levels that co-exist. Korthagen *et al.* (2013) described an effective teacher as an individual who strongly aligned the layers of the onion model subsequently impacting positively on the environment in terms of the competencies, behaviours, and characteristics acquired. The onion model incorporates competencies as an important layer, however, the relationship between the layers are what results in an effective teacher. The more a teachers' professional role and behaviour is manipulated by the teachers' core qualities, the greater the evolution of emotions within the teacher and the more effective the teacher will be (Boniwell, 2012; Fredrickson, 2009). The range of CPD models discussed in Section 2.4.3 follow the trajectory of professional teacher autonomy taking account of the

progression pathway from transmission to transitional to transformative practice. As professional development does not occur in a vacuum it must be viewed through different lenses to encompass all the different potential CPD opportunities available to teachers and the factors for consideration in the development of a professional development framework or programme for teachers. Therefore, just like students, teachers learn differently and have variable learning needs. In the context of this study, given the focus towards exploring teachers' professional development needs, an understanding of what influences adult learning, behavioural change, and the impact of different CPD models on professional development opportunities is imperative.

2.5 The Conceptual Framework

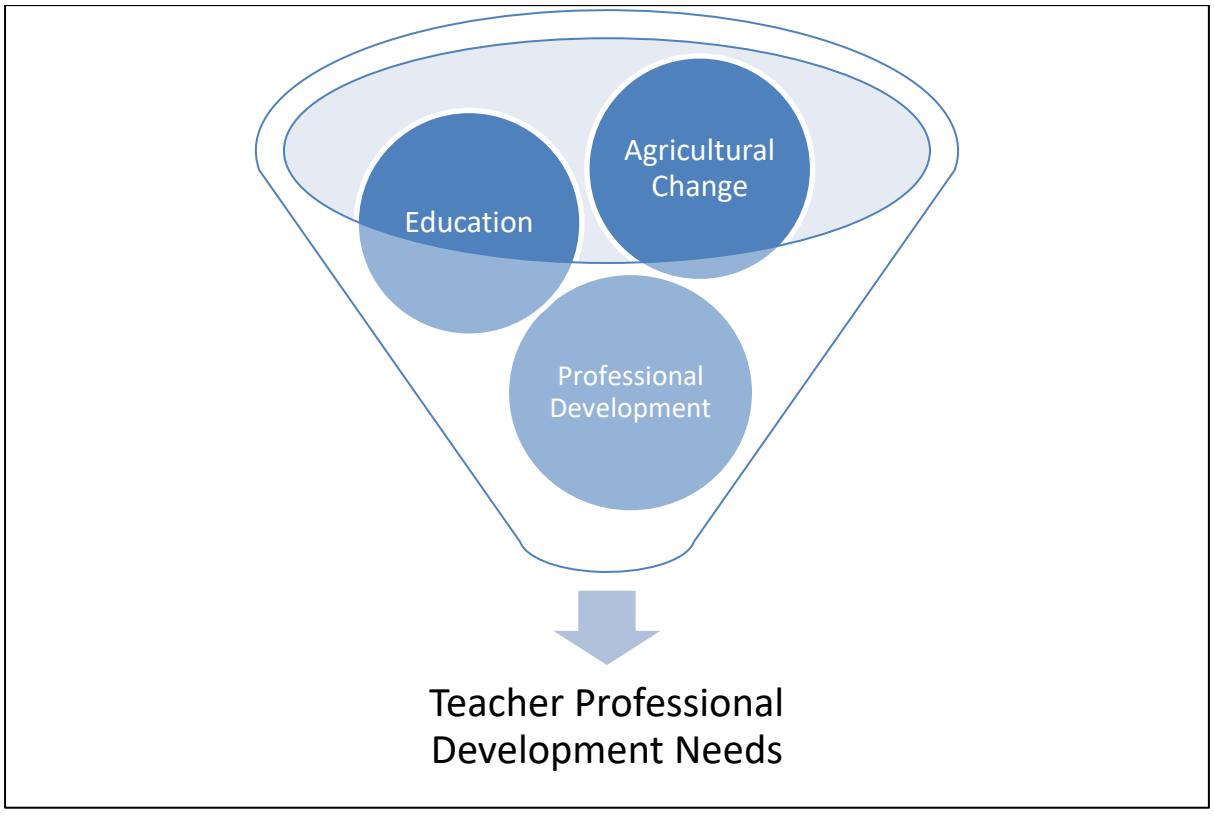

Figure 2.1: The Conceptual Framework

Agricultural change, pedagogy in education, and teacher professional development contribute to the debate of the professional development needs of agricultural teachers in their role as educators. While the significance of professional development to both the employer and employee has been well established in the literature, little is known about the specific professional development needs of

teachers in the agricultural context and so consideration must be given to both the agricultural and pedagogical context in exploring professional development needs and opportunities.

Agricultural change and the shift from productivism to post-productivism to multifunctional agriculture to neo-productivism highlight the multifaceted, complex relationships surrounding agricultural processes. Rising global populations and the need for increased food production to meet rising global demand resulted in the need for greater intensification of agricultural production systems. However, the effect of agriculture and the different production systems on the environment and the need to grow exponentially raised concerns regarding sustainability and the impact of agriculture on the environment. Consequently, new 'isms' evolved in accordance with changes in agricultural practice placing an emphasis on environment and sustainability within contemporary agricultural pathways. Sustainable rural development and ensuring rural resilience are important factors for consideration within this context. Education plays a fundamental role in the social, personal, and economic development of rural youth as they play a pivotal role in the sustainable development of rural communities, inheriting a responsibility for the land, the environment, and the community in which they reside. Consequently, education and professional development are important in this instance.

Education and the teaching and learning process have evolved over the centuries as a shift in the role of an educator towards a facilitator of knowledge exchange as opposed to an 'expert' teacher who transmits knowledge to the 'novice' learner was replaced with a student-centred learning environment. The traditional approach to teaching involved the teacher-centred environment with little to no interaction from the learners in the education process. This represents behaviouristic education. An understanding of the cognitive learning process became apparent and teachers began to understand that, for successful learning to occur, the knowledge and information received by the learner must reside in the long-term memory. To achieve this, activating, student-centred learning instructional techniques were required, placing the learner at the centre of the learning process. As a consequence, teachers had to reflect on their own teaching practice and make a shift away from the traditional style of teaching towards an environment where they behaved as a guide, directing learners in the learning process, encouraging them to become self-

directors of their own learning, adopting the ability to think critically and challenge ‘norms’. Subsequently, knowledge of individual learning styles, individual motivators, and the influence of teacher professionalism and identity on the learning process required some consideration. In this context, teacher professional development becomes imperative as teachers require new knowledge, skills, and competence to successfully direct the learning process and ensure effective teaching in an era where emerging technology remains constant.

Teacher professional development is a support tool for student learning as teachers master the pedagogies required to ensure effective teaching and successful learning within a rapidly changing, evolutionary teaching and learning environment. Professional development affords teachers the opportunity to develop both personally and professionally as they discover new instructional techniques, educational philosophies, and an increased ability to understand individual learning needs and requirements. Subsequently, learner engagement increases as the teacher has a greater ability to select instructional techniques suitable to individual learning needs enhancing their effectiveness as teachers. A comprehension of learning theories, learning styles, and the role of motivation in the teaching and learning process are imperative in this case and so teacher professional development has a role to play in providing this knowledge and information to teachers. However, the success of professional development opportunities depends on the type of CPD model employed and the contextual development of CPD programmes and opportunities in line with cognition of behavioural change theories and the science of adult learning. Thus, the complex, multifaceted levels associated with the philosophical assumptions of education become crucial to the development and implementation of professional development opportunities.

In conclusion, the concepts of agricultural change, pedagogy in education, and professional development of teachers are three key pillars in the exploration and identification of agricultural teachers’ professional development needs within the teaching and learning process. These three pillars form the basis of the conceptual framework (Figure 2.1) which provides a conceptual foundation for the thesis bringing together an explicit arena for analysis from a contemporary perspective.

Chapter 3: Setting the Context of the Study

3.1 Introduction

Agricultural education is the teaching of agriculture, natural resources and land management through hands-on experience and guidance to prepare learners for the agricultural industry (Bird *et al.*, 2013; NAAE, 2017; Rubenstein *et al.*, 2014). Such education equips learners with the necessary knowledge, skills, and capabilities required to progress within the agri-food sector. Agriculture is not just farming; it's a sustainable way of life within a rapidly expanding technological environment, and education has a significant role to play in the development of the future generation of young farmers. The agricultural education learning cycle encompasses three components; classroom learning, practical learning, and experiential learning through work experience/student placement. In Ireland, undergraduate and post-graduate agricultural degree programmes are delivered at National Universities of Ireland and Institutes of Technology. Vocational, practical Level 5 and Level 6 agricultural programmes are delivered within further education colleges, mainly Teagasc. University College Dublin, Waterford Institute of Technology, Tralee Institute of Technology, Limerick Institute of Technology, Galway Mayo Institute of Technology, Dundalk Institute of Technology, and Cork Institute of Technology are all involved in the delivery of Ordinary and Bachelors Agricultural Degree programmes. Teagasc is the main provider of accredited Certificates and Advanced Certificates in vocational education for the land-based sector in Ireland. In addition, Teagasc has strong links with higher and post-graduate education delivery as a result of its extensive partnership with the higher education sector (Teagasc, 2019a). This collaboration partnership supports the delivery of agricultural programmes within the higher education sector by acting as a technical knowledge base for these learners in addition to supporting progression opportunities for learners on the Teagasc Level 6 vocational education programmes.

The purpose of this chapter is to set the context for the study. The first section provides a background to vocational education and training (VET) followed by an explanation of the national education framework in Ireland. This helps the reader understand the positioning of VET on both national and international education

frameworks. The third section details the history of agricultural education at the VET level in Ireland followed by an exploration of the agricultural programmes delivered by the statutory body in Ireland. The final section outlines the recruitment of VET educators across different organisations both nationally and internationally with all five sections coalesced in the form of a conclusion at the end of the chapter.

3.2 Vocational Education and Training Sector

Vocational Education and Training (VET), also known as Further Education and Training (FET) across Ireland and the United Kingdom, incorporates education and training that takes place post-secondary school but is not part of the third level system (Department of Education and Science, 2004). The sector is responsible for the delivery of Level 1 to Level 6 qualifications on the National Framework of Qualifications (NFQ) (SOLAS, 2019). Irish government ministries known as departments are responsible for education and training across the island. The Department of Education and Skills (DES) is responsible for education and training at the primary, secondary, and tertiary level. However, vocational agricultural education is an exception; the Department of Agriculture, Food and the Marine (DAFM) is responsible for agricultural education and training at the vocational level in Ireland. Teagasc are largely responsible for the delivery of vocational agricultural education programmes as they have a statutory remit to provide and procure education and training (Teagasc, 2018a). All other VET courses are the responsibility of the Department of Education and Skills in Ireland, i.e. catering, beauty therapy, nursing studies, etc.

VET is provided across an array of centres funded by the State directly or through intermediary bodies. These centres comprise Universities, Institutes of Technology, Further Education Colleges, local Vocational Education and Training Centres, Youthreach and Traveller training centres, FÁS community training workshops and dedicated sectoral training centres. There are also a number of private providers including private third level colleges and commercial training bodies. However, the majority of VET occurs within the State sector (European Centre for the Development of Vocational Training, 2014). The *Further Education and Training Act 2013* resulted in the dissolution of FÁS and the establishment of a new authority, SOLAS, the Further Education and Training Authority. Additionally, 33 existing VECs

(Vocational Education Committees) were restructured into 16 Education and Training Boards (ETBs). The previous function of FÁS became the responsibility of the ETBs in an attempt to bridge the gap between local and regional centres (SOLAS, 2019). Therefore, presently, SOLAS are responsible for the strategic management of funding for the further education and training sector.

VET has a key role to play in the creation and retention of a highly skilled labour force within a knowledge society (European Centre for the Development of Vocational Training, 2014). The White Paper on Adult Education 2000 (Department of Education and Science, 2000) and the development of the National Framework of Qualifications (NFQ) are two significant developments within the education sector in Ireland over the last two decades. This was Ireland's first White Paper on Adult Education and signified the adoption of lifelong learning as a governing principle within educational policy. The document outlines the important role of adult education to Irish society and contributes to developments within the sector (Department of Education and Science, 2000). The NFQ places Irish education qualifications within the international sphere as it allows Irish qualifications to be easily compared with qualifications across Europe while also providing a clear structure outlining progression pathways across the Irish education system (Quality and Qualifications Ireland, 2016a). VET is an important, diverse sector within four distinct sectors of the Irish education framework which incorporates primary, secondary, and higher education sectors. The VET sector provides an array of courses for diverse learners over sixteen years of age (SOLAS, 2019). The sector provides re-skilling and up-skilling opportunities for employees and the unemployed as well as providing a progression route into higher education. VET courses are also available to individuals who have not completed second level education (SOLAS, 2019). Thus, a diverse range of learners can enter the VET sector and further their education as VET is accessible to all learners.

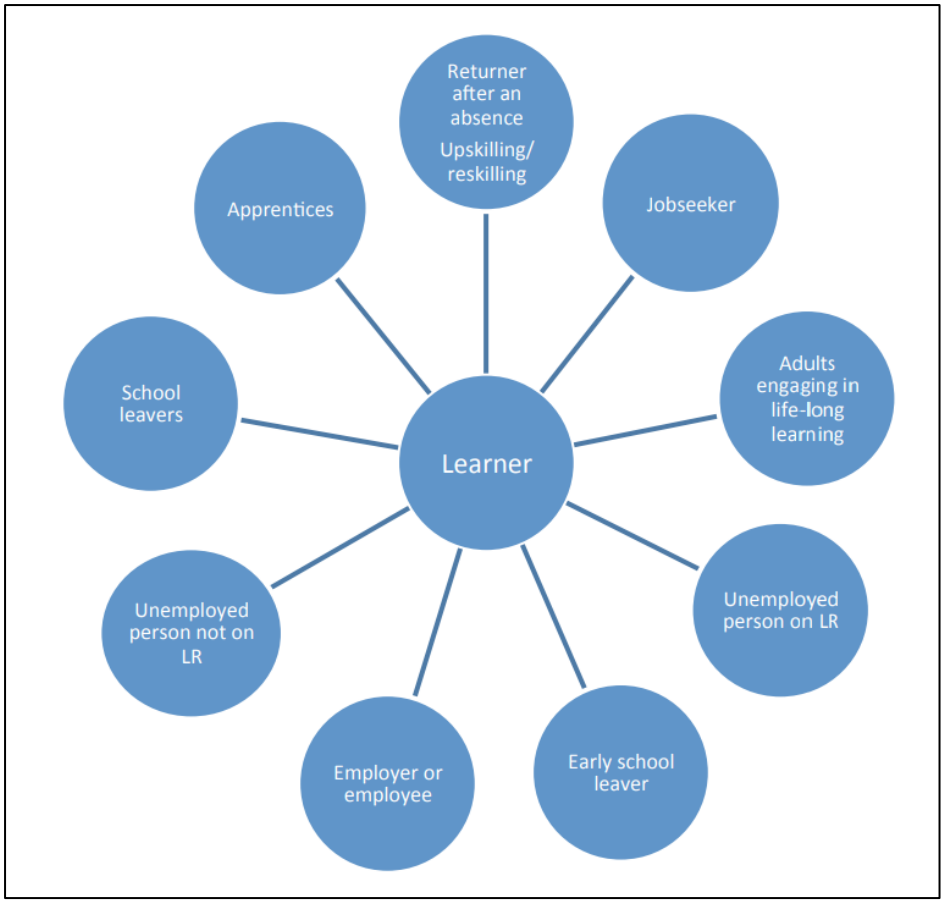

Figure 3.1: Profile of Typical VET Learners (SOLAS, 2019)

Figure 3.1 illustrates the variety of backgrounds and life experiences from which VET learners descend. Within vocational agricultural colleges, learners on full-time courses are generally school leavers and sometimes early school leavers. Learners on distance and part-time learning courses are often early school leavers, employees, and adults engaging in life-long learning. The profile of learners within the agricultural sector is unique given that a proportion of learners will pursue an agricultural qualification to gain 'young trained farmer' status (Table 3.2) while other learners will have a strong desire for agricultural education (Husband, 2015), seeking to gain new knowledge and skills. It is important for educators to understand what motivates their learners and to acknowledge and appreciate the different backgrounds from which their student population descend. Additionally, Teagasc are currently in the process of developing apprenticeships for the land-based sector. Previously, the Farm Apprenticeship Board was responsible for the training of farm managers via a three year course and apprenticeship-based programme during the period 1964 to 2002, when it ceased operation (Teagasc, 2016). This current

development of apprenticeship programmes for the land-based sector will result in employers taking a lead role in the education and development of apprentices. Thus, apprentices will become an important profile within the student population of Teagasc courses in the near future.

3.3 Educational Framework in Ireland

National qualifications frameworks detail the knowledge and skills required on the basis of a given qualification. They also demonstrate the progression route a learner can take in moving from one qualification to the next within a system (Quality and Qualifications Ireland, 2018). In 2001, the National Qualifications Authority of Ireland was established on a statutory basis under the *Qualifications (Education and Training) Act, 1999*. The establishment and maintenance of a National Framework of Qualifications was one of their main aims (National Qualifications Authority of Ireland, 2003). In 2012, Quality and Qualifications Ireland (QQI) was established by the *Quality Assurance and Qualifications (Education and Training) Act 2012* to quality assure Irish further and higher education and training programmes alongside the Irish National Framework of Qualifications (NFQ) (Quality and Qualifications Ireland, 2015). Previously, education in Ireland was certified by the Higher Education and Training Awards Council (HETAC) / Further Education and Training Awards Council (FETAC). The functions of QQI are in line with the previous functions of FETAC / HETAC which are to act as an awarding body, to set standards acceptable for awards made in the NFQ, to authorise education and training programmes, and to provide advice on foreign qualifications. The overall aim of QQI is to ensure high quality education and training opportunities exist where qualifications are recognised both nationally and internationally (Quality and Qualifications Ireland, 2016a). Educational qualifications are significantly important in terms of seeking employment and availing of greater opportunities in education i.e. Masters and Doctorate level studies. A national framework of qualifications creates a clear structure for comparing and contrasting qualification levels within Ireland and abroad (Union of Students Ireland, 2016).

The Irish National Framework of Qualifications (NFQ) consists of ten levels used in describing the Irish qualifications system (Figure 3.2).

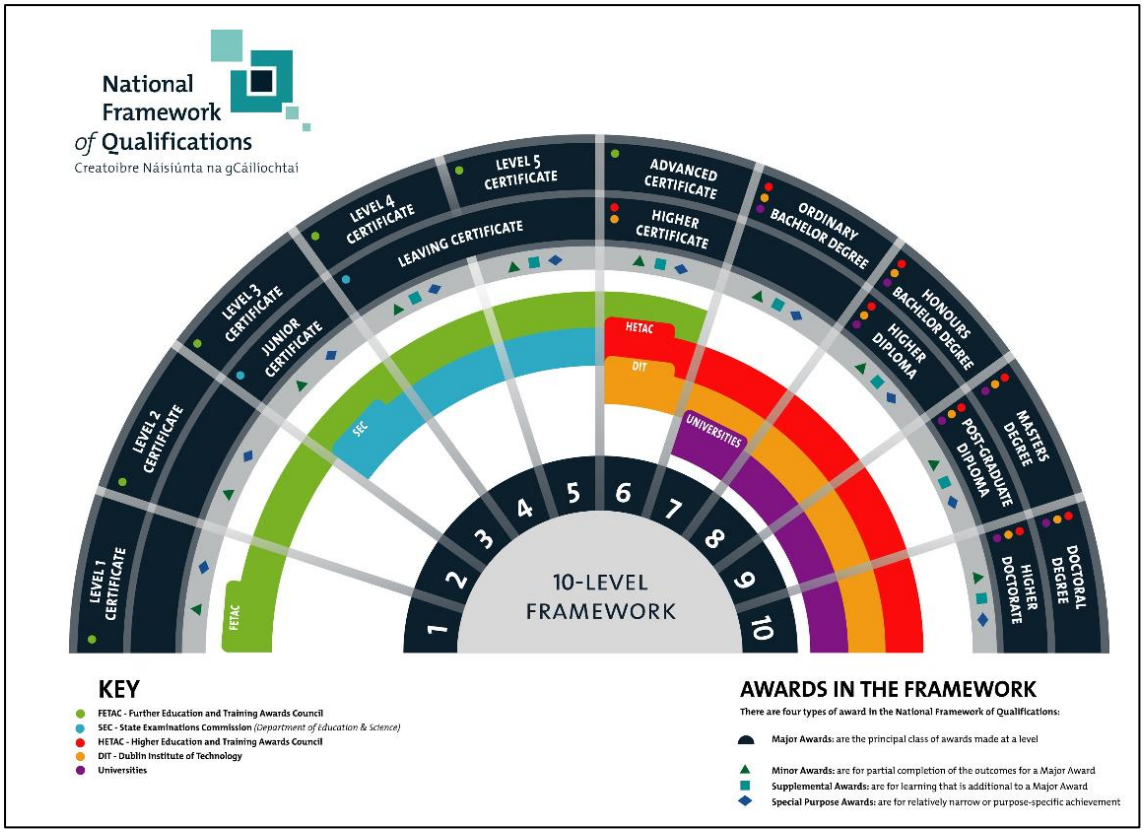

Figure 3.2: Irish National Framework of Qualifications Fan Diagram (Quality and Qualifications Ireland, 2016b)

The levels highlight the progression pathways that exist within the Irish education system making it easier for learners to identify and establish possible career progression pathways suitable to them. The key awarding bodies in the NFQ are QQI, State Examinations Commission (SEC), and Dublin Institute of Technology, and Universities (Quality and Qualifications Ireland, 2016b). For Teagasc, QQI are the awarding body for all Level 5 and Level 6 accredited agricultural programmes delivered, while University College Dublin is responsible for awarding the Teagasc Level 7 Professional Diploma in Dairy Farm Management. The NFQ comprises up to five qualification levels within higher education and five qualification levels within the primary and secondary education system. The higher education levels range from Level 6 to Level 10 on the framework. Within the higher education system there are three types of full-time undergraduate qualifications; Level 6 – Higher Certificate, Level 7 – Ordinary Bachelor Degree, and Level 8 – Honours Bachelor Degree, all of which are major awards. There is also a selection of other awards available to students which include minor awards, supplemental awards, or special purpose awards (Union of Students Ireland, 2016). Teagasc are involved in the delivery of

Level 5, Level 6 and Level 7 undergraduate agricultural awards in addition to assisting with the delivery of Level 8, Level 9, and Level 10 programmes through their collaborative partnership with higher education institutes. Teagasc also offer a special purpose award to academically impaired agricultural students. Therefore, on the NFQ, there are a total of four award types a student can pursue; (i) major award; (ii) minor award; (iii) supplemental award; (iv) special purpose award.

On a European level, there are two meta-frameworks in operation; (i) Framework for Qualifications of the European Higher Education Area, also known as the 'Bologna Framework' and; (ii) European Qualifications Framework for Lifelong Learning (EQF). The Bologna Framework enables individuals to relate national frameworks of qualifications from different European countries to each other (University Framework Implementation Network, 2016).

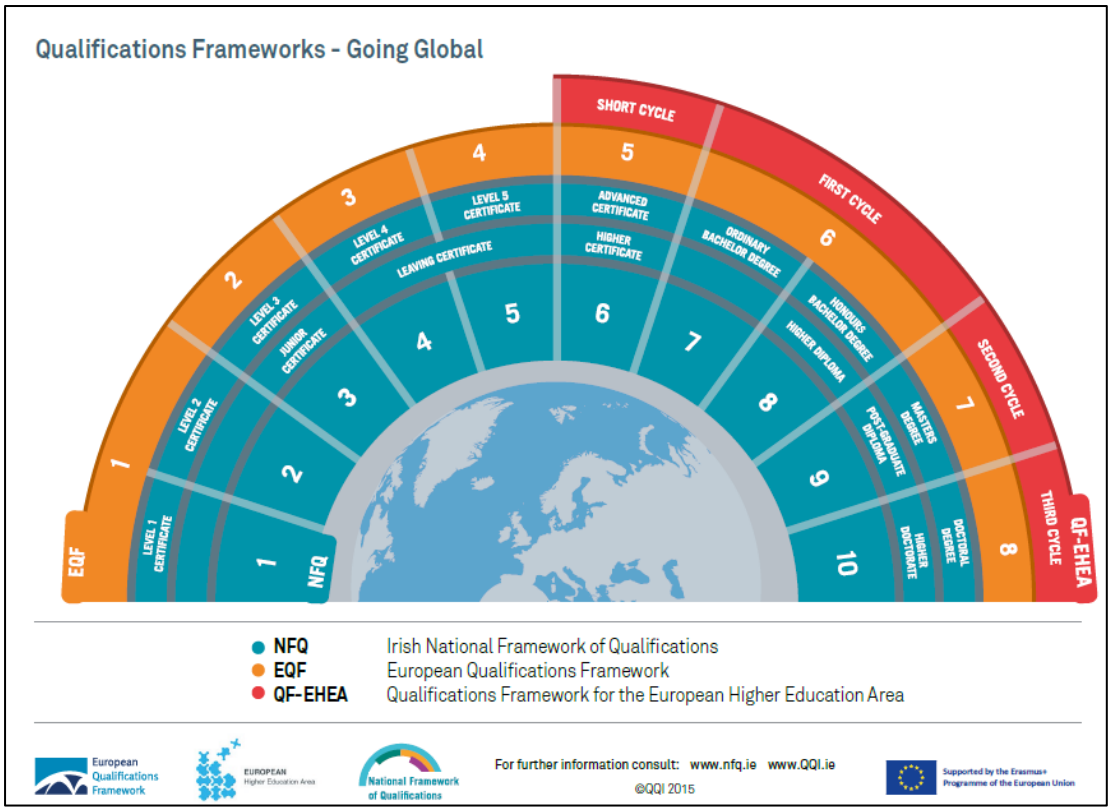

Figure 3.3: European National Framework of Qualifications illustrating the relationship between the Irish and European Education Framework (National Framework of Qualifications, 2019)

Therefore, as illustrated in Figure 3.3, vocational agricultural courses delivered at Level 5 and Level 6 on the Irish NFQ are equivalent to Level 4 and Level 5 vocational agricultural courses on the EQF.

3.4 History of Agricultural Education in Ireland

The Irish agricultural education system has evolved significantly since the establishment of the Department of Agriculture over a century ago. During the period 1900-1975, agricultural colleges were founded across Ireland to provide training for young farmers. County Committees of Agriculture were initially setup to provide training to young farmers in an attempt to stimulate the rural economy (Teagasc, 2016). In 1913, agricultural instructors employed by the County Committees were responsible for the delivery of agricultural day classes during the winter period. Over time, training shifted from day classes to night classes which resulted in a surge in the numbers attending these courses.

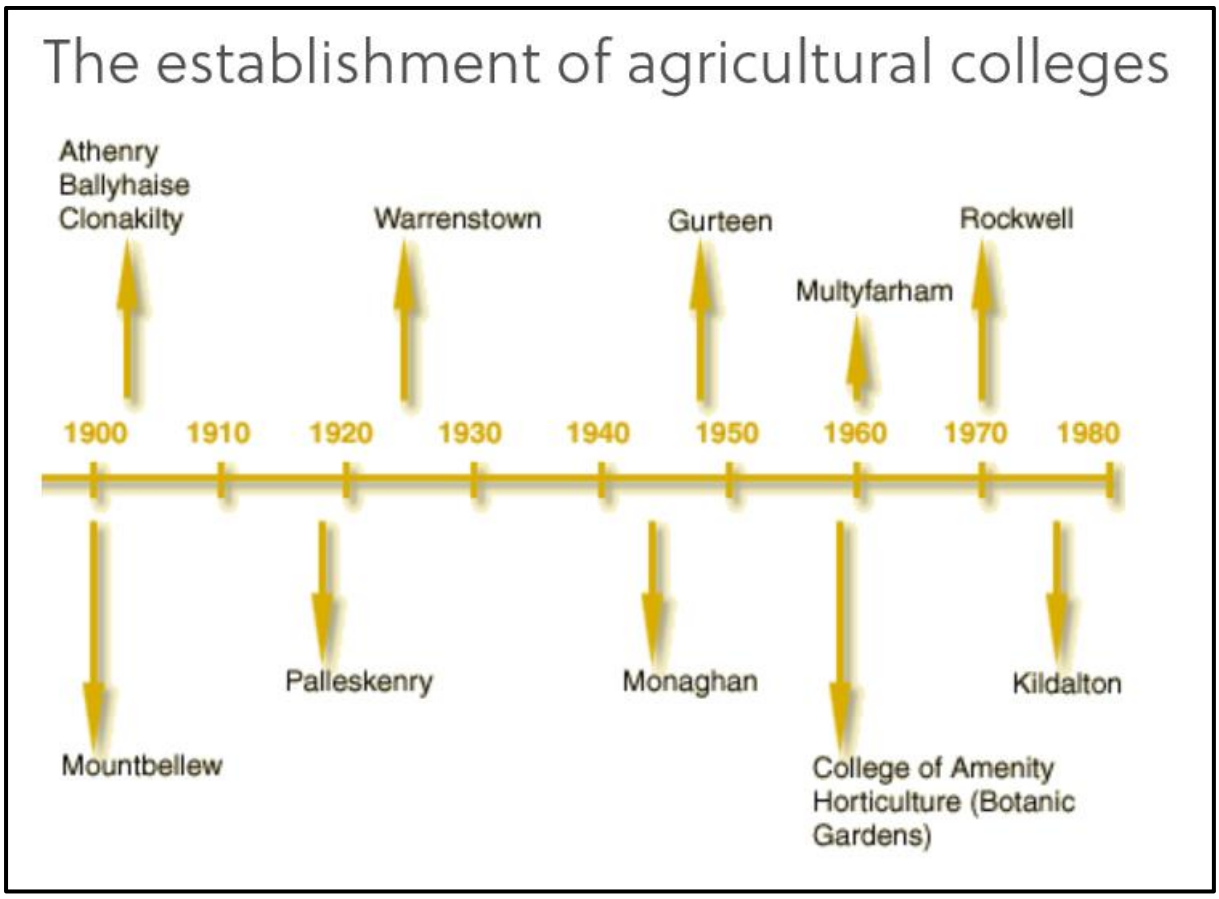

Figure 3.4: The Establishment of Irish Agricultural Colleges (Teagasc, 2016)

In 1980, a semi-state organisation, ACOT (the national advisory and training body), was established to provide training and advisory services to farmers (Teagasc, 2016) increasing the availability of the scientific and practical knowledge required by the agricultural industry (ACOT, 1981). ACOT inherited responsibility of the five state colleges; Athenry, Ballyhaise, Clonakilty, Kildalton, and the College of Amenity

Horticulture, formerly managed by the Department of Agriculture. ACOT also became responsible for the state funding of the private colleges. In 1983, ACOT introduced the Certificate in Farming, a training programme for young farmers. Today, this certificate is known as the Certificate in Agriculture with the opportunity to progress on to an Advanced Certificate in Agriculture in the areas of dairy, drystock, crops and machinery, and mechanisation. Teagasc is a state body which was established under the *Agriculture Act* in 1988. Teagasc are responsible for the provision of research, training and advisory services to the agricultural industry. Teagasc inherited the functions of ACOT as the integration of research, education and advisory services is believed to result in a more effective AKIS (Agricultural Knowledge and Information System) (Ingram, 2018; Knierim *et al.*, 2015; Prager and Thomson, 2014).

3.5 Teagasc Vocational Agricultural Education Programmes

Teagasc, the Agriculture and Food Development Authority, support science-based innovation in the agri-food sector and broader economy with the aim of strengthening and supporting sustainability, profitability, and competitiveness. It prioritises the development of an economically, socially, and environmentally sustainable primary agricultural sector (Teagasc, 2017b). Within education, Teagasc is one of the main providers of accredited vocational level training within the land-based sector (Teagasc, 2018a). Its education programmes are delivered through a network of agricultural colleges and regional education centres on a full-time, part-time, and distance learning basis. Teagasc currently deliver the following full-time vocational agricultural education programmes:

- Level 5 Certificate in Agriculture
- Level 6 Advanced Certificate in Agriculture (Dairy, Drystock, Crops and Machinery, Agricultural Mechanisation)
- Level 7 Professional Diploma in Dairy Farm Management

Additionally, Teagasc offer part-time and distance agricultural education programmes alongside horticulture and equine education programmes. However, this doctoral study is only concerned with full-time vocational agricultural education programmes offered at Level 5 and Level 6 within the colleges. Teagasc have also established partnerships with higher education agricultural providers in the delivery

of undergraduate and post-graduate degree programmes. National Universities of Ireland and Institutes of Technology in Ireland are responsible for the delivery of Ordinary and Bachelors Agricultural Degree Programmes. This collaboration with the higher education sector enables Teagasc vocational agricultural colleges to provide a technical knowledge base for these higher education institutions in addition to supporting progression opportunities of Teagasc vocational Level 6 learners into the higher agricultural education system. Teagasc vocational colleges are equipped with a range of teaching resources, including farm equipment, workshops, computer labs, and access to commercial farming enterprises, which provide an optimal environment for experiential learning (Teagasc, 2018a) within the further and higher education sector. At the post-graduate level, Teagasc has collaborative involvement with Level 9 (Masters) and Level 10 (Doctorate) post-graduate programmes with approximately 250 post-graduates participating annually (Teagasc, 2018a). In 2017, approximately 7000 learners participated on Teagasc full-time, part-time, or distance agricultural education programmes (Table 3.1) and Teagasc-linked higher education programmes (Teagasc, 2018a).

Table 3.1: Student Numbers at Agricultural Colleges and Teagasc Regional Centres 2016 / 2017 (Extracted from Teagasc Education Vision Report, (Teagasc, 2018a))

	Full-time courses[1] + Adult part-time and distance education courses[2]	
Teagasc Colleges	**Gross**	**Full-time Equivalent**
Ballyhaise	1,209	585
College of Amenity Horticulture Botanics	327	196
Clonakilty	648	379
Kildalton	1,179	716
Private Colleges		
Gurteen	740	427
Mountbellew	883	584
Salesian Pallaskenry	587	356
Teagasc Regional Education	1,639	1,071
Total Participation	**7,212**	**4,314**

**Notes: [1] Inclusive of Teagasc-linked higher education courses. [2]Peak participation, adult part-time and distance educationcourses commence and complete on a rolling basis.*

Additionally, Teagasc is involved in the delivery of accredited and non-accredited short courses and continuous professional development (CPD) opportunities for farmers and the wider agricultural sector with typically 3000 - 4000 adults per annum

participating on these courses. Vocational agricultural education programmes provided by Teagasc are delivered through their network of seven colleges; four Teagasc colleges and three private-linked colleges (Figure 3.5), and education centres within the twelve advisory regions.

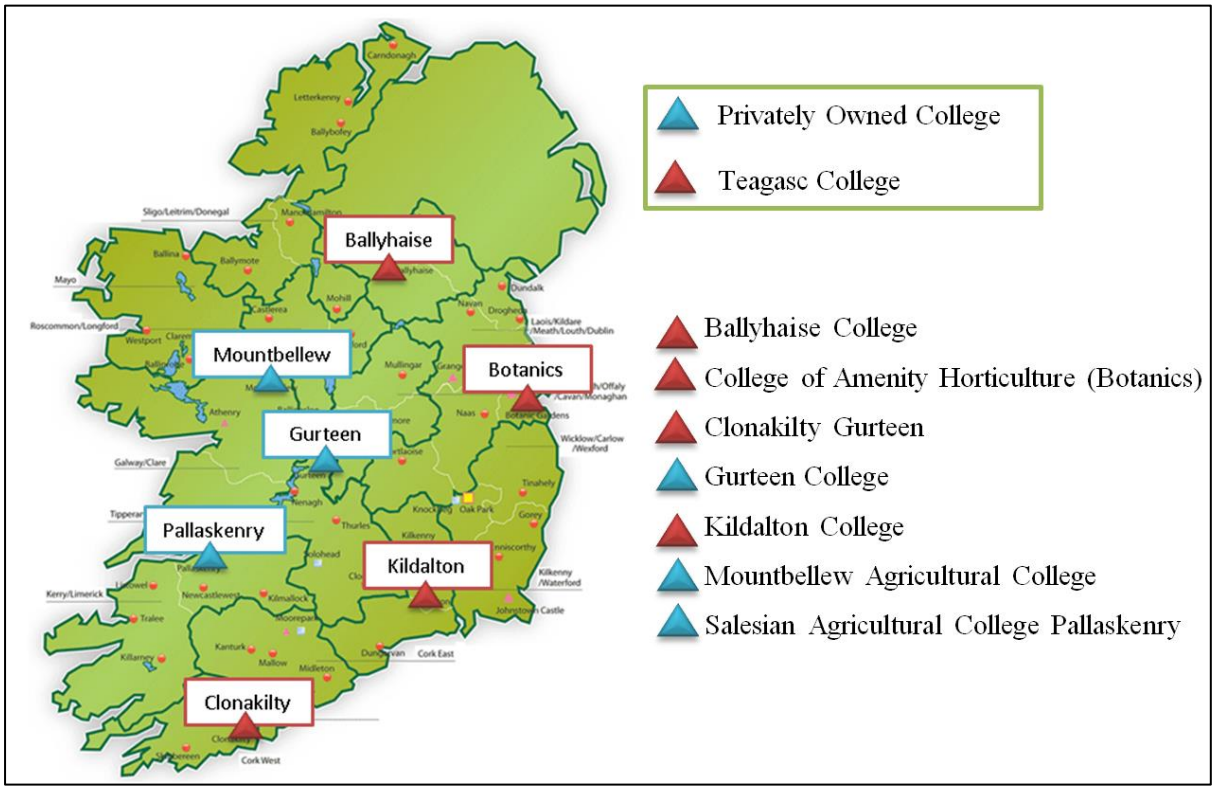

Figure 3.5: Map of Teagasc Vocational College Locations in Ireland 2019

There are approximately 176 permanent education staff located within colleges and advisory regions across Ireland involved in the delivery of vocational agricultural education programmes (Teagasc, 2018a). Learners obtain skills training and attain an in-depth knowledge of farming systems amongst a population of like-minded individuals (Teagasc, 2019a). Agricultural programmes comprise of a blend of classroom and practical instruction as students learn new knowledge and skills within the classroom, within a practical setting, and experientially through student work experience during the spring and autumn period. National and European policy under the Common Agricultural Policy (CAP) requires 'young trained farmer[1]' status for entry into certain agricultural schemes and to avail of certain incentives (Table

[1] A 'young trained farmer' is under 35 years of age and holds a relevant agricultural qualification

3.2). In this instance, an accredited agricultural qualification delivered at vocational Level 6 is often referred to as the 'Green Cert[2]'.

Table 3.2: Irish Agricultural Schemes Prerequisites

Agricultural Scheme	Young Trained Farmer Status Required	Educational Qualification Required
Young Farmers Scheme	Yes	Level 6
National Reserve Scheme	Yes	Level 6
Young Farmer Capital Investment Scheme (TAMS)	Yes	Level 6
Registered Farm Partnership / Collaborative Farming Grant Scheme	Yes	Level 6
Stamp Duty Exemption	Yes	Level 6
Capital Acquisitions Tax Relief	Yes	Level 6
100% Stock Relief on Income Tax	Yes	Level 6
Basic Payment Scheme	No	None
Greening	No	None
Area of Natural Constraint (ANC)	No	None
Green Low Carbon Agri-Emissions Scheme (GLAS)	No	None
Beef Environmental Efficiency Programme (BEEP)	No	None
Beef Data and Genomics Programme (BDGP)	No	None

Future CAP reform is expected to show commitment to young trained farmers due to the age profile of farmers across Europe, which is posing a significant challenge for the agricultural sector. In 2016, one third (32%) of farmers across Europe were greater than 65 years of age while only 11% of the farming population in Europe are under 40 years of age (Eurostat, 2019). An increasing age profile poses the threat of a loss in new and innovative knowledge that is required to assure sustainability of the farming sector while remaining competitive within a rapidly changing technological environment. Therefore, future rural development policies are expected to seek to reduce the age profile of farmers by encouraging more young people to pursue a career within the farming sector. This could potentially result in a surge in the numbers pursuing an agricultural qualification at the vocational level, but

[2] The 'Green Cert' programme comprises a list of land-based courses qualifying individuals as a 'trained farmer'. Individuals require this qualification to be eligible for agricultural schemes such as those listed in Table 3.2.

certainly will result in an equilibrium in the numbers of individuals pursuing an agricultural qualification as they aim to attain 'young trained farmer' status in order to be eligible for certain agricultural schemes as outlined previously. Vocational agricultural education providers, such as Teagasc, in this context, have an important role to play in the development of the future generation of young farmers as they equip them with the knowledge and skillset required to remain competitive but sustainable within the farming sector.

3.6 Teagasc Recruitment Policy

The future success of any organisation depends on their ability to attract and identify the best candidates given that attracting the best candidates is central to the success and survival of any organisation (Beechler and Woodward, 2009). Within the agri-food sector, Teagasc want to be the employer of choice, attracting highly skilled, motivated, and innovative candidates who are flexible and committed to continuous professional development. They want their candidates to be leaders within the agri-food sphere, recognised for their contribution to both organisational and industry development (Teagasc, 2019b).

Teagasc recruit agricultural advisors, college teachers, research officers, technicians, education officers, to name but a few. The recruitment of 'Agricultural Development Officers' is of primary concern to the researcher as the doctoral study explores the professional development needs of the agricultural teacher population within vocational agricultural colleges. Agricultural Development Officers play a central role in the delivery of advisory, education and training services within Teagasc. Advisors provide farm business clients with technical and financial information to promote efficient and sustainable resource management within their enterprises. College teachers and education officers are responsible for the delivery of full-time and part-time agricultural programmes within the colleges. Therefore, the recruitment of advisors, college teachers, and education officers within Teagasc occur in a vacuum as they are recruited together. Agricultural Development Officers are recruited based on their technical expertise, i.e. possession of a Level 8 agricultural science qualification, but an educational qualification is not a prerequisite for becoming a college teacher within the organisation, with no onus on the college teacher to obtain a pedagogical qualification subsequent to becoming employed.

On the contrary, the recruitment of educators by VET centres under the DES requires teachers to have a pedagogical qualification at the point of employment or to obtain a pedagogical qualification within two years of commencing employment. A similar recruitment policy is in existence in the Netherlands within the field of vocational education and training. This highlights a significant gap in the recruitment of teachers at the VET level under DAFM when compared to the DES recruitment requirements. This presents a significant challenge to Teagasc as an education provider in the context of qualifications and competence. Courses delivered under the DES are taught and assessed by competent teachers in possession of a pedagogical qualification. This is not to say that agricultural teachers delivering programmes under the DAFM are incompetent, but they lack a certificate to suggest they have the appropriate knowledge, skills, and dispositions required to support successful student learning. Positively, agricultural teachers responsible for the delivery of VET programmes are experts in the field of agriculture having been recruited based on the possession of a Level 8 qualification relevant to the field of instruction. Therefore, combining this knowledge with a pedagogical qualification which will enhance educator competence and comprehension of pedagogical theories and practices would situate agricultural education programmes and their tutors within a more competitive sphere.

The complex and multifaceted relationships surrounding both agricultural and educational processes within a rapidly globalising world necessitates continuous professional development for agricultural teachers. Given the recruitment policy at the agricultural VET level, as described in the previous paragraph, and agricultural teachers' lack of pedagogical training, the training needs of this cohort must be clearly determined to increase educator participation with in-service training and professional development opportunities. This supports the integration of relevant topics within an educational plan (Carlisle *et al.,* 2011). Determination of training needs provides requisite information of value for planning future professional opportunities through the evaluation of knowledge and skills (Denby, 2010; Chappell and Ford, 2014; Kol *et al.,* 2017). This supports increased effectiveness of the training provided while also impacting positively on employee satisfaction (Carlisle *et al.,* 2011). A training needs analysis is the first step in the identification of training needs (Govranos and Newton, 2014) in an effort to meet individual learning needs

which align with the needs of the organisation (Dening *et al.,* 2019). Consequently, in the context of this study, a training needs analysis was conducted in the exploration of the professional development needs of VET agricultural teachers, giving consideration to the recruitment of VET agricultural teachers based on technical expertise without consideration of their pedagogical abilities.

3.7 Conclusion

Agricultural providers have an important role to play in the development of the future generation of young farmers as they equip them with the knowledge and skillset required to remain competitive but sustainable within the farming sector. In Ireland, Teagasc are responsible for the provision of agricultural VET programmes, operating under the DAFM. Conversely, all other VET programmes outside of agriculture are delivered under the DES. A similar scenario was evident in the Netherlands until 2016. Prior to 2016 agricultural VET programmes in the Netherlands were under the remit of their Department of Agriculture, however, post-2016 agricultural VET programmes are under their Department of Education. In Ireland, VET agricultural teachers are recruited based on technical expertise and qualification with no obligation to gain a pedagogical qualification at any point during the course of their employment. On the contrary, under the DES, VET educators recruited must have knowledge of the subject area but must also possess a pedagogical qualification at point of employment or obtain such a qualification within two years of commencing employment. The same can be said for agricultural VET providers across Europe as they require agricultural VET teachers to possess a pedagogical qualification. Across Europe, rural development and European policy will support young farmer education going forward as an attempt is made to reduce the age profile of the farmer across Europe. Consequently, numbers enrolling in agricultural VET programmes in Ireland and across Europe are likely to remain steady. With this in mind and the fact that Teagasc has a close working relationship with national Universities and Institutes of Technology across Ireland in the delivery of Level 5 through to 10 programmes, it can be said that significant improvements to the competence of educators across the organisation can be made in line with international best practice. VET is available to all learners regardless of individual ability resulting in a diverse range of learners in terms of ability entering the VET sphere. This presents significant challenges to the teaching and learning process as the educators aim to support and guide the

learning of a range of learner abilities within the one classroom. It is in this context therefore that the possession of a pedagogical qualification alongside technical expertise is of utmost importance.

Chapter 4: Methodology

4.1 Introduction

The purpose of research comprises the generation of knowledge in line with a comprehension of the regularities associated with social processes, helping the researcher understand the presence, type, extent, and causes of problems and how they can be controlled (Benini, 2000). The three paradigms of positivism, interpretivism, and criticism guide research projects. Positivist research aims to explore, explain, evaluate, predict, and develop/test theories; interpretive research aims to understand human behaviour; and critical research aims to critique social authenticity by suggesting potential solutions to social problems (Sarantakos, 2013). Changing social and economic conditions strongly impact on the nature of social science research employed. For example, agricultural change and the shift from productivism to post-productivism, as detailed in Section 2.2, required realistic, specific, quantifiable data supporting the direct provision of facts and information to the relevant authorities to facilitate the introduction of pertinent policies.

In this chapter, philosophical assumptions underpinning social science research are discussed in detail with regard to this study and the methodologies employed. The subsequent section explores the research design employed giving consideration to the paradigms of research and the mixed methods research approach. A comprehensive documentation of each phase in the data collection process is provided including the sampling techniques employed and the analysis of data collected at each phase. The final section discusses ethical considerations in relation to the study before concluding with a chapter summary.

4.2 Philosophical Foundations of Social Science Research

Social science research is guided by three fundamental aspects; ontology, epistemology, and methodology. These aspects are positioned in a tier as ontology affects the epistemological position which affects the methodology prescribed by the research methods, designs, and implements (Sarantakos, 2013). Social science research aims to provide an understanding of social reality through the human lens while demonstrating how these views form individuals' actions within that reality (Anderson and Bennett, 2003; Bracken, 2010). This allows the researcher to expose

the impacts of human perception on the revelation of actual truths (David and Sutton, 2004).

The ontological perspective refers to the nature of reality and how the researcher views social reality (Bracken, 2010; Marsh and Furlong, 2002; Sarantakos, 2013). One ontological foundation is the adoption of the belief that the social interaction sphere is a lucid, external entity receptive to scientific and positive means of inquiry (Gallagher, 2008). Alternatively, social reality is constructed based on interactions with and meaning of the world based on lived experiences and prior knowledge (Byrne-Armstrong *et al.*, 2001). Thus, the two dominant ontologies are realism and constructionism. Epistemology refers to the nature of knowledge including the generation and distribution of knowledge based on inquiry (Bracken, 2010; Sarantakos, 2013). The epistemological orientation associated with social science originates from scientific research methods affiliated to the physical sciences. Scientific methods provide facts and certainty based on mathematics and logic (Bracken, 2010). In this instance, external conditions are controlled and observed systematically suggesting that human behaviour is externally governed. Therefore, this epistemology suggests external stimuli regulate human behaviour and are outside of their control, encompassing positivism. Conversely, knowledge is socially constructed, understood, and felt by individuals through engagement and interaction with individuals and the environment (Tuli, 2010; Maxwell, 2013), encompassing interpretivism. Research methodology refers to critical inquiry in quest of reality and knowledge. The methodology explains the procedures and paradigms employed in the research (Cohen *et al.*, 2007) placing methodology at the nucleus of the research process. Hence, methodology can be described as a research strategy which translates the ontological and epistemological principles into guidelines documenting the research process and the methods involved (Sarantakos, 2013).

The research paradigm encompasses the philosophical views, beliefs, and opinions of the researcher which guide behaviour and the choice of methodology (Jonker and Pennink, 2010). These paradigms refer to ontology, epistemology, and methodology as described above. The researcher's philosophical stance informs the methodology, highlighting the close, integrated relationship that co-exists between the methodology and the philosophy (Sarantakos, 2013). Theoretical paradigms including positivist, constructionist, transformative, and pragmatism are well

documented in the literature (Mackenzie and Knipe, 2006). In the case of this study, the researcher employed both quantitative and qualitative methods in addressing ontological and epistemological questions, embracing the positivist, constructionist, transformative, and pragmatic paradigms of social science research. Positivism and constructivism are the two dominant philosophical perspectives of social science research. Positivism typically guides the procedures of quantitative social science research. Researchers are drawn towards positivism as it generates knowledge and structures the research (Neuman, 2013). Constructionism refers to the theoretical foundation of qualitative methodology as the researcher explores and discovers a phenomenon which is not fixed (Sarantakos, 2013). The transformative paradigm encompasses the constructionist and positivist paradigms through the utilisation of both quantitative and qualitative research methods (Mackenzie and Knipe, 2006). This mixed methods approach structures transformative research through the development of a more comprehensive review across multiple perspectives and lenses (Somekh and Lewin, 2005) in a participative process. Pragmatism is not designated to any one philosophical system or reality as it focuses on the research problem (Creswell, 2013). Pragmatism forms the philosophical foundation for mixed methods research (Somekh and Lewin, 2005; Tashakkori and Teddlie, 2003), however, researchers often position themselves within the philosophical transformative paradigm (Mertens, 2014). Although, that said, mixed methods research can be used within any paradigm (Mackenzie and Knipe, 2006). Thus, the transformative paradigm supported the implementation of both quantitative and qualitative research methods in this study while the pragmatic paradigm presented the opportunity for multiple methods. Considering the positivist and constructionist paradigms are predominantly associated with quantitative and qualitative methods respectively, the researcher in this study embraced positivist, constructionist, transformative, and pragmatic philosophical paradigms in the application of a mixed methods research approach. Thus, such an understanding of the philosophical assumptions underpinning quantitative and qualitative research assisted in the identification of the most appropriate methodology and methods for the study given the fundamental role of paradigms in the selection of methodologies (Mackenzie and Knipe, 2006). The adoption of such research paradigms supported a more in-depth exploration of the professional development needs of agricultural teachers in their role as educators.

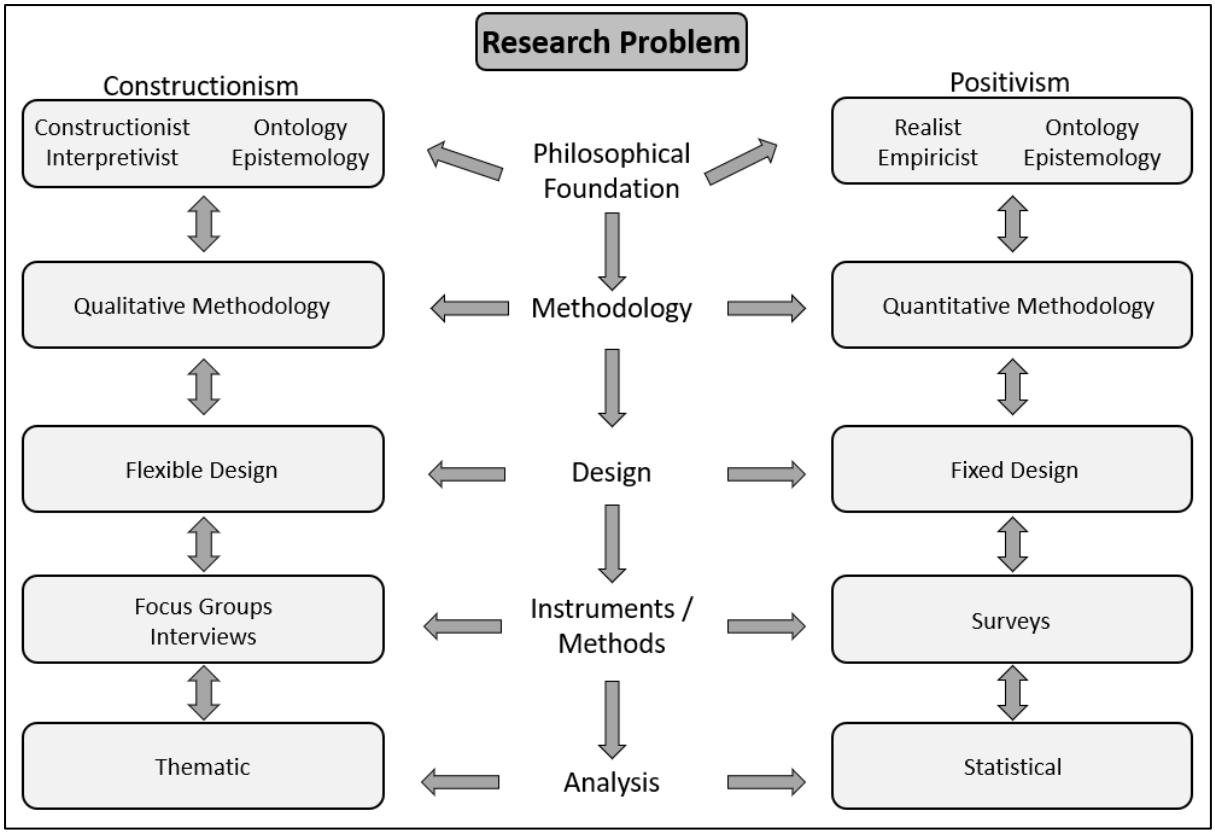

Figure 4.1: Philosophical Foundations of the Research Process adapted from Tuli (2010)

4.3 The Research Design

Research design comprises the aims, goals, objectives, purpose, and intentions of a research project giving consideration to availability of time, resources, and money (Hakim, 2000). The researcher's philosophical stance in relation to paradigms and the philosophical foundations of research, as detailed in section 4.2, will guide the methodology and the methods employed. There are three distinct approaches to linking research in the broad sense: quantitative, qualitative, and mixed methods. These research designs are alternative modes of inquiry investigated using multiple research tools (Creswell, 2013).

The quantitative paradigm is based on positivism encompassing a deductive approach to research (Rovai *et al.*, 2013). Ontologically, the quantitative paradigm relates to just one truth, a self-governing objective reality that subsists outside human discernment (Sale *et al.*, 2002). Epistemologically, the researcher and the participants are sovereign entities reducing the risk of bias as the research

phenomenon is studied outside the influence of the researcher (Guba and Lincoln, 2005). Generally, sample sizes are larger in quantitative studies compared to qualitative supporting statistical analysis based on a representative sample (Sale *et al.*, 2002). On the contrary, the qualitative paradigm is based on constructionist foundations comprising an inductive approach to research whereby social reality and underlying assumptions are closely linked (Almalki, 2016). Ontologically, the qualitative paradigm results in multiple truths based on the social construction of reality which is constantly changing (Sale *et al.*, 2002). Epistemologically, the researcher and the participants function collaboratively in the mutual creation of results within the study context helping shape inquiry (Guba and Lincoln, 2005). Generally, sample sizes are smaller when compared to quantitative research as the respondents tend to be purposefully selected to provide rich, in-depth contextual information (Borrego *et al.*, 2009). Thus, the underlying assumptions of quantitative and qualitative paradigms generate differences which extend further than the philosophical and methodological debates (Sale *et al.*, 2002) resulting in the significant importance of the distinction between quantitative and qualitative norms (Borrego *et al.*, 2009). The role of theory differs greatly between both research approaches given theory in quantitative research comprises the identification of hypothesis' and relevant implements. In contrast, an inductive approach to research and data analysis is associated with qualitative research supporting the detection and development of new insights. Sampling procedures associated with both approaches also differ with regard to emphasis placed on a representative versus a generalizable sample. Quantitative research focuses on the transferability of research findings to the larger population compared to qualitative research which aims to generalise results through an in-depth contextual account supporting connections between research findings and reality (Borrego *et al.*, 2009).

Mixed methods research has increasingly been acknowledged as the third major research paradigm alongside quantitative and qualitative research processes (Borrego *et al.*, 2009; Johnson *et al.*, 2007; Johnson and Onwuegbuzie, 2004). Generally, mixed methods refer to the practical and theoretical approach employed in the comprehension of multiple viewpoints, perspectives, circumstances, and beliefs (Johnson *et al.*, 2007). By definition, mixed methods is a research process involving the collection, analysis, and integration of both quantitative and qualitative

data within a single study to provide a comprehensive understanding of the research problem (Creswell, 2012; Ivankova *et al.*, 2006; Tashakkori and Teddlie, 2003). The purpose of mixed methods research is grounded in the view that a more comprehensive understanding of the research phenomenon can be achieved compared to the use of one approach on its own (Creswell and Clark, 2018; Ivankova *et al.*, 2006; Morse, 2016; Shannon-Baker, 2016). Integrating methods assists in achieving an holistic, complimentary, robust analysis of the research problem, taking advantage of the strengths of both research processes (Creswell and Garrett, 2008; Johnson *et al.*, 2007). A study conducted by McKim (2017) supports this declaration as she argues that mixed methods study's support more profound and complete comprehension of the phenomenon when compared to studies utilising either approach in isolation, thus increasing the validity of the findings (Hurmerinta-Peltomäki and Nummela, 2006). Additionally, the integration element of mixed methods research provides confidence in the results, conclusions and recommendations made (O'Cathain *et al.*, 2010). However, utilisation of mixed methods as a research process presents challenges to the researcher as they require knowledge of both quantitative and qualitative methodologies, both representing different research paradigms, as discussed in section 4.2. Consequently, an awareness of the researchers' skillset and ability to manage multiple demands associated with mixed methods research is paramount (Creswell and Clark, 2018). Additionally, an ability to select the most appropriate mixed methods research design for the study based on underlying research questions as opposed to preconceived bias' associated with research paradigms promotes shared responsibility (Johnson and Onwuegbuzie, 2004).

Creswell and Clark (2018) synthesised three core mixed method designs: (i) the convergent design; (ii) the explanatory sequential design; and (iii) the exploratory sequential design. The convergent design encompasses the amalgamation of both quantitative and qualitative analysis as a comparison of both sets of results with the aim of achieving a complete understanding of the problem and validating the findings (Creswell and Clark, 2018). The explanatory sequential design comprises a two stage design process from which an initial and extensive quantitative stage builds on the subsequent qualitative stage. Typically, the qualitative stage provides an explanation for the quantitative results. Integration commonly occurs between the

quantitative and qualitative stage of data collection helping inform and guide the qualitative stage. Explanatory sequential design is well documented in the literature (Almalki, 2016; Borrego *et al.*, 2009; Creswell, 2012; Creswell and Clark, 2018; Ivankova *et al.*, 2006), commonly used in both social and behavioural science research projects (Bowen *et al.*, 2017; Ivankova *et al.*, 2006; Li *et al.*, 2015; Subedi, 2016). The implementation of this mixed methods approach can be challenging for researchers as a decision has to be made on the priority/weighting given to the quantitative or qualitative data collection procedure and the point of integration within the methodology (Ivankova *et al.*, 2006). Finally, exploratory sequential design is the reverse of explanatory sequential design as the primary phase includes qualitative data collection procedures followed by quantitative. This mixed methods approach is typically employed in the development of a quantitative or standardised instrument within an abstemiously unstudied sphere. The qualitative phase identifies important considerations while the subsequent quantitative phase applies the new found considerations to a larger, more diverse sample of participants. Similar to explanatory sequential design, a decision on the point of integration between the two data collection procedures must be made. Exploratory sequential design as an approach to mixed methods is well documented in the literature also (Bloomer *et al.*, 2016; Creswell and Clark, 2018; Jokiniemi *et al.*, 2018).

Education research requires a diverse toolkit of research designs and methods to address complex, interdisciplinary research problems (Creswell and Garrett, 2008); with both quantitative and qualitative research procedures having a role to play in this context. Consequently, mixed methods research procedures can offer in-depth, contextual knowledge and information regarding a research phenomenon within education. The quantitative-qualitative continuum means mixed methods research integrates overlapping types of mixed methods research. At the centre of the continuum lies equal status which implies both quantitative and qualitative methodological approaches are used equally. Qualitative dominant mixed methods research comprises greater qualitative procedures as opposed to quantitative, denoted as QUAL +quan. Alternatively, quantitative dominant comprises greater quantitative procedures denoted as QUANT +qual (Johnson *et al.*, 2007). Therefore, it can be said the core mixed methods designs synthesised by Creswell and Clark (2018) and discussed above lie on the quantitative-qualitative continuum assisting

researchers in the selection and implementation of the research design and process applicable to the research problem being investigated.

4.4 The Data Collection Process

Research methods encompass the instruments used in the collection of data while investigating a research phenomenon (Almalki, 2016; Creswell, 2013; Sarantakos, 2013; Walliman, 2011). There are a multitude of instruments available (Cohen *et al.*, 2007; Walliman, 2011) to the researcher but the research paradigm and methodological ontologies and epistemologies will guide the selection of the research tools. The instruments selected are the responsibility of the researcher (Birmingham and Wilkinson, 2003). In the context of this study, a mixed methods research design was implemented as it supported an in-depth, contextual exploration of the professional development needs of agricultural teachers in their role as educators. Combinations of quantitative and qualitative methods in the form of sequential explanatory and exploratory design were employed in addressing each of the research objectives as outlined in Chapter 1. The research project consisted of three distinct phases in the collection of primary data in addressing each of the research objectives in order. Subsequently, each phase in the research process (Figure 4.2) is discussed in detail below.

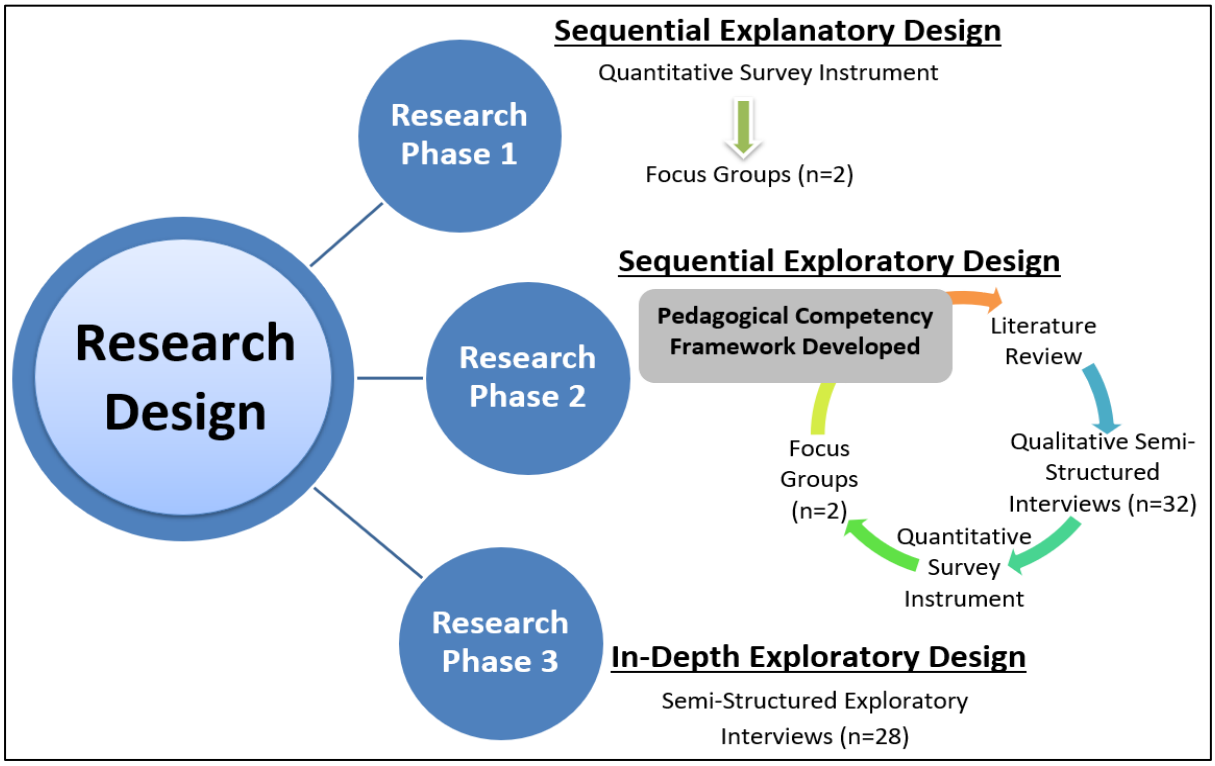

Figure 4.2: Research Design Employed within this Study

4.4.1 Research Phase 1: Sequential Explanatory Design

The mixed methods sequential explanatory design consists of two distinct phases: quantitative data collection procedures followed by qualitative (Creswell and Clark, 2018). In this study, the researcher first collected quantitative data using an online survey instrument. Subsequent to analysis of the survey (quantitative data collected) the researcher conducted the qualitative phase using focus group discussions. The two phases were integrated at the intermediate phase of the study with the development of the focus group discussions guide grounded in the findings from the quantitative phase. The rationale for this approach was that the quantitative data helped explain and provide a general understanding of the research problem. The qualitative phase assisted in the explanation of the statistical results obtained from the quantitative phase, allowing the researcher to explore participants' views and opinions in greater depth (Creswell *et al.*, 2003; Ivankova *et al.*, 2006; Tashakkori and Teddlie, 1998). The fundamental advantage of this approach to data collection was the opportunity to explore quantitative findings in more detail. This sequential explanatory mixed methods research design was employed to address objective one within this study.

Stage 1: Quantitative Phase

The aim of the quantitative phase was to identify agricultural teachers experience in their role as educators. This involved investigating the current levels of training received and satisfaction levels with training available, identifying potential improvements to future training and support provided to the agricultural teacher population, investigating agricultural teachers' existing knowledge of pedagogical skills and strategies, and finally investigating agricultural teachers' career path intentions. The quantitative data was collected using the online survey tool, Google Forms, which was self-developed and piloted prior to dissemination to the national population of agricultural teachers in Ireland. Surveys allow the researcher to sample a larger population at a point in time, are quick, easy, and cost-effective to administer, providing quick results. Surveys also support anonymity enabling the respondent to remain unidentified in the process (Sarantakos, 2013). Prior to developing the national survey, the researcher conducted a focus group discussion with a cohort of volunteer agricultural teachers at an education training day in County

Carlow in February 2016. The purpose of this pre-survey focus group was to gain an insight into the challenges facing agricultural teachers and to understand potential areas for improvement. The findings from the pre-survey focus group were used in the development of the national survey. The survey consisted of predominantly closed-ended questions (n=18), some open-ended questions (n=5), and 5-point Likert scales (n=13). Closed–ended questions were used to collect demographic information and information regarding teaching career and teaching qualifications. Likert scales were used to assess teachers' attitudes in relation to training, support, and teaching methodologies. Finally, open-ended questions enabled participants to elaborate on answers and provide more in-depth information. The national survey (see Appendix One) provided a comprehensive, contextual overview of agricultural teachers' experience in their role as educators, highlighting the training needs of this population of teachers within the vocational education and training (VET) sector.

Sampling Procedure

The national population of agricultural teachers across the six Teagasc agricultural colleges were selected using a purposive sampling procedure. The researcher was interested in exploring the professional development needs of agricultural teachers within the vocational education sector. Therefore, the national population of agricultural teachers were employed at this phase of the data collection process. The national population of agricultural teachers at the time of disseminating the survey (June 2016) was seventy-six. All seventy-six agricultural teachers were invited to complete the survey which received a satisfactory 67% response rate.

Stage 2: Qualitative Phase

The second phase, the qualitative phase, consisted of two focus group discussions conducted with agricultural teachers across the six Teagasc agricultural colleges. Focus group discussion refers to the collection of data through group interaction which supports group think (Morgan, 1996; Sarantakos, 2013). This environment helps stimulate discussion and increases motivation with regard to critical issues. The facilitator, researcher in this case, guides the discussion. Therefore, focus groups support the collection of valuable, detailed information within a short space of time (Sarantakos, 2013). The purpose of these focus group discussions were to delve deeper into findings from the national survey, quantitative phase, providing a

more in-depth explanation of the survey results obtained. Three key themes were used to guide the focus group discussion (see Appendix Two: Research Phase 1 Focus Group Guide): (i) level and type of training received; (ii) teaching skills and strategies; and (iii) future professional development needs. Both focus groups provided in-depth insights to satisfaction levels with current training received, identifying opportunities for improvement based on national survey results. The first focus group discussion was conducted with new, relatively inexperienced agricultural teachers (n=7) with less than five years' experience in their role as educators from across the six different Teagasc agricultural colleges. The second focus group was conducted with experienced agricultural teachers (n=6), with more than five years' experience in their role as educators, from an agricultural college located in the South-East of Ireland.

Sampling Procedure

Participants were selected using a purposive sampling technique as the researcher sought to conduct focus group discussions with inexperienced and experienced agricultural teachers. The national survey was used in the selection of these participants based on question thirty-six in the survey which asked participants if they were willing to participate in a subsequent focus group discussion. The first focus group conducted with inexperienced agricultural teachers was conducted at a training day held in County Carlow in October 2016. These participants consisted of new, inexperienced agricultural teachers (n=7) who were attending a four day pedagogical training course. The researcher capitalised on the opportunity to conduct a focus group with inexperienced educators from all six Teagasc agricultural colleges by conducting the focus group discussion at the end of the second training day. The second focus group discussion was conducted with experienced agricultural teachers (n=6) in an agricultural college in South-East Ireland in January 2017. Participants were invited to attend and participate in the discussion via email.

Data Analysis

The quantitative phase of the data collection process was coded and subsequently analysed using IBM SPSS Modeler 18 64-bit. Descriptive analysis was used to provide general descriptions of the national survey data followed by relational analysis which explored relationships and associations between variables.

Qualitative data collected was audio-recorded and subsequently transcribed verbatim before being coded using NVivo 12 software. Qualitative data obtained was coded using an inductive approach in the identification of themes emerging from the data. Repetitions, similarities, and differences were recorded and subsequently divided into themes. This method of analysis was applied to identify concepts occurring in-text, analyse patterns in-text, and to discover associations between themes. The main themes emerging from each of the two focus groups included; lack of support in terms of materials and resources available; vast diversity in level of student ability; lack of specialisation in specific subject area; lack of pedagogical knowledge; inadequately prepared and trained for their role as educators; barriers to professional development; and opportunities to improve and enhance both formal and informal training provided to educators. Findings from both the quantitative and qualitative phases were integrated at the intermediate stage by linking the quantitative findings to the qualitative results and discussing both in tandem.

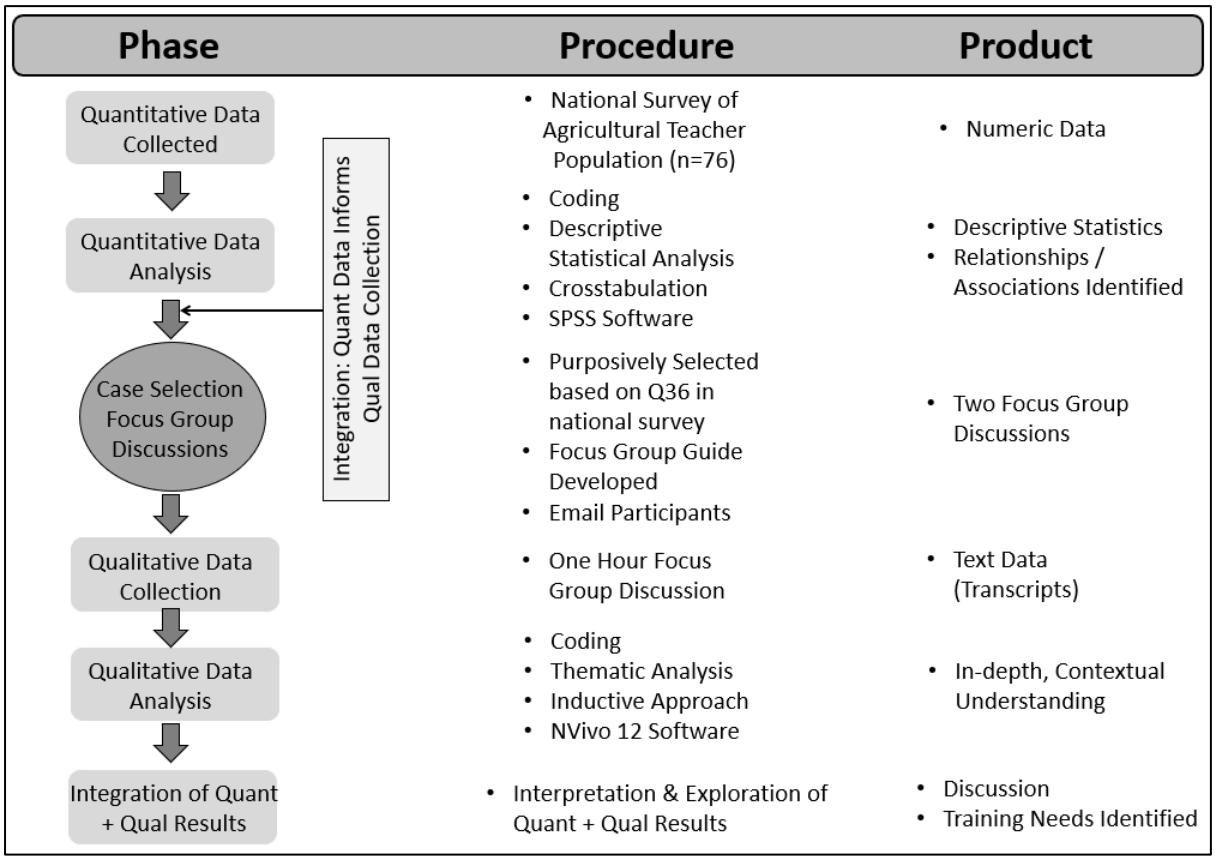

Figure 4.3: Explanatory Sequential Mixed Methods Research Design Employed in Research Phase 1

4.4.2 Research Phase 2: Sequential Exploratory Design

The mixed methods sequential exploratory design consists of three phases in which the researcher commences with qualitative collection of data and analysis followed by the development of an instrument/tool. The translation of the findings from the qualitative stage results in the development of the instrument which is then tested quantitatively (Creswell and Clark, 2018). Consequently, the instrument developed is grounded in the views and opinions of the participants. In this study, the researcher used in-depth exploratory semi-structured interviews to qualitatively collect data in the iterative phase. Analysis of the qualitative data collected resulted in the development of a framework which identified competencies surrounding pedagogy in education. The framework was then tested using a quantitative instrument, an online survey, to test the importance of each pedagogical competency identified in phase one to agricultural teachers in their role as educators. A fourth additional qualitative phase was added by the researcher to the exploratory sequential design to amend and finalise the framework developed for agricultural teachers. Finally, the development of the framework included an extensive review of academic literature in the area of pedagogy given the researchers background was scientific, in the area of agriculture. Consequently, a knowledge and expertise in the area of pedagogy was required to develop a framework applicable to agricultural teacher needs. Therefore, in summary, phase two of the research process was a mixed methods exploratory sequential design comprising of four distinct stages which are discussed in detail below. The purpose of this four-stage, exploratory mixed methods study was the development of a pedagogical tool to address the professional development needs of agricultural teachers in their role as educators based on findings from research phase one. This phase of the research process addressed objective 2 as detailed in Chapter 1.

Stage 1: Literature Review

An extensive review of academic literature in the area of pedagogy was conducted by the researcher in this study to provide a theoretical framework for the development of the pedagogical competency framework as detailed in Chapter 6. A literature review refers to the secondary analysis of published information in peer-reviewed academic journals (Sarantakos, 2013). The details and findings from the

extensive search are detailed in Chapter 2, more specifically in section 2.3, and Chapter 6 (Stage 1: Theoretical Framework) details the theoretical framework developed. Google Scholar was the primary web search engine used to explore pedagogy and discover academic publications. The purpose of this stage in the data collection process was to develop an expert knowledge of pedagogy, particularly in relation to the VET sector, to support the development of a framework which addresses agricultural teachers' professional development needs based on findings from phase one of the research process as discussed in section 4.4.1. Findings from this phase in the data collection process supported the development of the interview guide for stage two and informed the development of the framework over the course of this research phase.

Stage 2: Qualitative Phase

The second stage encompasses the qualitative collection of data using in-depth semi-structured exploratory interviews. Interviews support researchers in discovering the work of others (Qu and Dumay, 2011) providing the opportunity to explore a research phenomenon in depth. Semi-structured interviews lie on a continuum between structured and unstructured interviews consisting of aspects of both interview types (Sarantakos, 2013). In this study, semi-structured interviews involved the preparation of an interview guide which focused on the broad theme of agricultural teacher professional development needs. The semi-structured interview was chosen as it is flexible, accessible, and comprehensible often revealing important aspects of human and organisational behaviour (Qu and Dumay, 2011). It is an effective and convenient way of collecting data (Kvale and Brinkmann, 2009) as it enables interviewees to provide their personal account on the situation being investigated (Qu and Dumay, 2011). Finally, semi-structured interviews allow standardisation of core questions supporting replication of interviews with different participants ensuring data reliability (Kumar, 2011). Additionally, they allow the researcher to follow unexpected thoughts and opinions arising in the interview process and the opportunity to delve deeper.

The purpose of this stage was to explore the pedagogical competencies relevant to agricultural teachers for inclusion on the pedagogical competency framework being developed. Thirty-two face-to-face in-depth semi-structured exploratory interviews

were conducted with personnel within the agricultural VET sector and the higher education sector. Stakeholders beyond the VET field were included in this stage of the study as their knowledge and expertise of pedagogy and experience within education were deemed significant to the purpose of this stage of the data collection process. Semi-structured interviews were conducted primarily in Ireland (n=23); however, the Netherlands was included as a secondary case study (n=9) in this stage to contribute to the development of the framework. The Netherlands was included to provide a transnational lens through which pedagogical competencies could be identified. The Netherlands was selected given their extensive research regarding competency based education and the development of frameworks for other education sectors outside the agricultural sector (Biemans *et al.*, 2004; Mulder, 2012; van Dam *et al.*, 2010; Wesselink and Wals, 2011). Specifically, Wageningen University was identified as a partner university owing to its leadership in the field of agriculture and a department within the university exclusively focused on education and competence studies. The knowledge, experience, and expertise of scholars within this specific department in the university were considered of significant importance and value to the study and the goal of developing a pedagogical competency framework. In particular, Dr. Renate Wesselink, within the Education and Competence studies department in Wageningen University, has published similar research in the development of a competency framework for entrepreneurial teachers and the exploration of teaching professional development needs within higher education. Consequently, the Netherlands was chosen as a secondary case study in addressing the overall aim and objectives of this thesis. All semi-structured interviews in Ireland and the Netherlands were conducted over a period of nine months (November 2017–July 2018) with each interview lasting approximately one hour on average. Three broad semi-structured questions were used to guide the interview process (see Appendix Five: Interview Guide for Research Phase 2 and 3); (i) Do you think a pedagogical competency framework would be beneficial or useful for training VET agri-food teachers in pedagogical knowledge, skills, and competencies?; (ii) What pedagogical competencies: knowledge, skills and attitude, do you think all agricultural teachers should possess?; (iii) What is the best way of providing CPD to educators to ensure these pedagogical competencies are acquired?

Stage 2: Sampling Procedure

Participants were selected at this stage of the data collection process using a purposive snowball sampling technique. Purposive sampling refers to the deliberate selection of a participant based on their knowledge, skills, expertise, and experience in a given area. The researcher decides on the information and knowledge required with regard to the research phenomenon and study objectives and selects participants willing and able to provide relevant information for inclusion in the study (Bernard, 2017; Lewis and Sheppard, 2006; Tongco, 2007). However, it can be difficult for a researcher to reach all potentially relevant personnel and so indirect recruitment of participants can be required (Marcus *et al.*, 2017). This indirect recruitment is referred to as snowball sampling whereby the researcher asks a selection of participants to recommend suitable candidates outside the researchers initial reach (Etikan *et al.*, 2016; Marcus *et al.*, 2017; Sarantakos, 2013). Therefore, all participants are not identified directly by the researcher but through individuals who put the researcher in contact with other relevant participants.

In the context of this study, participants were initially selected based on the possession of a teaching qualification at Level 9 on the National Framework of Qualifications (NFQ). At the time of conducting this research (2017/2018) only five teachers (three agricultural and two horticultural) within Teagasc Agricultural and Horticultural Colleges across Ireland possessed a Level 9 teaching qualification. As a consequence, these five teachers were purposively selected for inclusion in the study. The researcher then used these purposively selected teachers to snowball other teachers, asking each agricultural teacher specifically to recommend one other agricultural teacher relevant to the study. This resulted in the identification of eight teachers for inclusion in the study. In Ireland, there are seven Teagasc Agricultural and Horticultural Colleges with each of these colleges managed by a college principal. Therefore, all seven college principals were purposively selected for inclusion in the study. The Curriculum Development and Standards Unit in Teagasc consist of key stakeholders who lead policy development regarding agricultural education nationally. Consequently, four of these key stakeholders were purposively selected by the researcher with each key stakeholder asked to nominate a key stakeholder within the higher education sector for the study. This resulted in eight key stakeholders for the study. In the case of the Netherlands, participants were

selected in the same manner. Through the guidance of a professor within the Education and Competence Studies Department in Wageningen University initial participants were purposively selected. The researcher then used the purposively selected participants to snowball further participants relevant to the study. Thus, participants in the Netherlands included college teachers (n=9) and key stakeholders (n=3), all within the VET and higher education sectors in the Netherlands. A total of nine semi-structured interviews were conducted in the Netherlands with twelve participants. Two of the interviews conducted in the Netherlands were group interviews due to a language barrier and proficiency in the English language.

In summary, purposive snowball sampling was used to identify participants for this phase of the study. Purposive sampling supported the researcher in selecting participants with the appropriate knowledge, skills, expertise, and experience relevant to the research phenomenon and the study objective being addressed. Snowball sampling increased the researcher's access to relevant personnel in the VET and higher education sector and also ensured data reliability and reduced bias associated with the purposive sampling technique (Sharma, 2017). A total of thirty-two in-depth semi-structured exploratory interviews were conducted with college teachers (n=8 in Ireland; n=9 in the Netherlands), college principals (n=7), and key stakeholders (n=8 in Ireland; n=3 in the Netherlands) primarily in Ireland but also including the Netherlands as a secondary case study.

Stage 2: Data Analysis

All in-depth semi-structured exploratory interviews conducted as part of the qualitative stage in the exploratory sequential design were audio recorded and subsequently transcribed verbatim prior to analysis. Qualitative coding was employed to separate, sort, and synthesise the large amounts of data collected. Codes were initially recorded as words or short phrases beside the interview transcript (Charmaz, 2006). Each pedagogical knowledge, skill, and disposition mentioned at least once across all thirty-two interviews was identified and recorded. These knowledge, skills, and dispositions were then clustered to form a single pedagogical competency for inclusion on the framework. A total of eight pedagogical competencies were identified. Open coding, axial coding, and integration were employed in the analysis of all interviews (Enosh *et al.*, 2015; Strauss and Corbin,

1998) and the identification of individual pedagogical competencies. Open coding refers to the process of recording comments and questions while transcribing interviews. All comments and questions recorded were subsequently reviewed once all interview transcripts were completed in-full and the researcher was acquainted with the dataset and interviewee responses. The next phase included axial coding which involved the identification of sub-categories. In the case of this study, sub-categories refer to related pedagogical competencies identified as part of the broader category of pedagogical competence (i.e. assessment, student engagement, scaffolding, etc.). The final phase incorporated the integration of sub-categories to form broader categories, which in this case refers to the construction of the individual pedagogical competencies (i.e. classroom engagement, professionalisation, educational philosophy, etc.).

Qualitative data collected in Ireland and the Netherlands were combined in the data analysis stage, as the ultimate goal was to develop a pedagogical competency framework which addressed the professional development needs of the agricultural teacher population in the VET sector. Agricultural education in Ireland is behind the curve with regard to teacher training and qualifications when compared to international best practice (as detailed in section 3.6), while the Netherlands is well advanced in the area of competency based education and the development of competency frameworks for a number of sectors. Therefore, the knowledge and expertise contributed to the doctoral study as a result of the field visit to the Netherlands was of significant importance to the development of the framework as a whole for agricultural teachers. Consequently, the researcher decided an all-encompassing analysis of the data as a whole, as opposed to as separate entities, provided a greater contribution to the framework development compared to looking at each single case alone.

Stage 3: Quantitative Phase

The third phase of the exploratory sequential design included quantitative data collection using an online survey tool, Google Forms. The purpose of this stage in the data collection process was to determine which pedagogical competencies identified in stage 2 of this research phase were to be included on the pedagogical competency framework being developed. Therefore, the quantitative survey

instrument was developed based on the findings from stage 2 and the pedagogical competencies identified at this stage. The online survey was self-developed and piloted prior to dissemination to the study participants. Participants involved at this stage of the exploratory sequential mixed methods design included the national population of agricultural teachers (n=72), national population of agricultural and horticultural college principals (n=7), and all members of the curriculum development and standards unit within Teagasc (n=8). Therefore, the survey was conducted with a total of 87 participants in November 2018 and achieved a satisfactory response rate of 80%. This response rate was satisfactory given that a typical response rate for an online survey is close to 50% (Kumar, 2014).

The quantitative survey instrument (see Appendix Three) consisted of primarily closed-ended questions (n=26) and some open-ended questions (n=2) offering participants the opportunity to suggest further pedagogical competencies; knowledge, skills, or dispositions, participants believed were absent and should be included on the framework. Closed ended questions consisted of questions in relation to demographic information, teaching career, and teaching qualifications at the beginning of the survey. The main body of the survey consisted of 5-point Likert scales asking participants to rate the importance of each pedagogical competency (identified as part of stage 2) from 1 = not at all important to 5 = very important to the role of an agricultural teacher. Therefore, the quantitative survey instrument acted as an inclusion/exclusion test for the pedagogical competencies identified in stage 2, in addition to assisting the researcher in determining the extent to which the qualitative findings in stage 2 generalise to the agricultural teacher population.

Stage 3: Sampling Procedure

Participants were purposively selected at this stage of the data collection process also. The pedagogical competency framework being developed was for the purpose of increasing agricultural VET teachers' pedagogical competence. Therefore, the national population of agricultural teachers were selected for inclusion at this stage of the study as the framework being developed concerned their training needs. The national population of college principals and all members of the curriculum development and standards unit were purposively selected given their impact at managerial and policy level. The researcher believed it was important these two

cohorts had knowledge of and a contribution towards the development of the framework given their role in providing and promoting professional development opportunities amongst the teaching population. All Irish participants in stage 2 of the data collection process were included in this stage, stage 3, in addition to a larger population of agricultural teachers and personnel at the policy level. The quantitative survey instrument was disseminated to participants in November 2018.

Data Analysis

The quantitative survey instrument was coded and subsequently analysed using IBM SPSS Modeler 18 64-bit. Initially, measures of central tendency including mean and mode were employed to determine the most common value in the dataset. This helped establish the degree of importance of each pedagogical competency identified in stage 2. Pedagogical competencies receiving an average score of 3.00 and above based on the Likert scales employed by the researcher were deemed important for inclusion on the framework. Therefore, this analysis supported the researcher in determining which pedagogical competencies were for inclusion/exclusion on the framework. Additionally, a factor analysis was conducted to ascertain relationships between the eight pedagogical competencies identified. Based on the analysis conducted at this stage of the data collection process, a first draft of the pedagogical competency framework being developed was constructed based on the findings from stages 2 and 3.

Stage 4: Qualitative Phase

The final stage in this exploratory sequential mixed methods design included two focus group discussions conducted with personnel at the managerial and policy development level within agricultural education. The purpose of these two focus group discussions was to facilitate a comprehensive review of the draft pedagogical competency framework developed at end of stage 3 with the view to refining the pedagogical competencies included on the framework. The first focus group was conducted with policy leaders (n=4) involved in curriculum reform at the national level within agricultural education. This involves all members of the curriculum development and standards unit within Teagasc (n=8). Unfortunately, only 50% (n=4) of the sample population were able to attend on the day the focus group was conducted in December 2018. However, this did not impact on the success of the

focus group and participants unable to attend on the day were contacted individually via email and asked to contribute to the framework by suggesting amendments. The second focus group was conducted with the national population of college principals (n=7) in January 2019. Four questions were used to guide the discussion (see Appendix Four: Research Phase 2 Focus Group Guide) in both focus groups: (i) If we were to develop a teaching qualification for agricultural teachers based on the framework as it stands what do you think it should look like?; (ii) What do you think the final framework should contain?; (iii) How would you rank each competency?; (iv) What do you think is the biggest risk to agricultural VET providers if we do not provide adequate pedagogical training to teachers within this sector? Therefore, the draft pedagogical competency framework developed at the end of stage 3 was discussed, amended, and redesigned within the two focus group discussions based on the potential to develop a formalised teaching qualification for agricultural teachers within the VET sector.

Stage 4: Sampling Procedure

Similarly, participants for this stage of the data collection process were purposively selected by the researcher. Personnel involved at the managerial and policy level in agricultural education were purposively selected as a result of their involvement with curricular reform and professional development for agricultural teachers. The overall aim of this study was to explore the professional development needs of agricultural teachers in their role as educators and these two cohorts of personnel were deemed significant in the research process. Both cohorts were involved in all three primary data collection stages of this research phase to increase validity, reliability, and applicability of the pedagogical competency framework developed.

Stage 4: Data Analysis

Qualitative data collected in stage 4 of the research process via focus groups discussions (n=2) were audio-recorded and subsequently transcribed verbatim. The purpose of this stage in the data collection process was to amend and finalise the pedagogical competency framework developed. Findings from the focus group discussions supported the changes and improvements made to the pedagogical competency framework. Qualitative coding, as described previously, was employed to separate, sort, and synthesise the large amounts of qualitative data collected. The

final pedagogical competency framework was developed at the end of stage 4 analysis based on the findings from all four stages in this research phase.

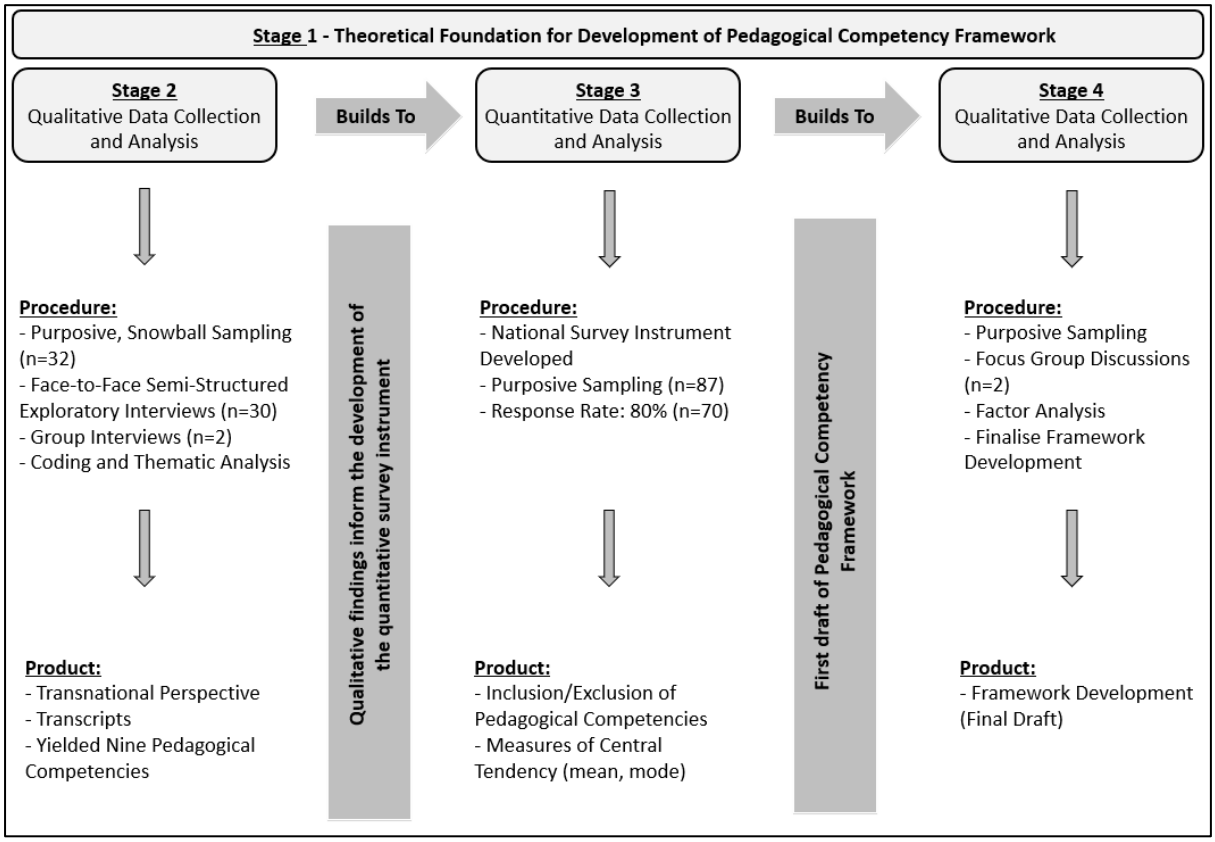

Figure 4.4: Exploratory Sequential Mixed Methods Research Design Employed in Research Phase 2

4.4.3 Research Phase 3: In-Depth Exploratory Design

A qualitative, case study approach was employed at this phase in the research process to address objective 3 of this study. The purpose of the case study approach was to provide a comprehensive, in-depth understanding of the primary and secondary motivators attracting young people towards agricultural education at the vocational level, giving consideration to what inspires further educational choice. In-depth semi-structured exploratory interviews were conducted with personnel within the agricultural sphere to explore the research phenomenon and address the research objective.

Case study research is a commonly used qualitative methodology (Yazan, 2015) having gained reputation as an effective methodology for the investigation of complex world issues (Mills *et al.*, 2017b). Case study approach has been employed

by multiple disciplines including social sciences, education, business, law, and health. Ontologically, the case study approach encompasses the positivist perspective. Epistemologically, such an approach refers to the constructionist standpoint. The ultimate goal of the case study approach comprises an in-depth analysis of an issue and its context with the aim of understanding the issue from the participants point of view (Merriam and Tisdell, 2015; Simons, 2009; Stake, 2013; Yin, 2018). In-depth semi-structured exploratory interviews were used to collect data under the case study research design process. The researcher required several skills, including the ability to listen actively, take detailed notes, and carefully plan and prepare for the interview process (Qu and Dumay, 2011). Semi-structured interviews support in-depth, detailed exploration of the research phenomenon while affording the researcher the opportunity to follow up on unexpected thoughts and opinions that may arise (Kumar, 2014). Consequently, in-depth semi-structured exploratory interviews were deemed the most appropriate method of data collection within the case study design in investigating motivators amongst young people regarding further educational choice. These interviews were conducted with agricultural teachers (n=6), agricultural college principals (n=6), agricultural graduates (n=6), current agricultural students (n=6), and policy leaders (n=4). Therefore, a total of 28 in-depth semi-structured exploratory interviews were conducted with participants during this research phase with each interview lasting approximately one hour. All interviews were conducted by the researcher over a period of nine months from November 2017-July 2018. The interview process was guided by a number of questions (see Appendix Five: Interview Guide for Research Phase 2 and 3) in relation to young peoples' motivators and influencers on the decision making process with regard to further educational choice.

Sampling Procedure

A purposive snowball sampling procedure as described in detail in section 4.4.2 was employed for this phase of the data collection process also. All agricultural teachers (n=6), agricultural college principals (n=6), and policy leaders (n=4) interviewed under stage 2 of research phase 2 were included in this phase of the study and interviewed in relation to young peoples' motivations and further educational choice alongside the interviews conducted in relation to the development of the pedagogical competency framework. Agricultural graduates and current agricultural students

were snowballed from the interviews conducted with the agricultural teachers in this phase. Each agricultural teacher interviewed was asked by the researcher to nominate one current agricultural student and one agricultural graduate suitable for the study. The requirements in selection of these two cohorts were; (a) current agricultural students must be enrolled on a full-time Level 6 agricultural programme; and (b) agricultural graduates must be farming full-time and have completed an agricultural qualification more than 3 years ago. This resulted in the identification of six agricultural graduates and six current agricultural students for inclusion in the study. Approaching the research in this way and including all cohorts of an education system from policy level to managerial level to instructor level to student level meant all key actors involved in agricultural education programmes were included in this phase of the study. This assisted in the establishment of a comprehensive, contextual, in-depth exploration of the research phenomenon which was concerned with student motivators. The findings provide insights and perspectives from all sides and angles of the education system which help reduce bias and increase the reliability, validity, and applicability of the results obtained.

Data Analysis

Qualitative data collected as part of the case study design process was audio-recorded and subsequently transcribed verbatim. Qualitative data analysis procedures as detailed previously in section 4.4.2 were employed in the data analysis stage of this research phase. Large amounts of data collected were separated, analysed, and synthesised using qualitative coding; open coding, axial coding, and integration (Enosh *et al.*, 2015; Strauss and Corbin, 1998) using NVivo 12 software. Open coding was employed to record comments and questions during the transcription process. Subsequently, axial coding was employed in the creation of subcategories within the dataset. This included the identification of each individual motivator; primary and secondary, influencing further educational choice. Finally, the last stage included integration of the subcategories into broader categories which resulted in the identification of primary and secondary motivators. Therefore, concepts occurring in-text, patterns occurring, and associations between themes were identified, analysed and recorded accordingly. Findings from this research phase are documented in Chapter 7.

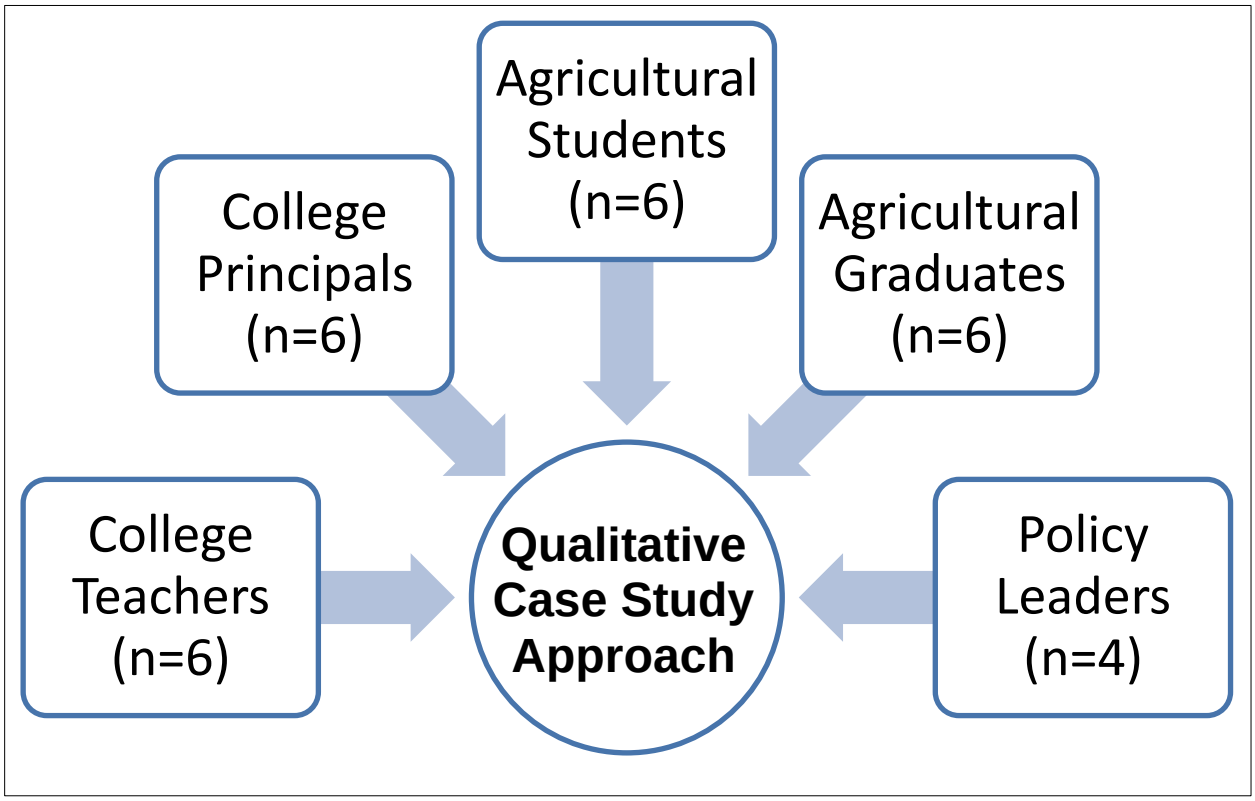

Figure 4.5: Research Phase 3: In-Depth Exploratory Design Participants

4.5 Ethical Considerations

The researcher and the researched constitute the two fundamental elements of a research project. Research must be conducted in line with scientific rules, standards, and cultural instructions and recommendations (Sarantakos, 2013). Therefore, it can be said that social science research connects people and regulations. With regard to professional practice, the researcher remained objective while conducting the research, maintained professional integrity, accurately collected, recorded, and analysed the data collected ensuring all participants remained anonymous in the process and that all data collected remained confidential. This study involved conducting research with adults and young people over the course of the project. When the research project commenced in September 2015 it was not necessary to obtain full ethical approval to conduct the research relevant to this project. However, the researcher compiled an information leaflet (see Appendix Six: Information Leaflet for Interviewee Participants) and a participant consent form (see Appendix Seven: Ethics Consent form for Semi-Structured Interviews) for all interviews and focus groups conducted as part of the study. These documents are included in the appendices section of the thesis. The information leaflet provided a description of the

doctoral study highlighting the aims and research objectives associated with the project. It identified the risks and benefits associated with participation and explained how the information gathered would be used. The participants were provided with the information leaflet in advance of the interview or focus group to allow enough time for absorption of information. Participants were then asked to sign the participant consent form on the day of the interview or focus group to confirm participants consent to participate in the study and for the research findings to be used as part of the study. Therefore, the researcher obtained consent from all individuals involved in interviews and focus groups as part of the selection process prior to conducting primary data collection.

4.6 Summary Remarks

Social science research is complex, diverse, and varied requiring a broad range of research designs and methods to address research problems. Three fundamental philosophical foundations associated with social science research include ontology, epistemology, and methodology. These three foundations exist in a continuum as ontology affects the epistemological position which affects the methodologies prescribed by the research methods, design, and instruments. Dominant ontologies include realism and constructionism which are associated with quantitative and qualitative research processes respectively. Epistemology encompasses positivism and interpretivism with methodology described as a research strategy which translates the ontological and epistemological principles into procedures documenting the research process and the methods employed. A knowledge and understanding of the philosophical assumptions underpinning both quantitative and qualitative methods of data collection helped in the identification of the most relevant methodology and methods applicable to this study. Quantitative and qualitative research processes are the two most popular research methodologies employed, however in the case of this study the researcher combined both quantitative and qualitative methodologies in the form of a mixed methods research design process. The researcher engaged explanatory and exploratory sequential design processes in addition to an in-depth case study approach to address the ontological and epistemological questions. This involved the integration of the positivist, constructionist, transformative, and pragmatic paradigms of social science research. Utilisation of the mixed methods research design paradigm supported a more

comprehensive, contextual exploration of the professional development needs of agricultural teachers in their role as educators. The research paradigm plus the methodological ontologies and epistemologies guided the selection of research instruments used in this study; survey's, focus groups, and semi-structured interviews. Participants were selected using a purposive snowball sampling procedure across the three distinct research phases employed in the study. An inductive approach to data collection and analysis was employed as the primary aim was to gain a knowledge and profound understanding of the professional development needs of agricultural teachers. This supported the grounding of research findings in the aims, objectives, opinions, and beliefs of the study participants. Both quantitative and qualitative data analysis procedures were employed in the analysis of the findings obtained.

The findings from the data collection phases of the doctoral study are detailed in the following three chapters as peer-reviewed publications. The first results chapter, Chapter 5, relates to objective one and the identification of the professional development needs of agricultural teachers in their role as educators. The second results chapter, Chapter 6, details the development of a pedagogical competency framework to address the professional development needs of agricultural teachers as identified in Chapter 5 (objective 2). Finally, the third results chapter, Chapter 7, addresses objective three, providing a detailed account of the primary and secondary motivators influencing young peoples' further educational choice within farming itself. There is a clear flow between objective one and two respectively in terms of identifying agricultural teacher professional development needs and addressing such needs through the development of a pedagogical competency framework. The third objective, which explores students' motivators inside the context of further educational choice within farming itself, contributes a nuanced understanding of young people within agriculture. This conceptualisation is of importance to agricultural teacher professional development in terms of creating a successful teaching and learning environment and enhancing student engagement.

Chapter 5: Results

An Exploration of the Professional Development Needs of Agricultural Educators within the VET Sector: A Mixed Methods Study

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Abstract

Recent studies have highlighted the contribution of education to the productivity and viability of the Irish agricultural sector. This paper explores the training needs of agricultural educators within the vocational education and training sector by examining educators' experience in their role based on educator qualification, availability of continuous professional development and opportunities for development. The study was conducted in Ireland using a mixed methods explanatory sequential design. The study sample consisted of the national population of agricultural educators within the vocational education and training sector, i.e. agricultural colleges. Data collection methods included a national survey and three focus groups. The findings highlight a challenge across Irish agricultural colleges in how educators are trained to teach, in their motivations for the role, and their long-term desire to remain teaching. It also demonstrates the importance of continuous professional development and the need to enhance training, particularly, pedagogical training, to agricultural educators. It can be concluded that stronger supports are required at both recruitment and throughout an educator's career for development and progression. This study is one of the first studies in Ireland to investigate the continuous professional development needs of agricultural educators within the vocational education and training sector. The paper explores the pedagogical underpinnings of agricultural education, with the aim of developing teaching and learning needs in parallel to technical expertise.

Keywords: Agricultural education, pedagogy, professional development, training, vocational education, teaching and learning, extension, Ireland, mixed methods

Paper Type: Original research paper

Introduction

Contemporary agriculture is characterised by a number of demographic challenges that include an ageing population, engaging young farmers, and succession (Meredith and Crowly, 2018; Ní Laoire, 2002; Russell, 2017). For young farmers, the formal route to farming, and in particular to achieve eligibility for state supports is through agricultural education. While Heanue and O'Donoghue (2014) demonstrate the importance of a formal agricultural qualification in benefiting higher production rates and increasing economic returns in a competitive agricultural industry, there have been limited studies on the teacher experience within the delivery of that qualification. It is timely, therefore, to reflect further on the early education of young farmers, and specifically, on the teachers that facilitate their learning. It is well established that there are two pathways of education in agriculture – formal and informal pathways (Beijaard *et al.*, 1997; Kilpatrick, 2000; Rolls, 1997). In the lifetime of a farmer these pathways will intertwine and separate, one informing the other, and leading on to each other. While the role of the extension agent as an educator is well established in public and private advisory services, the parameters of formal teaching are less clear.

Agricultural education is the teaching of agriculture, natural resources, and land management through hands-on experience and guidance to prepare learners for entry into the agricultural industry (Bird *et al.*, 2013; NAAE, 2017; Rubenstein *et al.*, 2014). Generally, there are three key foci within studies of agricultural education, namely: (i) the impacts of education and training on the sector (Brennan *et al.*, 2016b; Heanue and O'Donoghue, 2014; Howley *et al.*, 2017; Leonard *et al.*, 2017); (ii) the learner experience (Alkhasawneh *et al.*, 2008; Anthony Jr, 2008; Biggs, 1999); and to a much lesser extent, (iii) the teacher role (Dolan and Kenny, 2014; Kind, 2016; Walker and Gleaves, 2016). It is this latter focus of the role, experience, and perspective of the teacher that is central to this paper. The purpose of the paper is to explore the experience of agricultural educators within the Vocational Education and Training Sector[3] (VET) in Ireland, identifying opportunities for and barriers to their professional development in the context of advances in approaches to teaching and learning. Young farmers now engage with formal educational services in the

[3] VET takes place post-secondary/high school but is not part of the third level system

form of VET. In Ireland, this equates with Teagasc-provided[4] Level 5 and Level 6 courses on the National Framework of Qualifications (NFQ) as derived by Quality and Qualifications Ireland (QQI)[5]. While educational services are formalised and accredited by QQI in Ireland the actual training for teachers is not.

Traditionally agricultural education is very much intertwined with extension (Cristóvão *et al.*, 2012; Hermans *et al.*, 2015; Ingram, 2017; Prager and Thomson, 2014). Given the over-lapping nature of the two, education has become an integral part of extension services rather than as a separate route of knowledge transfer and professional development. Indeed, in the context of this paper's case study, the current 'common pool' approach to recruitment highlights the on-going interchange of extension and education within the agricultural knowledge system in Ireland. In this instance, for example, advisors and educators are recruited from the same pool of agricultural science graduates. It is extensively highlighted in the literature that a strong link between advisory, education and research results in a much more effective agricultural extension system (Anderson and Feder, 2004; Botha *et al.*, 2008; Prager and Thomson, 2014). However, in the case of this research project, where individuals are recruited from the same pool of applicants regardless of preferred professional pathway their first choice of working in the agricultural knowledge system may be advisory rather than education and they may take up education positions while awaiting opportunities for advisory roles. Different medium-term career goals present a challenge in terms of their training needs and requirements.

Agricultural education institutions have an important developmental role in terms of delivering the knowledge and expertise to the trainee farmer and helping them acquire the skills and attributes required to apply this knowledge and expertise to farming systems. The trainee farmer gains the confidence and ability to seek new knowledge and adapt such knowledge to any farm system (Anderson and Feder,

[4] Teagasc is the main provider of VET in agriculture, food, horticulture, and equine studies in Ireland.

[5] Level 5 and Level 6 courses on the NFQ are equivalent to Level 4 and Level 5 respectively on the European Qualifications Framework. Graduates of V.E.T. programmes obtain a Certificate level of training, acknowledging their specialised skills training and ability to perform as a skilled labourer within the workplace.

2004; Darnhofer *et al.*, 2012; Klerkx *et al.*, 2012). The challenge, however, is in examining the needs of teachers in this context. Very few of the current teaching cohorts in agricultural colleges have formal pedagogical qualifications, having been recruited due to their agricultural science qualification and expertise. Consequently, these educators have little to no pedagogical background as there is no obligation on agricultural educators to complete pedagogical courses at any stage in their career. This is outside the norm of other VET agricultural education jurisdictions within Europe, such as the Netherlands, where agricultural educators must either possess a teaching qualification upon employment or alternatively obtain a teaching qualification within two years of employment (De Bruijn *et al.*, 2017). Given that Ireland is an outlier in the context of agricultural education there is a strong rationale for exploring the professional development needs of agricultural educators.

Given the challenges outlined, this paper is organised around four key areas. The first provides a theoretical framework for the study. Secondly, the methodologies employed in the data collection phase are detailed. The third section provides a discussion of the results, and finally, the paper draws conclusions and recommendations associated with the results. It is important to note this paper is part of a broader research project and this initial stage of the study explores the overall professional development needs of agricultural educators. Other foci, as a result of the findings to date, include the development of a competency framework to provide support to educators following identification of specific pedagogical training required by agricultural educators in the future. The framework will be used as a tool for auditing, planning and assessing future continuous professional development (CPD) needs of agricultural educators within the VET sector and will provide the basis of future publications.

Theoretical Framework

At its simplest, education can be divided into its two interdependent parts; teaching and learning. Teaching is a complex term: is it a profession or occupation, a practice or activity, vocation or calling? The results of teaching are found in the learner, not in the teacher and teaching does not always result in learning and therefore must be constructed around the apparent need for learning (Fitzmaurice, 2010; Jõgi *et al.*, 2015; Noddings, 2003). Hence, the educator becomes a facilitator of learning and

guides student learning. Consequently, teaching and learning are very tightly bound activities.

The roles and responsibilities of the teacher have become much more complex and demanding (Kasule *et al.*, 2016) as they are expected to deal with a wider range of students of varying levels of ability in an environment where the needs and demands of learners are constantly changing (Conway *et al.*, 2009; Gleeson, 2012; Tobail *et al.*, 2016). Consequently, educators should be supported in their attempt to cope with these emerging demands through the provision of appropriate, up-to-date and relevant, high-quality CPD (Harford, 2010; McMillan *et al.*, 2016; Murphy and de Paor, 2017). CPD and training have a key role to play in securing staff commitment and helping staff realise their true potential (Dysvik and Kuvaas, 2008; Velada and Caetano, 2007). Investment in training also reassures employees they are valued by their employer which consequently increases employee motivation and commitment to the organisation (Ashar *et al.*, 2013; Dysvik and Kuvaas, 2008; Ghanbari and Eskandari, 2013). Educators are attracted to CPD when an opportunity presents itself to expand existing knowledge and skills, contribute to their growth as educators and enhance student learning and educator effectiveness within the classroom (Guskey, 2002; Velada and Caetano, 2007). Therefore, a systematic approach to the training process whereby there is assessment of training needs, development and implementation of a training program followed by evaluation of the training process should be employed. Identifying the training needs through assessment is a crucial part of the training process as it provides information on who needs to be trained, the type of training program required and how the results of the training program are to be evaluated. Investment in training and approaching the training process in this manner helps an organisation achieve a more competent, better motivated and more independent workforce (Elnaga and Imran, 2013; Hanaysha, 2016; Kapenda and Pieters, 2017). Finally, staff morale increases, and positive employee attitude evolves where skills development is associated with career progression, recognition and reward thus highlighting the benefits associated with investment in training and CPD.

Methodology

A mixed methods approach was used in this study by combining both quantitative and qualitative research methods. There are several definitions of mixed methods but for the purpose of this research mixed methods can be defined as a way of collecting and analysing quantitative and qualitative data, integrating both methods of data collection and their results, and using certain mixed methods designs (Creswell and Clark, 2018). The core mixed methods design used in this study was the explanatory sequential design which consists of two distinct phases: quantitative data collection followed by qualitative. Quantitative data was collected via a national survey and analysed prior to collection of qualitative data via two focus groups. The two phases of data collection were integrated at the intermediate stage of the study. The quantitative phase helped explain and provide a general understanding of the research problem. The qualitative phases assisted in the explanation of statistical results obtained in the quantitative phase, allowing the researcher explore participants' views and opinions in more depth (Creswell and Clark, 2018; Ivankova *et al.*, 2006; Tashakkori and Teddlie, 1998). A national survey of agricultural educators and three focus groups were used to gather the information required to answer each research objective.

Pre-Survey Focus Group

Prior to developing the national survey, a focus group was conducted with a cohort of volunteer agricultural educators (n=9) at an education training day held in County Carlow, Ireland in February 2016. The purpose of this focus group was to gain an insight into educators experience in their role as educators in terms of regular challenges they face and potential areas for improvement. The information gathered in this focus group was used in the formulation of the national survey.

National Survey

All agricultural educators (n=76) within the six Teagasc[4] Irish Agricultural Colleges were invited to complete a national survey in June 2016. A satisfactory response rate of 67% was achieved from the national survey which consisted of both open-ended (n=5) and closed-ended (n=31) questions. This survey focused on current levels of training received and satisfaction levels with such training, identification of potential

improvements to future training and support provided, investigated educators pedagogical knowledge, and finally agricultural educators career path intentions and the impact of training and support on their career path intentions. A 5-point Likert scale was used to assess attitudes and satisfaction within the survey. Prior to distribution of the national survey, it was piloted with a cohort of individuals who had previous teaching experience in an Irish agricultural college. The results from the pilot survey were analysed and final amendments were made to the national survey prior to distribution.

Agricultural Educators Focus Groups (n=2)

Following analysis of the national survey, two focus groups were conducted with agricultural educators within the six Teagasc4 Irish Agricultural Colleges. Participants were selected from the national survey based on their agreement to participate in a follow-up focus group. The first focus group consisted of new, relatively inexperienced educators (n=7) with less than five years' experience in their role as educators from each of the six agricultural colleges. A second focus group was conducted with more experienced educators (n=6) in the South-East of Ireland who had more than five years' experience in their role as educators. Both focus groups explored three main themes: (i) level and type of training received; (ii) teaching skills and strategies; and (iii) future professional development needs. These focus groups provided in-depth information on pedagogical training available to educators and their level of satisfaction with all types of training offered to them based on national survey results. They also identified potential areas for improvement in terms of future educator training in pedagogical skills and strategies based on educator experience.

Data Analysis

Qualitative data collected via the focus groups were recorded and subsequently transcribed. These transcripts along with the national survey results helped identify many key themes within this study.

Quantitative data collected via the national survey was coded and subsequently analysed using the statistical processing computer software package IBM SPSS Modeler 18 64-bit. Descriptive analysis was used to provide general descriptions of

the national survey data followed by a relational analysis which explored relationships and associations between variables.

Thematic analysis was used to analyse qualitative data obtained from each of the three focus groups. An inductive approach was used for coding and identification of themes from qualitative data collected. Repetitions, similarities, and differences were recorded and subsequently divided into themes. This method of analysis was applied to identify concepts occurring in-text, analyse patterns in-text, and to discover associations between themes. The main themes emerging from each of the three focus groups included; lack of support in terms of materials and resources available; vast diversity in level of student ability; lack of specialisation in specific subject area; lack of pedagogical knowledge; inadequately prepared and trained for their role as educators; barriers to professional development; and opportunities to improve and enhance both formal and informal training provided to educators.

Integration in this explanatory sequential design consisted of explaining survey results with qualitative focus groups, connecting the quantitative results with the qualitative data collection.

Results Discussion

Profile of Respondents

Based on national survey results obtained in this study the majority of agricultural educators in Irish agricultural colleges are male (80%) and aged between twenty and forty years of age (82%). Of the agricultural educators surveyed, 63% have permanent contracts and very little experience in their role as educators with only one-third of educators possessing more than five years' experience in their role. The majority of Irish agricultural educators possess a Level 8 Honours Bachelor degree qualification (35%) or Level 9 Post-Graduate degree qualification (49%).

The study population in this paper is small due to the nature of the delivery of agricultural education within the VET sector in Ireland. As alluded to previously, there are six Agricultural Colleges nationally under the Department of Agriculture, Food and the Marine and at the time of this study, there were less than one hundred agricultural teachers (n=76) within these colleges teaching full-time students. Consequently, the sample size used within this study may appear to be relatively

small but the numbers used are representative of the national population of agricultural educators given the size of the total population of agricultural educators in Ireland.

Agricultural Educators Perceptions and Attitudes towards a Teaching Role

The majority of agricultural educators (90%) 'like' teaching because it gives them great satisfaction and pride from the student interactions and success achieved by individual students. As a result, they feel it is a very rewarding job which provides them with great experiences and opportunities to meet new people and build connections. As one educator states;

> *"I believe that enabling a student to achieve, helping them to develop an understanding of new information and potentially a passion for a particular subject area is one of the most rewarding things you can do. Walking out of a class where students really became engaged in the subject and a good discussion was generated is very uplifting. What's not to like (Respondent 42, Q28 (a). National Survey)"*

However, deeper investigation into employee attitudes and perceptions in terms of motivation for their role and their level of commitment to that role revealed that educators do not intend to stay in formal education within extension, seeking career paths in other areas of the extension services. Almost three-quarters of educators that do not intend to remain in education have less than five years' experience in their role as educators. These findings present a significant challenge in terms of agricultural educator retention levels into the future.

A career in the advisory services is the most sought after position with 72% of educators who wish to move on from education intending to enter the advisory services. Other areas of interest include research, private agricultural industry and full-time farming. This presents a significant challenge in the field of VET agricultural education as education does not appear to be the preferred professional pathway in agricultural extension within Ireland. Consequently, commitment and retention of agricultural educators into the future may pose a significant challenge to the VET sector.

As identified previously, almost three-quarters of these educators have less than five years' experience in their role as educators. Consequently, it must be noted that this cohort of educators were employed at a time when severe pressure was being placed on Irish agricultural institutes to reduce the back-log of individuals on a waiting list for a place on a Green Cert programme[6] to become recognised as a 'trained farmer'. Typically, pre-2015, in excess of 3500 students enrolled on Teagasc[4] V.E.T. programmes. However, post-2015, in excess of 5000 students are enrolling on these programmes. Cohorts of educators recruited since 2015 were inexperienced in their role and endured greater pressures than their more experienced counterparts who are familiar with the education system. Consequently, a greater number of these educators perhaps view other roles, as mentioned previously, as more favourable career paths. Interestingly, on the other hand, more experienced educators with greater than six years' experience in their role as educators who wish to move on from their role as agricultural educators seek a career in a senior educational role. Consequently, these results suggest educator's motivations differ depending on their stage in their career.

Perception of Agricultural Educator Training

Agricultural educators receive technical training to stay abreast with current and new technologies and practices in agriculture. Technical training is available to educators on a monthly basis if they can allocate the time to attend training. New entry agricultural educators also receive a limited level of pedagogical training in teaching and learning skills and strategies via a four-day pedagogical course (Level 6 QQI Award), however, this training is not mandatory and is only offered to new recruits at present, typically within eighteen months of commencing employment. This study examined educators level of satisfaction with the training received and identified areas for improvement. When the relationship between educators' level of satisfaction with training received and their level of confidence in both their technical and pedagogical content knowledge was examined an association between the two variables became evident. Findings presented in Table 5.1 and Table 5.2 suggest

[6] The Green Cert Programme comprises a list of land-based courses qualifying individuals as a 'trained farmer'. Individuals require this qualification to be eligible for agricultural schemes i.e. stamp duty exemption, agricultural stock relief, national reserve, young farmer scheme, etc.

there is an association between educators' level of satisfaction with training received and their overall knowledge of the core agricultural enterprises they teach as well as their knowledge of the teaching and learning skills that enable effective teaching. This highlights that training has a key role to play in the development of agricultural educators both personally and professionally.

Table 5.1: Relationship between educators rating of their technical knowledge on the core agricultural enterprises they teach and their level of satisfaction with technical training provided on the core agricultural enterprises (n=51)

		Level of satisfaction with technical training provided on core agricultural enterprises			
		Unsatisfied Overall No. (%)	**Don't Know** No. (%)	**Satisfied Overall** No. (%)	**Total** No. (%)
Rating of technical knowledge on core agricultural enterprises	**Poor Overall**	2 (66.7%)	0 (0.0%)	1 (33.3%)	3 (100.0%)
	Neither Good Nor Bad	2 (40.0%)	0 (0.0%)	3 (60.0%)	5 (100.0%)
	Good Overall	14 (32.6%)	2 (4.7%)	27 (62.8%)	43 (100.0%)
	Total	18 (35.3%)	2 (3.9%)	31 (60.8%)	51 (100.0%)

Table 5.2: Relationship between educators rating of their knowledge on the teaching and learning skills that enable effective teaching and their level of satisfaction with pedagogical training provided (n=51)

		Level of satisfaction with pedagogical training provided			
		Unsatisfied Overall No. (%)	**Don't Know** No. (%)	**Satisfied Overall** No. (%)	**Total** No. (%)
Rating of knowledge on teaching and learning skills that enable effective teaching	**Poor Overall**	7 (87.5%)	0 (0.0%)	1 (12.5%)	8 (100.0%)
	Neither Good Nor Bad	6 (60.0%)	2 (20.0%)	2 (20.0%)	10 (100.0%)
	Good Overall	11 (33.3%)	8 (24.2%)	14 (42.4%)	33 (100.0%)
	Total	24 (47.1%)	10 (19.6%)	17 (33.3%)	51 (100.0%)

Agricultural educators are satisfied with the level and type of technical training provided to them. Sixty-one per cent of educators are satisfied with technical training

received which was proven further in the focus groups with one educator stating *'The technical training is good you cannot deny that (Participant 5, FG3, Pg8)'* and all other participants in full agreement with this statement. Within the focus groups it was also highlighted that educators do not want more technical training but believe it could be improved through the provision of one-off trainings on online agricultural tools i.e. Carbon Navigator[7], Nutrient Management Plan Tool[8], etc.

> *"There is stuff there like the Nutrient Management online or Carbon Navigator. There is general stuff, not just enterprise-specific, that I wouldn't get to training on during the year because I don't have time to go but everybody here should know that stuff (Participant 5, FG3, Pg6)"*

Therefore, as a result of these findings, technical training satisfactory levels are good amongst agricultural educators.

In contrast, there is an evident difference between agricultural educators level of satisfaction with technical versus pedagogical training. Forty-seven per cent of agricultural educators are not satisfied with pedagogical training received and a further 20% are unsure of their level of satisfaction. These levels highlight a need to provide sufficient pedagogical training to agricultural educators in the future. Within this study, less experienced educators were more satisfied with pedagogical training when compared to their more experienced colleagues. This is not surprising as new entry agricultural educators receive a four-day pedagogical course (Level 6 QQI Award) which equips them with a certain level of pedagogical competence. The more experienced educators do not receive this training (nor did they in the past) which further signifies the importance of both improving and extending the provision of pedagogical training to agricultural educators. However, the form of pedagogical training required by more experienced versus less experienced educators differs. Within the focus groups conducted with more experienced educators in this study,

[7] Carbon Navigator: online farm management package which measures environmental gains that can be made on farm by setting targets in key areas e.g. length of grazing season, spring application slurry.

[8] Nutrient Management Plan tool: online system for developing nutrient management plans for environmental and regulatory purposes.

educators highlighted key areas for improvement and the type of training that would benefit this particular cohort of educators;

> *"I learnt more by watching other people present to other students…by watching them, how they're arriving and they're presenting themselves and the tone and the style and how they communicated it. It was actually therapeutic or energising watching a number of people in action…I'm sure we'd all benefit from different styles… (Participant 1, FG3, Pg15)"*

> *"It is well known that teachers are the worst people you can present to because for the first half-hour of the presentation they'll be looking at the person presenting and will say well how would I have reacted (Participant 2, FG3, Pg15)"*

This cohort of educators are not seeking information on the theories that underpin education but seek knowledge on new technologies and alternative communication, presentation and teaching styles.

There is a positive attitude amongst all agricultural educators in this study and a willingness to engage in training, particularly pedagogical training. Of those educators that completed the national survey, 79% are willing to engage in additional pedagogical training upon provision. A strong association was evident between agricultural educator level of satisfaction with pedagogical training and willingness to engage with 60% of agricultural educators who are unsatisfied with current pedagogical training received declaring a willingness to engage in this form of training. Therefore there is great potential to increase and improve the pedagogical training provided to agricultural educators which in turn could improve their satisfaction levels with pedagogical training and lead to increased student engagement and better morale overall both in the classroom and the workplace. As this study is the first stage in a broader research project the purpose of this paper is to explore the CPD needs of agricultural educators and subsequent research conducted by the authors will identify the specific pedagogical training needs of agricultural educators into the future.

Conclusions and Recommendations

There is a challenge facing Irish agricultural colleges in how teachers are trained to teach, in their motivations for the role, and their long-term desire to remain teaching. Primarily, agricultural educators with less than five years' experience in their role as educators seek employment in the advisory services with longer-term staff seeking senior educational roles. This represents a change in agricultural educator motivations depending on their stage in their career. Furthermore, regardless of professional pathway, education is not the preferred career within agricultural extension. This poses a significant challenge to the retention of agricultural educators within the VET sector. Therefore, agricultural educators require stronger supports both at recruitment and throughout their career for development and progression.

A limited number of agricultural educators possess a pedagogical qualification as a result of being recruited based on their technical knowledge and expertise with no obligation on these educators to complete any pedagogical training or qualifications. As mentioned previously, this is outside the norm of other European jurisdictions, for example the Netherlands, where agricultural educators are obliged to obtain a teaching qualification within two years of employment unless they already possess a teaching qualification upon employment (De Bruijn *et al.*, 2017). These educators are expected to deal with students from a variety of backgrounds, with varying levels of ability in a setting where the demands of students are constantly changing (Conway *et al.*, 2009; Gleeson, 2012; Tobail *et al.*, 2016). This places increased pressure on agricultural educators which subsequently highlights the importance of providing relevant, up-to-date, high-quality CPD to these educators (Harford, 2010; McMillan *et al.*, 2016; Murphy and de Paor, 2017) in an attempt to provide stronger supports and better assistance to agricultural educators in their role.

From this study, agricultural educators are satisfied with the technical training they receive which provides them with information on current and new technologies and practices available to the different agricultural enterprises (Beef, Dairy, Sheep, Tillage, etc.). However, a deficiency in the provision of pedagogical training provided to agricultural educators has been identified. Agricultural educators in this study are not satisfied (47%) with the pedagogical training they receive and seek more support

and guidance in this area. Despite the level of dissatisfaction with the provision of pedagogical training, agricultural educators in this study have a positive attitude towards CPD with 79% of educators willing to engage in future CPD on pedagogical skills and strategies. Consequently, this highlights an opportunity to engage with agricultural educators and enhance the pedagogical CPD made available to educators in the future. Investment in CPD will play a key role in the development of educators both personally and professionally as it leads to increased staff morale and commitment to an organisation, enhanced student and educator motivation, and improved educator effectiveness and student engagement, as extensively highlighted in the literature (Ashar *et al.*, 2013; Dysvik and Kuvaas, 2008; Ghanbari and Eskandari, 2013; Velada and Caetano, 2007).

Given the career path intentions of agricultural educators in this study, their commitment to their role, the lack of pedagogical training provided, and their willingness to engage in future CPD, the need to improve and enhance the CPD opportunities available to agricultural educators is evident. Investment in CPD will benefit both the educator and the organisation. It will enable educators to identify their true potential and feel valued by the employer but also benefit the organisation as it should lead to a more competent, better motivated and more independent workforce (Elnaga and Imran, 2013; Hanaysha, 2016; Kapenda and Pieters, 2017).

Therefore, in conclusion, both formal qualifications and informal peer engagement have a role to play in the development of agricultural educators within the VET sector. This paper extensively highlights the importance of CPD and the need to both increase and enhance the availability of CPD, particularly the provision of pedagogical skills and strategies, to agricultural educators. Such investment also has the potential to increase retention of educators within the organisation and boost staff morale, which are significant challenges facing agricultural education within the VET sector in the present competitive industry. Subsequent research conducted by the authors as part of the broader research project will identify specific pedagogical training needs of agricultural educators into the future.

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Chapter 6: Results

Use of a Transnational Participative Process to Develop a Pedagogical Competency Framework for Sustainable Agricultural Teachers

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Highlights

- A pedagogical competency framework was developed for agricultural teachers.
- Transnational mixed methods approach was developed to construct the framework.
- The framework presented in this paper is grounded in a participative process.
- Eight pedagogical competencies for agricultural teachers were identified.
- Research focus has transferability to land-based education within the rural context.

Abstract

This paper details the development of a pedagogical competency framework (PCF) for agricultural teachers within the vocational education and training (VET) sector. In light of the need to address global food security and sustainable land use, education in the sector has a responsibility to examine not only what it teaches but also why and how it teaches. As part of a response to this need, a participative, transnational mixed methods approach incorporating four distinct stages was developed to construct the framework. The research focus is on agricultural education, which has broader transferability in the methodological, conceptual and practical approaches to land based education, particularly in the rural context.

Keywords

agricultural education, competency framework, pedagogy, VET, professional development

Introduction

Competence can be described as a multifaceted blend of knowledge, skills, attitudes, values, understanding, and desires which result in an effective, embodied cognition within a particular domain (Deakin Crick, 2008). Educator competencies raise educators' awareness of the need to up-skill and develop throughout their career. Competence based approaches are used across a variety of disciplines (Biemans *et al.*, 2004; Boahin *et al.*, 2014; Mulder, 2012; Mulder and Winterton, 2017), supporting the transformation of teaching philosophy and practice, quality assuring continuous professional development (CPD), and enhancing educators' ability to teach and achieve a productive learning environment (European Commission, 2013b). This paper details the development of a 'pedagogical competency framework (PCF)' for agricultural teachers within the vocational education and training (VET) sector. The study-specific mixed methods approach draws on a body of methodological and theoretical approaches to building competency frameworks. In developing the framework, mixed methods were employed at multiple scales (horizontal, i.e. transnational (Ireland and the Netherlands); and vertical, i.e. participative design and top-down to bottom-up), allowing breadth and depth within the study, and to position the research findings' applicability beyond the discipline of agriculture into broader land related education programmes. The epistemological position of the research required the development of a mixed methods approach and highlights the interdependencies of theory and methodology, converging in the PCF.

The PCF described within this paper is defined as a conceptual structure which encompasses the pedagogic knowledge, skills and dispositions required by teachers to support the delivery of quality teaching and learning within the land use related VET sector (Alexander, 2013; MindTools, 2019). There is a range of literature on the development of competency frameworks within education sectors, particularly in higher education (Lans *et al.*, 2014; Roth and Pilling, 2008; Strasser *et al.*, 2005; Wesselink, 2010; Wesselink and Wals, 2011). This paper will contribute and add to this body of work by developing a transnational, participative mixed methodology for the development of competency frameworks; and given the dearth of such research within the agricultural VET sector, provides a new perspective on teaching and learning where there is a tendency to place more emphasis on technical and

scientific value. Hence, there is a need to conceptualise a competency framework which is concerned with developing educator competence in pedagogical knowledge in parallel with technical expertise.

A competency framework is a tool that can be used in supporting educators' professional development to promote quality education and enhance teaching. The purpose of the PCF described within this paper therefore is to provide a roadmap of pedagogical competencies which educators should aim to achieve within the agricultural VET sector. With this aim, the researchers created and developed a participative mixed methods approach to establish the framework. Educators are considered key agents in shaping education for learners and generating change and innovation in educational practices (Bakkenes *et al.*, 2010; Kasule *et al.*, 2016). Agricultural teachers play a significant role in the development of future 'young farmers' entering the highly competitive agricultural sector (Bird *et al.*, 2013; Fielke and Bardsley, 2014; NAAE, 2017; Rubenstein *et al.*, 2014) with the additional challenge of goals for sustainable land use. Therefore, development of such a framework has the potential to enhance the provision of agricultural land use education as the framework can be used as a tool to identify deficiencies in teachers' pedagogical capabilities and seeks to enhance educator quality which has a significant influence on the quality of graduates in any education system globally (Rowe, 2003).

Paper Structure

Given the complexity of the PCF developed and the participative methodological approach used in establishing the framework, the paper is specifically structured to reflect the research stages. The next section details the methodology created for the development of the framework. The subsequent sections detailed in the paper follow the methodological approach employed within the study as per Figure 6.1. This structure was adopted because the development of the methodological approach and the resultant framework are inextricably linked. In the case of this paper, a discussion of the findings from this study is provided after all data collection methods and results are presented in each stage. This paper addresses the objective to conceptualise a framework for VET teachers which demonstrates the necessary pedagogical competencies required within the agricultural domain.

Methodology

A sequential mixed methods design was selected for this study to capitalise on the strengths of both qualitative and quantitative approaches in explaining significant findings (Leech and Onwuegbuzie, 2010) in addition to ensuring significant depth and breadth was obtained (Chen, 1997; McKendrick, 1999). Achieving depth was fundamental to this study to explore the pedagogical competencies agricultural teachers should possess given their unique and distinct contexts within the VET field. Breadth was achieved by the inclusion of a transnational perspective to the study by carrying out elements of the research in both Ireland and the Netherlands. Traditionally, exploratory sequential mixed methods design begins with the collection and analysis of qualitative data to explore a phenomenon, followed by the development of a quantitative instrument. The final step is to test the quantitative instrument and the extent to which it generalises or extends the initial qualitative findings (Creswell and Clark, 2018). Therefore, a qualitative exploration is followed by a quantitative instrument. For this paper, the researchers developed a participative mixed methods approach by combining findings from the literature (Kasule *et al.*, 2016; Wesselink and Wals, 2011) to create their own design which incorporates an additional qualitative step of follow-up focus groups as well as a transnational perspective. The methodology was created by the researchers for the purpose of this study as the strengths of one approach counteract the weaknesses of another offering new insight that goes beyond separate quantitative or qualitative methods alone. Incorporating a transnational element provided a universal lens through which pedagogical competencies were identified, increasing the practical relevance of the framework. The first stage in the development of the framework involved an extensive review of the literature leading to the development of a theoretical framework. The second stage was a qualitative exploration of the pedagogical competencies relevant to agricultural VET teachers using face-to-face semi-structured exploratory interviews. Agri-food is the largest indigenous economic sector in Ireland, and as such accounts for 64% of land use (Trading Economics, 2019; World Bank, 2019). Similarly, the Netherlands has a particularly advanced agri-food sector, especially in education competence studies (Mulder *et al.*, 2005; van Dam *et al.*, 2010), and thus was included as part of stage 2 data collection. This transnational insight provides the PCF with an international perspective, giving

greater context to what could be a narrower national sectoral study, given that the development of pedagogical qualifications at the VET level in Ireland is a relatively new space. The third stage involved the development of a quantitative survey instrument based on interview data collected. A draft version of the framework was developed following analysis of the interview and survey data collected. Finally, the fourth phase included focus group discussions with senior agricultural education managers to finalise and refine the framework, in tandem with a variable Factor Analysis. A final version of the framework was created following complete analysis of all four stages of data collection. All stages in the researchers data collection were integrated; one informing the other to develop a comprehensive PCF which is embedded in the culture, nature, and perspectives of the sample population (Creswell and Clark, 2018).

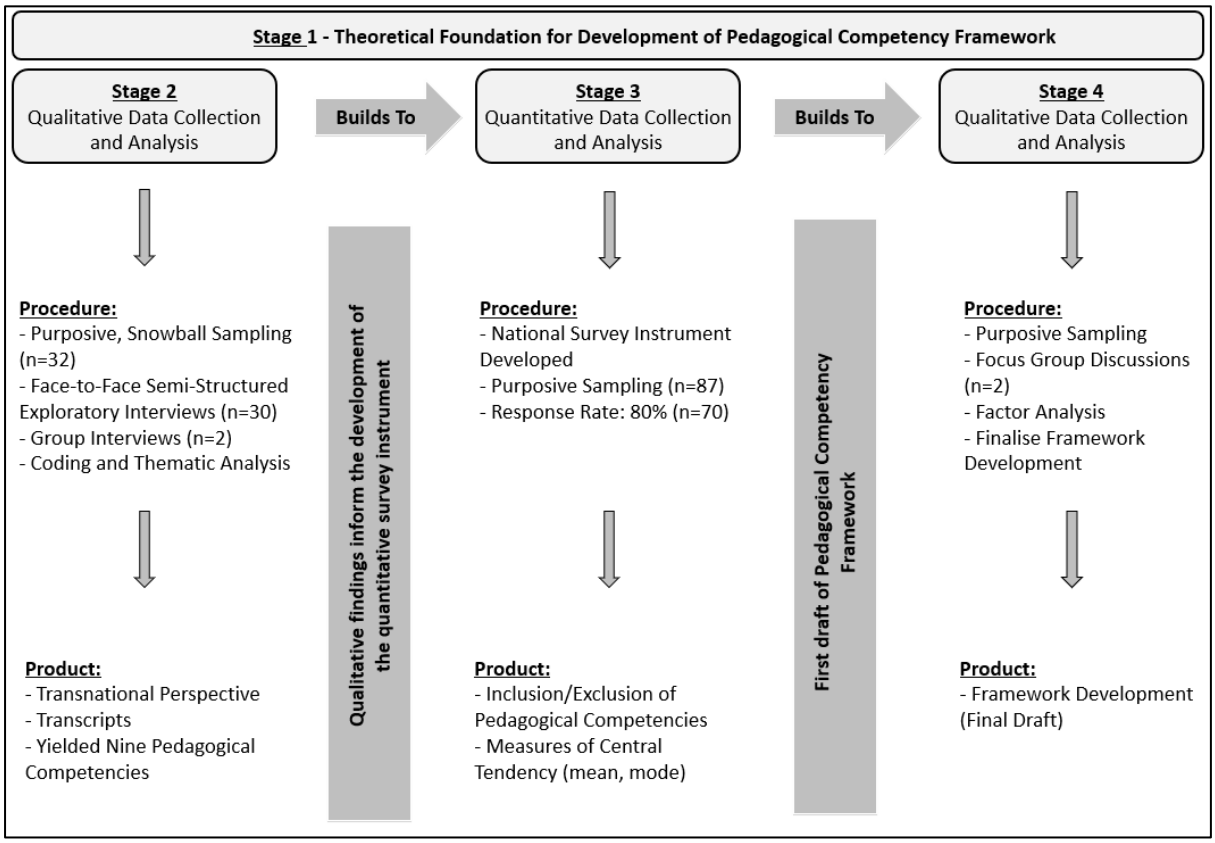

Figure 6.1: Procedures of the Exploratory Sequential Design Employed in this Study

Stage 1: Theoretical Framework

An extensive review of the literature was conducted prior to data collection procedures to create a theoretical model for the PCF. Competence signifies the integration of knowledge, skills and attitudes that empower individuals to complete particular tasks (Wesselink and Wals, 2011). Competencies support strategic workplace planning, selection, training and development, performance management, succession planning, motivation and reward (Dubois and Rothwell, 2004; Lievens *et al.*, 2004; Wesselink and Wals, 2011). Within teaching, the concept of competence encompasses tacit and explicit knowledge, cognitive and practical skills, in addition to individual characteristics such as beliefs, motivation, emotions and values (Rychen and Salganik, 2003; European Commission, 2013b). Pre-defined teacher competence frameworks can aid in the selection of educators, their preparation and professional development, and facilitate the development and implementation of policy procedures. Within this study, the development of the framework is concerned with pedagogical competence which is defined as an individual's capability to use a synchronised, collaborative combination of tangible and intangible resources to achieve efficacy in pedagogy (Madhavaram and Laverie, 2010). Therefore, pedagogical competence is at the core of the framework. Teachers' pedagogical competence also refers to the ability to facilitate learning including planning, implementation and evaluation of individual learning outcomes. The success of both teaching and learning depends on individual educator competencies (Rahman, 2014). Therefore, to improve the performance of educators, the educator must improve their pedagogic competence.

From the agricultural land use perspective, the importance of education within a rapidly changing technological and economic environment has been identified (Fielke and Bardsley, 2014; Heanue and O'Donoghue, 2014). Farmers with a formal agricultural qualification have larger farms, increased family farm incomes, and greater gross margins per hectare than their non-educated counterparts (Heanue and O'Donoghue, 2014). Therefore, there is a place for agricultural education in terms of economic, social and sustainable development. In addition, educated farmers are more likely to adopt technology (Cotching *et al.*, 2009; O'Callaghan *et al.*, 2016) and so can support and encourage the diffusion of new technologies within farming communities as they set an example for less educated farmers.

Over the past decade agricultural land use has changed considerably across Europe (van Vliet *et al.*, 2015). Agricultural land follows development trajectories and is continually changing as mountain areas encounter land abandonment (MacDonald *et al.*, 2000), societal demands influence peri-urban areas (Zasada, 2011), and technological developments drive yield increases (Olesen *et al.*, 2011). Agricultural areas are responsible for the provision of a wide variety of goods and services such as food, feed, and fibre but also incorporate biodiversity preservation (Young *et al.*, 2007) and climate change mitigation (Freibauer *et al.*, 2004; van Vliet *et al.*, 2015). At a European level, policy measures and regulations directly influence the impact of agricultural land use on the environment (van Vliet *et al.*, 2015). Two significant drivers of agricultural land use change include population expansion and dietary changes of the expanding population. An increased need for food, fuel, and shelter is encountered as global population rises (Foley *et al.*, 2011). Additionally, increased wealth within population clusters causes a shift in food consumption patterns towards commodities that are more land intensive to supply, such as meat products (Alexander *et al.*, 2015; Delgado *et al.*, 2001; Godfray *et al.*, 2010; Kearney, 2010; Keyzer *et al.*, 2005; Tilman *et al.*, 2011; Weinzettel *et al.*, 2013). Agricultural intensification and expansion can help meet the increased demand for agricultural commodities by improving yield through the use of increased inputs such as fertiliser, pesticide, water, and changes to management practices (Cassman, 1999; Johnson *et al.*, 2014; Tilman *et al.*, 2011). However, land use change or agricultural intensification can have negative environmental impacts in terms of greenhouse gas emissions, soil quality deterioration, scarce water resources utilisation, and biodiversity loss (Alexander *et al.*, 2015; Smith *et al.*, 2013). Thus, agricultural education and the professional development of agricultural teachers has a fundamental role to play in terms of educating farmers on the impact of farming on the environment and the need to ensure sustainable farming practices are employed within a rapidly expanding sector.

The development of pedagogical competence requires three types of knowledge: (i) know-why; (ii) know-how; and (iii) know-what (Madhavaram and Laverie, 2010). Know-why provides a theoretical understanding to the accomplishment of a given task as an educator learns new things and ways of doing things through analysis. Know-how is accomplished via learning-by-doing as a result of practical, hands-on

knowledge gained through performance of a task. Finally, know-what results from the generation of new knowledge and ideas through the use of pedagogical instructional innovations which result in more efficient, effective teaching (Madhavaram and Laverie, 2010). All three types of knowledge are considered in the development of the PCF detailed within this paper.

Where educator competence is evident, the performance levels of students are greater (Darling-Hammond *et al.*, 2001; Goldhaber and Brewer, 2000; Ingvarson and Rowe, 2008; Liakopoulou, 2011; Vandevoort *et al.*, 2004). Pedagogically educated educators have a greater ability to understand their students and reach out to difficult students or students with learning difficulties for example (Altan and Lane, 2018; Brouwer and Korthagen, 2005; Darling-Hammond, 2000; Musset, 2010; Winch, 2017). As professionals, educators recognise professional learning as imperative to maintaining sustained professional practice. Educator professional learning occurs in many ways and the PCF developed acknowledges four dimensions of educators' learning: personal/professional, individual/collaborative, formal/informal, and school-based/external (Gallimore *et al.*, 2009; Jones and Dexter, 2014; Korthagen, 2017; Richter *et al.*, 2011). It is important to note, however, these four dimensions of educator learning are not mutually exclusive as they can intertwine and interchange resulting in an array of different learning opportunities. A great deal of educator learning occurs as a result of shared informal conversations (Owen, 2014; Richter *et al.*, 2011) amongst education staff in addition to the collaborative sharing of new ideas, methodologies and resources within a supported team (Jones and Dexter, 2014; Stoll *et al.*, 2005). Additionally, applied on-the-job learning embedded in the work itself as well as removing individuals from their normal working environment is valued in terms of educator learning (AITSL, 2014; Harris and Lambert, 2003). Teacher education also has the potential to contribute to the development of educators' professional identity which can be a determinant of how teachers teach, their professional development, and their attitude towards educational change (Schepens *et al.*, 2009) which is influenced by educators' own intrinsic beliefs which can alter educators' expectation of students within the classroom (Scott and Dinham, 2008). In conclusion, the framework is based on the approach that the educator will possess the academic qualification and have an adequate knowledge of the subject matter in which they will teach upon employment (Flannery, 2019). The educator can

become pedagogically competent once they achieve each competency on the PCF developed.

Stage 2: Exploration of Pedagogical Competencies

The purpose of this stage was to explore pedagogical competencies for inclusion on the PCF. Face-to-face semi-structured exploratory interviews (n=32) were conducted with personnel within the agricultural VET sector and higher education within Ireland (n=23) and the Netherlands (n=9). Key stakeholders beyond the field of agricultural VET were included in this phase of the study due to their extensive knowledge and expertise of education, more specifically pedagogy, and their position within the field of tertiary education. Their knowledge and experience were deemed to be of significant importance to the development of the PCF given the purpose of this stage of the data collection process. The Netherlands was included at this stage of the data collection process to provide a transnational perspective through which pedagogical competencies could be identified. The Netherlands was selected due to the extensive research in the area of competency based education and the development of competency frameworks for other education sectors outside the agricultural VET sector (Biemans *et al.*, 2004; Mulder, 2012; van Dam *et al.*, 2010; Wesselink and Wals, 2011). All participants were selected using a purposive, snowball sampling procedure; i.e. initial participants were asked to recommend other suitable participants for the study. Irish participants included college principals (n=7), college teachers (n=8), and key stakeholders (n=8) within agricultural VET and higher education sectors. Dutch participants included college teachers (n=9) and key stakeholders (n=3) within the agricultural VET and higher education sectors in the Netherlands. A total of nine Dutch interviews were conducted with twelve participants. Two Dutch interviews were group interviews due to individual's lack of confidence in English proficiency. All semi-structured interviews were conducted over a period of nine months with each interview lasting approximately one hour. Participants were asked the following three questions; (i) Do you think a PCF would be beneficial or useful for training VET agricultural teachers in pedagogical knowledge, skills, and competencies?; (ii) What pedagogical competencies; knowledge, skills and attitudes, do you think all agricultural educators should possess?; (iii) What is the best way of providing CPD to educators to ensure these pedagogical competencies are acquired? Semi-structured interviews were used as

they allow for the standardisation of core questions enabling replication of the interviews with different participants ensuring data reliability (Kumar, 2011), in addition to offering the opportunity to delve deeper and follow unexpected thoughts and opinions with individual participants.

Stage 2: Data Analysis

Qualitative data collected via face-to-face semi-structured exploratory interviews were audio-recorded and subsequently transcribed verbatim. Qualitative coding was used to separate, sort and synthesise these large amounts of data collected. Codes were initially recorded as words/short phrases next to each interview transcript (Charmaz, 2006). All pedagogical competencies mentioned at least once across all thirty-two interviews were identified and subsequently included on the framework. Open coding, axial coding, and integration were also used during the interview analysis phase (Enosh *et al.*, 2015; Strauss and Corbin, 1998). Open coding refers to the phase in which the researcher records comments and questions while transcribing interviews. All comments and questions were then reviewed after all interview transcripts were complete and the researcher was familiar with the dataset and interviewee responses. The next phase involved axial coding where the researcher identified subcategories, i.e. related pedagogical competencies (e.g. assessment, student engagement, scaffolding, etc.), based on the pedagogical competencies identified. The final phase involved integration of sub-categories, i.e. related pedagogical competencies, into broader categorisations, i.e. pedagogical competency (e.g. curricular knowledge, classroom engagement, etc.). A total of nine pedagogical competencies were identified at this stage by participants as important for agricultural VET teachers.

Results Discussion of Stage 2: Exploration of Pedagogical Competencies

Data analysis yielded nine themes, each representing a distinct pedagogical competency: curricular knowledge, modern teaching practices, student diversity, classroom engagement, educational philosophy, interpersonal skills, professionalisation of teachers, authentic education, and intrapersonal skills.

Curricular Knowledge

Within this study, curricular knowledge refers to the way in which an education field is organised and arranged for instruction (Shulman, 1987) while influencing why a teacher teaches the way they do. It incorporates the aims, objectives, and goals of a program/course (Kreber and Cranton, 2000). Participants referred to the importance of curricular knowledge in terms of teacher's ability to constructively align learning outcomes with learning goals followed by assessment practices, both formative and summative, in an attempt to ensure quality assurance processes and procedures:

> "*In further education the curriculum is assigned for you, so is the assessment and so where is the scope for the creativity? But you need to understand how programmes are constructively aligned with learning outcomes, how they're measured, how they're assessed, and that cohesive blend of approaches to teaching and learning is very important (Interviewee 15)".*

Irish agricultural education programmes are extensively reviewed and validated at the end of an academic year via a process known as verification. Verification is an internal quality assurance procedure conducted across all agricultural colleges to ensure all educational programmes are delivered, assessed, and managed in accordance with course memoranda and module specifications (Teagasc, 2018b). Hence, *"…the whole area of quality assurance, record keeping, assessments, managing assessments, internal verification, and external verification (Interviewee 3)"* were identified as important related pedagogical competencies within curricular knowledge for Irish agricultural VET teachers. All related pedagogical competencies combined within curricular knowledge lead to constructively aligned curricula which Biggs (1996; 2003; 2014) describes as an outcome-based approach where teaching and assessment methods are elected in line with learning outcomes.

Table 6.1: Draft Pedagogical Competency Framework - Curricular Knowledge

Pedagogical Competency: Curricular Knowledge	
Related Pedagogical Competency	**Qualitative Evidence from Semi-Structured Exploratory Interviews**
Quality Assurance Learning Goals Learning Outcomes Assessment (Summative & Formative) Corrections Verification Record Keeping Teacher-Student Expectations	"Other skills I think would be important are around assessment and the ability to understand the difference between assessment of learning, assessment for learning, and multiple modes of assessment and that notion of constructively aligning what you're teaching with how you're assessing it and how can you demonstrate that a student has achieved a particular learning outcome (Interviewee 19)" "Teachers have to be very clear about the goals of the lesson, at the end of the lesson you will go home and you will have learned this….it's always about expectations what do you want with your class, how do you engage, how do you get a connection, that's the first thing. You have to connect…. why are you doing this, why it's important that you engage, why it's important that you join my lesson. You have to be clear on that because if you don't they don't open their mind for what they are going to learn (Interviewee 27)" "I would strongly argue that any teacher who wants to be able to engage students within the context of their programme and module needs to have a strong understanding of curriculum design. That's as basic as lesson planning and that whole notion of constructively aligning your teaching with the assessment (Interviewee 19)"

Modern Teaching Practices

In this study, modern teaching practices refers to an approach to teaching and learning which incorporates an array of instructional techniques for consideration in the context of young farmer education. Participants referred to the important role mode of delivery have to play in providing quality education to young farmers. Teaching is about facilitating student learning, encouraging them to be independent learners, developing their own knowledge and understanding of a subject area (Postareff *et al.*, 2007). Interviewee 5 identified facilitation as a key related

pedagogical competency within modern teaching practices for inclusion on the framework:

> *"Facilitation, once I realised I could be there as a facilitator and it was ok to teach in that way, that has totally changed how I teach…it's quite hard to learn how to facilitate and be confident but I think at Level 5[8] and 6[9] it's important (Interviewee 5)"*.

Learning is a means of interacting with the world and the way in which a student structures and reflects on knowledge obtained brings about change in how they view the world (Biggs, 1999). Hence, education is about gaining knowledge on the one hand but also incorporates conceptual change. The instructional techniques chosen by educators to achieve the desired learning outcomes and goals for the lesson are dependent on the audience being taught, the content being delivered, and the expected level of competence (White *et al.*, 2010). Given this study's focus on VET specifically, participants acknowledged and made reference to the importance of students as independent learners within a practical setting gaining knowledge and understanding in an active, student-centred learning environment:

> *"A lot of the students learning is informal so if you have them in groups and they can swap stories…it's more collegial and there's a number of different ways of approaching it (teaching) (Interviewee 16)".*

Hence, related pedagogical competencies identified as important for teachers during stage 2 of the data collection process included active teaching methods such as differentiated instruction, teachers as facilitators, use of alternative teaching strategies such as group work, flipped classroom, problem based learning, and many more, in addition to the importance of universal design and scaffolding the learner to ensure an inclusive education system whereby all student abilities are catered for within the agricultural VET system. In addition, ICT (Information and Communications Technology) and eLearning platforms were at the fore of the majority of conversations with participants as they recognise, understand and appreciate that the students of today and the future are from an era where

[9] Level 5 and Level 6 courses on the National Framework of Qualifications in Ireland are equivalent to Level 4 and Level 5 respectively on the European Qualifications Framework.

technology, ICT, virtual learning platforms, and online worlds are familiar territory and play a part in their everyday lives (Doster, 2013; Nikirk, 2009):

> *"Digital literacy is going to be a critical skill…so how can we prepare the teacher of the future to have an awareness of multiple types of interfaces (Interviewee 19)".*

They acknowledge the differences that exist between the older and younger generations in terms of technology use and virtual learning within the classroom.

Table 6.2: Draft Pedagogical Competency Framework - Modern Teaching Practices

Pedagogical Competency: Modern Teaching Practices	
Related Pedagogical Competency	**Qualitative Evidence from Semi-Structured Exploratory Interviews**
Differentiated Teaching eLearning Students as Researchers Action Learning Alternative Teaching Strategies Technology/ICT Peer-to-Peer Learning Scaffolding Facilitation Skills Universal Design	"Digital literacy skills for teachers and for educators in general are absolutely critical, otherwise we are so far apart from the people we are teaching and we're not engaging with them in the same language. I don't think that teachers need to be expert in every technology, they need to be aware, they need to know what the kids are using, and if you're using technology to support your pedagogy, be it through Moodle or whatever, that you have a really, really strong sense of how do I develop content for Moodle (Interviewee 19)" "There's a lot of discussion at the moment about problem-based learning and that'll create a completely different mind-set with the student, rather than at the moment you're trying to push information into the student, whereas if you start trying to get them seeking and answering, or as somebody said one time if you can give them the why they'll find the answer themselves (Interviewee 18)" "Flip the classroom! I mean there's not enough of that going on and we're guilty of it, it's being more conscious of that as a learning tool but making them (the student's) responsible (Interviewee 9)" "Teachers have a big mix within a group so I think it's looking at universal design (Interviewee 5)" "There are different teaching methods that can be used such as using short videos in class and having a discussion (Interviewee 11)"

	"I've had some experience with action learning in the past…they set up a situation where some of the teachers would get involved actively in a company selling whiskey. You had the sales and marketing and you'd have three or four people who'd be doing different things. This was a way of getting people involved. The same thing could be done with students. Teachers were doing it to assimilate what students could do (Interviewee 20)"

Student Diversity

In the context of this study, student diversity refers to the multiple levels of ability amongst the agricultural student population in terms of their educational needs but also giving consideration to student wellbeing and supports students may require within the VET system. The importance of inclusive education and facilitating the needs of all learners was highlighted as fundamental within the agricultural VET sphere. Heterogeneous students groups and the diverse student population were depicted as one of the major challenges facing the agricultural VET sector:

> *"Managing diversity in the classroom and managing learners who are at multiple levels, academic levels, of ability is very challenging…we will often have class groups where you've people at multiple different levels of learning so how do you scaffold the learner who's struggling with the learner who is getting bored because they already understand the concept (Interviewee 19)".*

The fourth goal of the Sustainable Development Goals (SDG) of the United Nations, Quality Education, wishes to ensure inclusivity and equity within education while promoting lifelong learning for all learners. A key target within this SDG is equal access to VET by 2030 (Biermann *et al.*, 2017; Global Goals, 2018). Across the agricultural VET sector:

> *"Learners with special needs, all kinds of needs, are increasing which is wonderful because it means there's more open access to education than there was twenty, thirty years ago but it does require teachers to operate and engage with students in a different way and be mindful of the different needs (Interviewee 19)".*

Hence, agricultural VET teachers require the skillset and competence to facilitate a diverse student group in terms of physical and academic ability given the practical nature of the courses. In addition, participants also identified having an understanding of your learner's profile, being conscious and aware of the health and wellbeing of your learners, providing support to students with special educational needs i.e. dyspraxia, dyslexia, dyscalculia, ADHD, etc., operating a buddy system, e.g. peer mentoring, and offering one-to-one support to students, as vital competencies relevant to the role an agricultural educator plays given the context and culture teaching in the sector (Table 6.3). These related pedagogical competencies identified in stage 2 of the data collection process are illustrated by excerpts in Table 6.3.

Table 6.3: Draft Pedagogical Competency Framework - Student Diversity

Pedagogical Competency: Student Diversity	
Related Pedagogical Competency	**Qualitative Evidence from Semi-Structured Exploratory Interviews**
Learner Profile Health and Wellbeing Supporting students with special educational needs Heterogeneous Student Groups Student One-to-One Support Buddy System	"Teachers need training on their own delivery style, how students learn, and that a weak student isn't unintelligent. They might be intellectually challenged when it comes to adding two and two but they probably have some super skills when it comes to practical skills be it fencing, tractor driving, stockmanship skills, etc. Teachers are too quick to label students (Interviewee 14)" "There are more and more students with special educational needs like autism, ADHD, etc. It's taking more time in the guidance of those students and it's very important that you have good support for the teachers on that and it's important that the teacher understands the student (Interviewee 25)" "To bring all learners along even though all those learners are sometimes at different levels Tutors need to be able to impress on the learners to give things a chance but tutors also need competencies in if people are not engaging is it because there is a mental health issue, is it because they're at a Level 5 and maybe they should be at a Level 4 or is there literacy skills? We need that holistic person that is not just the teacher or the qualified expert or subject matter expert, we need that person who is able to keep an eye, and it's not always mental health, but just on all the various issues that might affect ten learners but affects everyone individually so we do still need that human feel

	(Interviewee 1)" "It's the ability to interpret where the students actually at, I'd say that's the biggest issue because you have such a variety (Interviewee 7)" "For the teacher of the future a core competence for me is being able to identify students with difficulties and if you don't have the expertise and you won't, an individual teacher may not have the expertise to deal with every little problem and even a learning difficulty that a student might have but the teacher will need to know about that (Interviewee 19)"

Classroom Engagement

Classroom engagement is defined in this study as the factors which influence student engagement and the importance of a positive student-teacher relationship in achieving an effective student learning environment. Classroom management encompasses teacher actions which result in creating an environment which supports positive social interaction and academic learning (Dicke *et al.*, 2015; Evertson and Weinstein, 2013). Interviewee 23 affirmed that:

> "*Engagement is particularly important and teachers seek to engage students in the learning and don't just throw information at the students (Interviewee23)".*

The relationship between the student and the teacher plays a pivotal role in supporting instruction and classroom engagement. The level of respect for both the student and the teacher will influence student engagement and the success of a given lesson (Burden, 2016), which interviewee 8 alluded to:

> *"…being comfortable with people, the people skills and communication skills and allowing students express themselves and not being intimidated by it…striking a balance between classroom behaviour and the interaction from students within the class (Interviewee 8)".*

Good classroom managers harmonise instructional technique, classroom activities, and students' characteristics with instructional goals (Dicke *et al.*, 2015; Emmer and Stough, 2001). Participants identified an array of related classroom engagement competencies as being of importance for agricultural VET teachers; student

engagement, a knowledge of the effects of classroom layout on learning, conflict resolution, establishing good student-teacher relationships, managing staff-to-student ratios and large group sizes, adopting lesson plans, and an ability to manage student behaviour within a given lesson. Excerpts in Table 6.4 illustrate each related pedagogical competency as included on the PCF.

Table 6.4: Draft Pedagogical Competency Framework - Classroom Engagement

Pedagogical Competency: Classroom Engagement	
Related Pedagogical Competency	**Qualitative Evidence from Semi-Structured Exploratory Interviews**
Student Behaviour Presentation Skills Student Engagement Classroom Layout Conflict Resolution Student-Teacher Relationship Staff: Student Ratio Lesson Plans Timetabling	"Skills like classroom management that's where we fall down the whole time. We expect a newly qualified person to know everything and they don't. The use of lesson plans I think that's important. It's not something I use but I can see the benefit of them to newly qualified people in that if you have a forty-five minute class you need to have some sort of a layout to that (Interviewee 4)" "Simple things like how to lay out your classroom, I don't know whether putting it in a horseshoe shape works for everybody but they are useful tools to have (Interviewee 10)" "To be able to manage any issues or conflict that might occur (Interviewee 1)" "There needs to be something looked at other than the student walking in with their PowerPoint and their workbook and maybe 10% of students engage, that's the challenge. The fact that the agricultural numbers are big shouldn't stop us doing the right thing as regards delivery, it means more resources (Interviewee 18)" "The design of classrooms is important. There needs to be flexibility in the classrooms for arranging chairs and everything inside because tiered classrooms might work for a lecture but if you want participation then you might have to have a different style altogether (Interviewee 20)"

Educational Philosophy

Philosophy refers to the theory and practice of education (O'Connor, 2017). Educational philosophy assists in the analysis of the relationship between theory and practice encouraging teachers to be more rational and critical in their thinking (Elias and Merriam, 2005):

"*How do you shift the philosophical position somebody might have as a teacher? It's about exposing them to new ideas, new ways of doing things and also showing them how it's done elsewhere…it's having an approach and philosophical position within the sociocultural environment in which you work (Interviewee 19)".*

Educational philosophy as a pedagogical competency within this study incorporates the individual teacher's teaching philosophy, their knowledge of the different learning theories, teaching theories and educational philosophers, and their impact on the teacher as an educator. There was limited engagement across this area within the exploratory interviews conducted which reflects the nature of teaching within the VET sector and the limited pedagogical support and training provided to agricultural teachers within this sector (Flannery, 2019). Table 6.5 illustrates each related pedagogical competency within educational philosophy.

Table 6.5: Draft Pedagogical Competency Framework - Educational Philosophy

Pedagogical Competency: Educational Philosophy	
Related Pedagogical Competency	**Qualitative Evidence from Semi-Structured Exploratory Interviews**
Teaching Philosophy Educational Philosophers Teaching Theories Learning Theories	"Over a period of time people would acquire their own skills in regard to what works well in a classroom and sometimes by just trial and error but I think just to be able to learn the basis of the teaching theories that are out there and to look at different philosophers and to imbed their practice in educational we'll call it the psychology and the learning theories would be very, very beneficial (Interviewee 3)" "Teachers should have an in-depth knowledge of how learning works for the student and the classroom…they need to know all about learning styles and how people learn…and they need to know their own personality and how they interact with people and how they teach and they need to be able to adapt their own style to the needs of the students (Interviewee 12)" "Learning how to teach and the skills and the tricks and the forms and learn Vygotsky and learn Piaget and all the theories, it's very important. For me it's so interesting it's almost a hobby I read that for fun and I read Hetti for fun because I like to teach…with my interest it comes naturally but if it doesn't come naturally then someone needs to tell you that you have to do it (Interviewee 31)"

Interpersonal Skills

Interpersonal skills within this paper are defined as the set of skills teachers require to ensure positive, effective interactions amongst colleagues. Interpersonal skills are both difficult to teach and learn, however they can be acquired through development, practice, and evaluation within educational settings (Reynolds, 2004; Skinner *et al.*, 2016). Such skills enable individuals to interact successfully with colleagues within the workplace (Cerezo-Narváez *et al.*, 2018). Communication and *"…not being afraid to communicate with colleagues and learn from peers are important skills (Interviewee 8)"* in addition to teamwork, organisation, time management, leadership, management, and collaboration as identified by participants as essential competencies for agricultural teachers within this study (Table 6.6). Speech is one part in communication but:

> *"A big part of teaching is the non-verbal communication. It works two ways; what signals I am sending but also the students' signals. If the students sit with their backs to me it's hard to connect, I want to make eye contact (Interviewee 27)".*

The importance of non-verbal communication cannot be underestimated in terms of both teacher and student performance, both playing a significant role in achieving high levels of student engagement and autonomy within the classroom (Ledbury *et al.*, 2004; Zeki, 2009). An organised teacher who collaborates with colleagues and industry, works effectively within a team, and manages and leads student learning is a more effective teacher. Thus, these attributes are deemed to be of significant importance for agricultural VET teachers.

Table 6.6: Draft Pedagogical Competency Framework - Interpersonal Skills

Pedagogical Competency: Interpersonal Skills	
Related Pedagogical Competency	**Qualitative Evidence from Semi-Structured Exploratory Interviews**
Time Management Leadership Teamwork Communication (Verbal and Non-Verbal) Organisation Management Collaboration	"It's teamwork, it's working effectively as part of a core teaching unit (Interviewee 3)" "Being comfortable with people, so the people skills and communication skills and allowing students to express themselves and not being intimidated by that so striking a balance between classroom behaviour and that interaction from students within the class (Interviewee 8)" "You're not just employed to teach you're employed to manage a curriculum you're employed to manage the delivery and you're employed to manage the learning of your people in front of you (Interviewee 9)" "I'd like to see people who exhibit some sort of leadership skills that would be able to progress those in the classroom situation (Interviewee 9)" "Connection between the company life and the educational life so then you can combine both (Interviewee 25)" "It's time management so how can I survive in school and how can I deal with all the work I get (Interviewee 27)" "You're not there only to observe or to teach but you have to be a team member also in developing new programmes (Interviewee 28)" "Good communication in a classroom is very important so that they're clear, they can deliver their message. Organisation in terms of lesson plans and the objectives of what they expect out of the students (Interviewee 23)"

Professionalisation of Teachers

Professionalisation, in the context of this study, refers to the social process of continuously up-skilling and developing one's personal and professional competencies to stay abreast with advances in both technical and pedagogical theory and practice. Professional development plays a fundamental role in improving overall college performance (Bolam, 2000; Hargreaves, 1994) and its importance is increasingly acknowledged worldwide (Fraser *et al.*, 2007). It is a continuous process

of reflection and review which aligns itself with developmental needs that meet corporate, departmental and individual needs. Hence *"teachers as reflective practitioners"* was identified as an important related pedagogical competency under professionalisation of teachers:

> *"It's an iterative process. Teachers try something, go back reflect on it and try again and Schons[10] circle is helpful in terms of competences and the ability to reflect and be able to change both practice and thinking and being open to that is really, really important (Interviewee 19)".*

It also incorporates learning as a process of self-development which lends itself to personal growth incorporating skills and knowledge that aid in the education of youth (Middlewood *et al.*, 2005). Hence, mentoring and coaching were identified as important developmental skills for agricultural teachers entering the VET sector:

> *"When you step back from teaching there's definitely a place for mentoring and coaching because you have different people coming in with different skills, different qualifications, different levels of interest and a wide range of modules being delivered (Interviewee 2)".*

Engaging in CPD activities enhances professional skills, builds on professional knowledge, and contributes to the clarification of professional values which further enhance the student learning experience (Bolam, 2000). However, it is important to note, it is not just the professional knowledge attained that is important but the context within which it is attained and subsequently used that assists in providing an understanding of the nature of that knowledge (Kennedy, 2005). Interviewee 19 referred to socio-cultural theory and what it means:

> *"I believe in socio-cultural theory which means we are informed by the context, the environment in which we interact and it informs our approaches, informs our philosophy and what we believe in, so we need to be aware of that wider environment which means bringing teachers into communities of practice (Interviewee 19)".*

[10] A reflection framework which encourages teachers to reflect both in-action (during teaching) and on-action (after teaching) (Schön, 2017).

Within agricultural education there is ample opportunity to develop communities of practice as it is quite a defined sector within industry:

> *"Teachers coming together to talk about a situation and learn from it and each other and how to deal with it. Teachers learn from each other in the presence of an expert who coaches the group (Interviewee 27)".*

Mentoring, coaching, shadowing, peer-to-peer learning environments, networking, observation, teachers as researchers, and attendance at conferences, seminars, etc. were identified as important competencies for agricultural teachers during stage 2 of the data collection process.

Table 6.7: Draft Pedagogical Competency Framework - Professionalisation of Teachers

Pedagogical Competency: Professionalisation of Teachers	
Related Pedagogical Competency	**Qualitative Evidence from Semi-Structured Exploratory Interviews**
Mentoring Coaching Reflective Practitioner Supervised Peer-to-Peer Learning Environments Shadowing Networking Observation Teacher as Researcher Conferences, Seminars, Workshops, In-Service Training, etc.	"This whole area of coaching and mentoring that's very important…coaching is not for me telling them what to do it's for them to ask the questions and not even for me to answer the questions but for them to ask the questions to themselves and realise that I (the teacher) need this help…I'm seeing mentoring then maybe as completely different, coaching is very much on a one-to-one basis whereas mentoring you could easily take on maybe four or five and mentoring would be more of a father figure role whereas coaching is very much self-examination (Interviewee 4)" "We need to get them into the classroom with mr or mrs class teacher, senior module manager, this is how it works, some sort of shadowing that can go on…sit at the back of the class and watch the senior person in action and watch how they manage the group dynamic, watch how they cultivate the learning in the group, watch how they can have the ability to make every student hang on what they are saying, that's a brilliant, brilliant skill… I would still say I would benefit from going into some of our senior teachers and watching them in action. I always love to any chance I get to go in and watch them in action because I learn something from them (Interviewee 9)" "Anyone that's new coming in has very little experience or

	exposure to teaching, module specs, anything like that so they do need coaching or peer supports and like attending conferences or technical days improves their information on say the modules and keeps them up-to-date and it develops their own personal goals (Interviewee 11)" "They have to be entrepreneurial but that will also require a sense of curiosity and being able to do research in your field of agriculture or in your agricultural subject (Interviewee 28)" "There's very little sharing of information from within colleges in terms of how they do anything, what are teachers finding useful in any given module or across modules or what could be adopted from one module to another. And I'm sure if you took the best aspect out of every college and put them together there's an awful lot there (Interviewee 14)" "The ability to be able to observe others and the ability for others to come in and give you feedback, so that ability to be able to give and receive feedback (Interviewee 19)"

Authentic Education

Researchers within this study define authentic education as an autonomous learning environment whereby the student is at the centre of the learning process and is actively engaged in the creation of knowledge based on experience. Key education theorists such as Vygotsky, Piaget, Bruner and Perry perceive learning as an active process whereby the student is actively engaged as opposed to passively absorbed. Hence, the student is at the centre of the learning process and class participation is equally distributed between the teacher and the students:

> *"Put the teacher in the coaching role so students are adding knowledge by asking questions, doing research, and the teacher helps them in educating themselves, otherwise they are consuming knowledge. Make them active, make them pro-active and have them learn by themselves (Interviewee 25)".*

The student is given responsibility for their own individual learning which is facilitated by the teacher (Elias and Merriam, 2005; Hannon, 2005; Knowles, 1970; Price, 2000) leading to an autonomous learning environment. Higher order thinking is achieved in an active student learning environment leading to deeper learning and

increased student engagement (Biggs, 1999; Wood, 2003). The learning models of Dewey, Lewin, and Piaget lend themselves towards the nature of experiential learning which can be described as a process whereby transformation of experience can lead to the creation of knowledge:

> *"We need to bring real-life examples and create very relevant, interesting anecdotes and experiential knowledge…you sit thirty/forty people in a room, they have massive experience they can bring to the table and lots of information they can share (Interviewee 9)".*

Such a learning cycle touches on experience, reflection, thought, and action in response to the learning environment and what is being learned (Kolb and Kolb, 2005; 2012; Kolb, 2014). Hence, learner experience plays a central role in the learning process. Participants referred to the importance of authentic education in terms of achieving an active student learning environment where the student is at the centre of the learning process, learns experientially, and is given responsibility for their own learning (Table 6.8).

Table 6.8: Draft Pedagogical Competency Framework - Authentic Education

Pedagogical Competency: Authentic Education	
Related Pedagogical Competency	**Qualitative Evidence from Semi-Structured Exploratory Interviews**
Active Student Learning Environment Student-Centred Learning Environment Student Responsibility for Learning Experiential Learning	"I can give them a question and they literally run off and are doing it and are very engaged (Interviewee 5)" "The trick is to give all control to students (Interviewee 31)" "You have to learn in an authentic context, you have to be in a real situation where you would also be the professional…always trying to have everbody active in the process of learning (Interviewee 28)" "Unless it is relevant, contextualised and appropriate to the learner, the learner will just not get it (Interviewee 19)" "PowerPoint doesn't work for everyone or reading out of a book, teachers need to do more real-life learning with case-studies or problem-based learning, get more engagement from the students (Interviewee 11)"

Intrapersonal Skills

Within this study, intrapersonal skills are defined as the individual's communication with the mind and personal attributes one brings to the job of teaching. Non-cognitive attributes are difficult to measure but contribute to successful teaching beyond pedagogical content knowledge (Klassen and Kim, 2017). Emotionally intelligent individuals have an ability to understand and express oneself, understand and relate to others, control individual emotions and the emotions of others, and use their emotions as a source of information (Nafukho *et al.*, 2016):

> *"Empathy and an ability to deal with students and empathy in terms of knowing that in any class you're going to have weaker students, stronger students, different types of personality students, so to tune into all of that and take it on board (Interviewee 23)".*

As a consequence, teachers have an enhanced ability to relate to students and their behaviour within the classroom. A motivated individual has an ability to guide individuals towards achieving a target or set of goals (Klassen and Kim, 2017; Schunk *et al.*, 2008) which, in an education context, could lead to students achieving intended learning outcomes or learning goals. There is little research on the intrapersonal skills of teachers; however participants identified emotional intelligence, initiative, creativity, trustworthiness, role models, confidence, self-motivation, enthusiasm, and social skills as key intrapersonal skills all agricultural teachers should possess to be effective in their role.

Table 6.9: Draft Pedagogical Competency Framework - Intrapersonal Skills

Pedagogical Competency: Intrapersonal Skills	
Related Pedagogical Competency	**Qualitative Evidence from Semi-Structured Exploratory Interviews**
Emotional Intelligence Creative Trustworthy Role Model Confident Self-Motivated Enthusiastic Social Dynamics Initiative	"Are good teachers born or can you make a good teacher? So inherently does somebody have the natural skills or can you be taught those skills? (Interviewee 3)" "I'd like to see them strongly able to exhibit they're own initiative (Interviewee 9)" "The first thing and the most important thing for me is to be confident in the knowledge that you have (Interviewee 10)" "We need that holistic person that is not just the teacher or the qualified expert or subject matter, we need that person who is able to keep an eye, and it's not always mental health, but just on all the various issues that might affect ten learners but affects everyone individually so we do still need that human feel. We need rounded, grounded individuals (Interviewee 1)" "Things like initiative, motivation, enthusiasm for the job, they're probably the things that either make or limit somebody (Interviewee 18)" "Teachers have got to treat their people like people and have got to be an example too because the example is not always coming from home (Interviewee 31)" "There's academically fantastically intelligent people who can come in and get doctors, and bachelor of this and bachelor of that but they've got no social contact or social skills they're brilliant people on paper but they've really got a problem with articulation and are boring as fudge! It's like watching paint dry (laughing)! So I think dynamics is really important (Interviewee 31)" "Having empathy with learners and particularly developing a relationship with students and being able to see beyond somebody having difficulties, being able to step in and being that type of teacher that you'll see it, and it doesn't have to get to crisis level before you see it. What are your strategies as a teacher to see is somebody struggling and for me a lot of that is around awareness (Interviewee 19)" "Motivation, if the teacher doesn't inspire you and motivate you I think that is a disadvantage (Interviewee 23)"

Stage 3: Inclusion/Exclusion Test of Identified Pedagogical Competencies

A quantitative survey instrument was developed based on the results of stage 2 and the initial pedagogical competencies identified for the draft framework. The purpose of the survey was to act as an inclusion-exclusion test of the related pedagogical competencies identified in stage 2. The national population of agricultural teachers and college principals across all the relevant Irish colleges together with policy leaders in the Irish field were invited to complete this online survey (n=87). Hence, all Irish participants included in stage 2 were included in stage 3 of the data collection process; together with the national population of agricultural teachers (n=77), compared to a sample of same used in stage 2. Therefore, the Irish sample population for stage 3 is the same as stage 2 but a larger number of individuals are included at stage 3 using purposive sampling. Kumar (2014) reported a 50% response rate for a survey would be fortunate. This study achieved a more than satisfactory response rate of 80% (n=70). Participants were asked to indicate the degree of importance of the pedagogical competencies identified in stage 2 using a 5-point Likert scale ranging from 1=not at all important to 5=very important. This aimed at identifying pedagogical competencies for inclusion/exclusion on the framework. An open-ended question in the survey also invited participants to add additional competencies they considered important for inclusion on the framework. This quantitative phase of the study tested each related pedagogical competency for inclusion/exclusion on the framework in addition to determining the extent to which the qualitative findings in stage 2 generalise to the population in question i.e. agricultural teachers.

Stage 3: Data Analysis

Quantitative data collected via online survey in stage 3 was coded and subsequently analysed using IBM SPSS Modeler 18 64-bit. Measures of central tendency, mean and mode, were used to compute the most common value in the distribution to help ascertain the degree of importance of each pedagogical competency. The mean and mode of each related pedagogical competency presented in the survey was calculated first. Subsequently, the mean and mode for the overall pedagogical competency were calculated. An average score of 3.00 and above was regarded as important for inclusion on the framework based on the Likert scale employed by the

researchers. This analysis enabled the researchers to identify pedagogical competencies for inclusion/exclusion on the framework based on their degree of importance relative to measures of central tendency. Finally, the first draft of the PCF was developed following analysis of data collected in stage 3.

Results Discussion of Stage 3: Inclusion/Exclusion Test of Identified Pedagogical Competencies

Descriptive results of the measures of central tendency presented in Table 6.10 reveal respondents regarded all pedagogical competencies as important (4.00-4.99) or very important (5.00). As a consequence no pedagogical competencies were excluded from the framework following analysis of stage 3 results. This is not surprising as these results reflect Irish agricultural teachers desire for more pedagogical supports as highlighted in a previous study conducted by Flannery (2019) on the CPD needs of agricultural VET teachers. The lack of training and support provided to agricultural teachers in the area of pedagogy resulted in all identified pedagogical competencies in stage 2 being of significant importance to the teaching population within this study. Furthermore, educational philosophy as a competency received the lowest score as a measure of central tendency which reflects this current lack of pedagogical support and the focus towards technical competence within the sector as opposed to reflecting on the teaching and learning process (Flannery, 2019). It also reflects the limited engagement with educational philosophy within stage 2 exploratory interviews mentioned previously. The lack of exclusion in the case of this study highlighted the importance of the final stage of the methodology which offered the only phase in which the PCF could be refined. Under the pedagogical competency of intrapersonal skills identified in stage 2, two related pedagogical competencies were added following analysis of the quantitative survey instrument. These related competencies were 'flexibility' in terms of teachers *"…ability to change and accept that change (Respondent 19)"* and 'open-mindedness' in terms of being *"…positive and open in their approach to education and training (Respondent 64)"*. No other pedagogical knowledge, skills or attitudes were identified for inclusion on the framework as a result of the survey. In conclusion, pedagogical competencies identified by participants in stage 2 were valid and relevant to agricultural VET teachers.

Table 6.10: Results of quantitative survey instrument used in stage 3 to identify pedagogical competencies for inclusion/exclusion on the framework (Total n=70)

Pedagogical Competency	Mean	Mode	Standard Deviation
Curricular Knowledge	4.50	4.25	0.37
Modern Teaching Practices	4.24	4.27	0.58
Student Diversity	4.23	4.00	0.70
Classroom Engagement	4.40	5.00	0.47
Educational Philosophy	3.99	4.00	0.65
Interpersonal Skills	4.40	5.00	0.46
Professionalisation of Teachers	4.31	4.20	0.53
Authentic Education	4.37	4.33	0.55
Intrapersonal Skills	4.56	5.00	0.40

Likert range of importance scale: 1 = not at all important; 5 = very important

Stage 4: Finalising Pedagogical Competency Framework

The purpose of stage 4 was to conduct a comprehensive review of the draft PCF developed at the end of stage 3 with a view to refining the pedagogical competencies included on the framework. To achieve this, two methodologies were employed: firstly, two purposively sampled focus groups were conducted; followed by a Factor Analysis of the key competencies to ascertain relationships. The first focus group was conducted with national stakeholders involved in the development of agricultural VET programmes (n=4). The second focus group was conducted with college principals (n=8) due to their role as senior managers and responsibility for supporting teacher CPD. Both cohorts were involved in stage 2 and 3 of the data collection process. Four key questions were used to steer the focus groups discussions; (i) If we were to develop a teaching qualification for agricultural teachers based on the framework as it stands what do you think it should look like?; (ii) What do you think the final framework should contain?; (iii) How would you rank each competency?; (iv) What do you think is the biggest risk to agricultural VET providers

if we do not provide adequate pedagogical training to teachers within this sector? Hence, the PCF was discussed, amended and redesigned within the two focus group discussions based on the potential opportunity to develop a formalised teaching qualification for agricultural VET teachers.

Stage 4: Data Analysis

The purpose of this stage in the data collection process was to amend and finalise the PCF. Firstly, qualitative data collected via focus group discussions was audio-recorded and subsequently transcribed verbatim to support the changes and improvements made to the framework. Qualitative coding, as described in stage 2 data analysis section of this paper, was used to separate, sort and synthesise these large amounts of data collected. Following the focus group analysis, a Factor Analysis was conducted to determine correlation levels between each pedagogical competency, to ascertain where each competency should sit on the framework.

Results Discussion of Stage 4: Refining and Finalising Pedagogical Competency Framework

All participants across both focus group discussions agreed the draft framework provided a very comprehensive overview of the pedagogical competencies required by agricultural VET teachers:

> "*The framework is excellent and has pulled together issues we have spoken about for years and we thought had to be done…it's a brilliant comprehensive framework…there is no doubt this framework needs investment…what you have done there is such an important piece of research (FG2)"*.

They recognised and acknowledged the importance of developing such a framework for agricultural teachers given the socio-cultural environment within which these educators teach. Participants within focus group 2 (senior management) believed:

> *"The people who would get most benefit from the framework are the teachers that are embedded in teaching and have made mistakes over the last three-to-five years (FG2)".*

Thus, this framework has the potential to enhance and develop pedagogical competence of agricultural teachers within the sector regardless of teaching

experience. Additionally, both focus group discussions stated the importance of progression opportunities and recognition of commitment to professional self-development as an incentive for agricultural teachers to pursue pedagogical training to achieve pedagogical competence:

> *"There should be progression…for example in Scotland it's built into their career path, a teaching qualification, and if they don't complete it they don't get a promotion. That's probably half the problem in Ireland as teachers don't get anything extra and their workload doesn't get reduced (FG1)".*

Therefore, teachers require recognition and acknowledgement of their efforts to up-skill and develop as educators.

Participants within the focus group discussions acquiesced with the pedagogical competencies identified and the terminology used within the framework. However, some participants had difficulty understanding some terminology and jargon used:

> *"Authentic education, you have to be able to identify with it and I would have to look at the related pedagogical competencies to understand what it means (FG1).*

> *"I struggle a little in interpreting intrapersonal skills, diversity and authentic education too and maybe I should understand them* (FG2)"*!*

This is not surprising given the majority of recruited educational professionals within the VET sector stem from scientific backgrounds with limited pedagogical knowledge (Flannery, 2019; Smith and Yasukawa, 2017). Hence, participants encountered difficulty in understanding some of the educational jargon used within the framework. This further highlights the gap in VET teachers' knowledge as educators and the significant importance of developing such a framework. It also emphasises the need to ensure the final framework is accessible. Finally, participants also alluded to the importance of VET agricultural programmes' reputation and the need to have pedagogically competent educators delivering such programmes to maintain the status quo and prestigious reputation that exists amongst agricultural education programme providers both nationally and internationally:

"It's the quality of the course and a risk to reputation (FG1). As we said we are in competition with other education providers so we need to be providing the best programme we can provide and this framework will go a long way towards helping that (FG2)".

Whilst the pedagogical competencies presented within the framework stand alone to an extent, we do not assume independence of each competency but expect them to intertwine and interchange:

"They're all very important and they can all stand alone in some ways but it's the bringing of them all together that makes somebody a really good teacher (FG1)".

This was also evident when participants were asked to rank each competency in order of importance given that both groups were unable to agree on an appropriate rank order of the pedagogical competencies. According to participants, the level of importance of each pedagogical competency depended on the teacher's stage in their teaching career, the level of training received to date, and future aspirations within the agricultural education sector. Participants suggested that:

"There's no right place to start as such and teachers should opt for what's most relevant to them rather than being forced to go this route because that's what's on offer (FG2)".

This highlights the complexity of the role of an agricultural teacher and the importance of each pedagogical competency on the framework to individual teacher's CPD needs within the VET sector. Findings from stage 4 resulted in the creation of the final version of the framework.

Pedagogical Competency Framework Finalised

As a result of the progression through each stage of the study-specific mixed methodology, the final eight-part framework was arrived at. Synthesising the findings of the literature, interviews, online survey, and focus groups, the framework forms around the four pillars of the individual, institutional, technical, and instructional. Layered upon the pillars is the teacher-student perspective which acts to anchor the refined eight pedagogical competencies that form the finalised PCF. In refining the

framework from nine to eight key areas, changes were made to the draft framework. As a result of discussions in the focus groups the term ‘Authentic Education’ was changed to ‘Student Engagement’, and ‘Modern Teaching Practices’ which had a strong emphasis on technology in the classroom has been incorporated into ‘Student Engagement’. Following analysis of the focus groups, a Factor Analysis was conducted to ascertain relationships between the final eight competencies. Firstly, it was observed that all eight pedagogical competencies identified correlated 0.4 or greater with at least one other competency, suggesting factorability exists. Secondly, the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.897 and Bartlett’s test of sphericity was significant ($p<0.05$). Consequently, the following pedagogical competencies identified were categorised on the framework as per Figure 6.2; Intrapersonal Skills and Interpersonal Skills (correlation 0.704); Curricular Knowledge and Classroom Engagement (correlation 0.591); Educational Philosophy and Professionalisation (correlation 0.707); Student Engagement and Student Diversity (correlation 0.650). Each competency categorised within the teacher-student axis on the framework was then positioned under each of the four pillars identified (Figure 6.2).

Table 6.11: Factor loadings based on Factor Analysis of all eight competencies identified on the pedagogical competency framework (Total n=70)

Correlation Matrix	**Curricular Knowledge**	**Student Diversity**	**Inter-Personal Skills**	**Professionalisation**	**Classroom Engagement**	**Educational Philosophy**	**Intrapersonal Skills**	**Student Engagement**
Curricular Knowledge	1.000	0.468	0.608	0.533	0.591	0.381	0.499	0.400
Student Diversity	0.468	1.000	0.617	0.545	0.434	0.508	0.540	0.650
Interpersonal Skills	0.608	0.617	1.000	0.642	0.634	0.538	0.704	0.656
Professionalisation	0.533	0.545	0.642	1.000	0.745	0.707	0.636	0.596
Classroom Engagement	0.591	0.434	0.634	0.745	1.000	0.629	0.580	0.519
Educational Philosophy	0.381	0.508	0.538	0.707	0.629	1.000	0.547	0.671
Intrapersonal Skills	0.499	0.540	0.704	0.636	0.580	0.547	1.000	0.661
Student Engagement	0.400	0.650	0.656	0.596	0.519	0.671	0.661	1.000

The four pillars recognise that teaching and learning does not take place in a vacuum, and are driven by a number of factors: (i) Individual: be that the individual teacher or student and the experience they bring into the classroom; categorised under this pillar are Student Diversity and Intrapersonal Skills; (ii) Institutional: the context in which teaching and learning takes place, the requirements of professional bodies, the culture of the organisation, and the resources provided for teaching and learning; categorised under this pillar are Interpersonal Skills and Classroom Engagement; (iii) Technical: this pillar was a particularly strong feature of the interviews and focus groups given the demands on farmers to gain strong technical expertise through VET, and in the Irish case is the main driver behind recruitment of teachers; categorised under this pillar are Curricular Knowledge and Professionalisation; and (iv) Instructional: this final pillar is possibly the most challenging for the Irish VET sector given the emphasis on technical knowledge over skills in teaching and learning; categorised under this pillar are Educational Philosophy and Student Engagement.

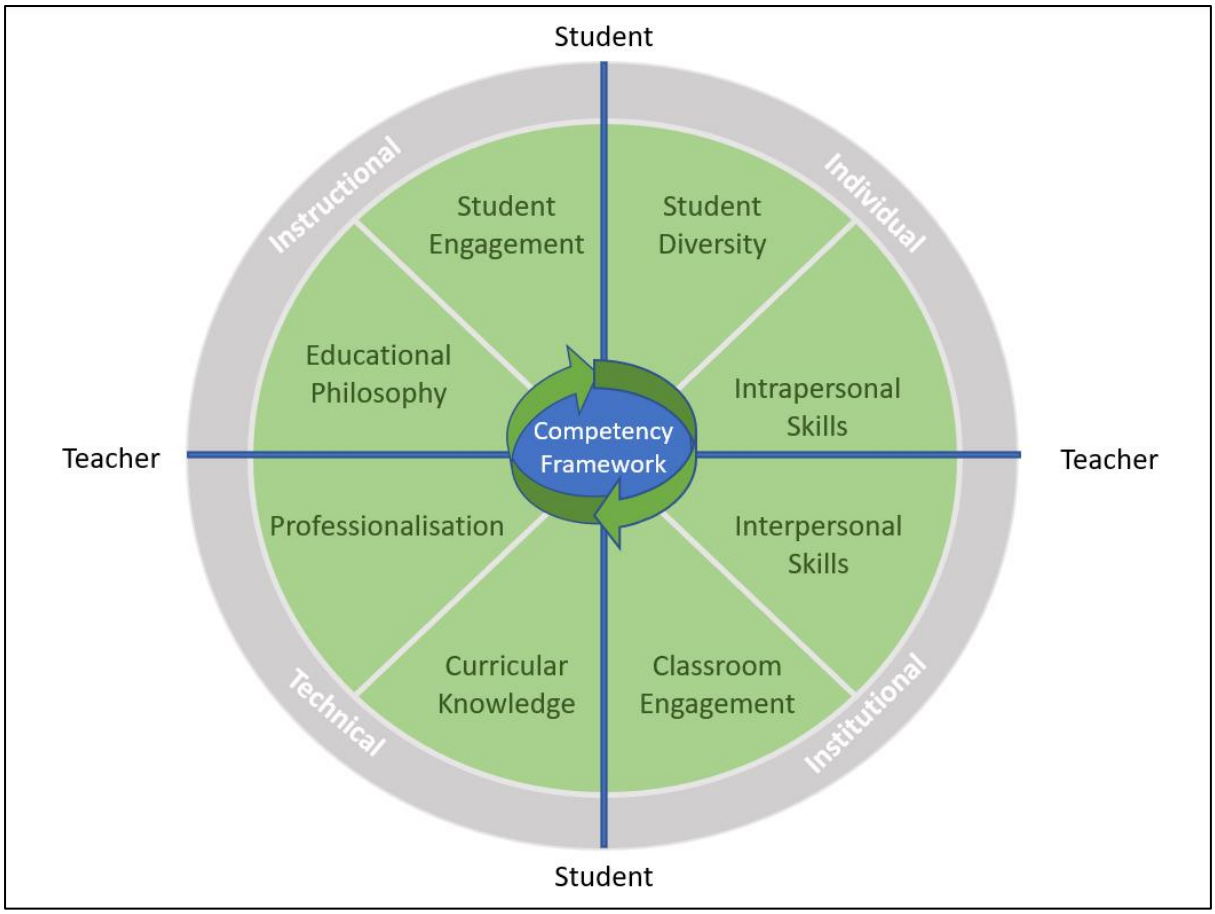

Figure 6.2: Developed Pedagogical Competency Framework for VET Teachers within Agriculture

Overall Discussion and Conclusion

The purpose of this study was to detail the development of a PCF for VET teachers within agriculture using a participative, transnational mixed methodological approach. The innovative methodology employed provided depth and breadth in the identification of the relevant knowledge, skills and dispositions applicable to this cohort of educators. This study contributes to the body of literature on the development of competency frameworks for the higher education sector (Lans *et al.*, 2014; Mulder, 2012; Roth and Pilling, 2008; Strasser *et al.*, 2005; Wesselink, 2010; Wesselink and Wals, 2011), but is one of the first studies to attempt developing a PCF for the agricultural VET sector. This paper contributes to this body of work through the participative mixed methodology created for the development of the framework discussed, providing a new perspective to teaching and learning in an educational environment where technical expertise is paramount. Four distinct stages were developed by the researchers to conduct this research. First, the researchers extensively reviewed relevant literature to develop a theoretical model for the framework; second, the researchers conducted a qualitative examination of the pedagogical competencies relevant to agricultural VET teachers; third, a quantitative survey instrument was developed based on findings from the qualitative examination to assess the significance and relevance of the pedagogical competencies identified; fourth, a second qualitative examination was conducted to refine and finalise the PCF, together with a Factor Analysis. While the research focus is on agricultural education there is transferability in the methodological, conceptual and practical approaches to land based education, particularly in the rural context.

The methodological approach employed in this study; QUAL→quant→qual, enabled the findings to be grounded in the views of participants ensuring significant depth and breadth was achieved (Chen, 1997; McKendrick, 1999). The initial qualitative process yielded nine pedagogical competencies which were further refined during following stages to create the final eight-part framework. The researchers also incorporated a transnational element at this stage of the data collection process, achieving breadth, which led to an increase in the practicality and functionality of the framework at the VET level. The subsequent quantitative survey instrument confirmed and refined the findings from the initial qualitative examination. The final qualitative process facilitated the researchers in finalising the PCF (Figure 6.2)

resulting in the eight-part framework. A Factor Analysis was also conducted following this stage in the data collection process to determine positioning of pedagogical competencies identified on the PCF. The methodological approach developed and implemented for this study has strong potential for transferability to other disciplines, particularly in the context of VET, and can be used by scholars across a range of research fields. The incorporation of a transnational element provides an international lens through which research can be conducted, increasing its scientific and practical relevance within a research field. The integration of qualitative and quantitative research findings creates a participative process which provides greater evidence when exploring a research problem.

The final framework contributes to the conceptual understanding of competency frameworks. Based strongly on a participative process that engaged with agricultural teachers, senior management, and key stakeholders within the VET sector, the framework is grounded in the practical needs of teachers while furthering conceptual understandings of teaching and learning in a technically, land based driven VET scenario. The arrangement of the framework under the four pillars of individual, institutional, technical, and instructional, and arranged around the teacher-student axis, provides insight to the requirements of teaching in a technically-driven VET environment.

In terms of practical implications, the development of the PCF yields many benefits to agricultural teachers and management within the VET sector. The framework is adaptable and can be used by teachers at any stage in their teaching career, unconditional of whether teachers possess a teaching qualification or not, to identify specific CPD opportunities relevant to them and their teaching. The framework has potential to be used across a variety of education programmes and adjacent vocations. The many benefits associated with the development of the framework include; enhancing the provision of pedagogical training provided to teachers, raising awareness of the pedagogical competencies VET teachers should aim to achieve, broadening teachers' knowledge of the teaching and learning skills that enable effective teaching, improving teacher quality leading to gains in student performance, enhancing the delivery and quality of VET programmes by enhancing teachers' effectiveness within the classroom through the provision of pedagogical CPD.

In conclusion, this paper details the transnational process involved in the development of the PCF for VET teachers within the agricultural sector. In the development of the PCF, a new transnational and participative mixed methods approach was developed and created from a synthesis of education and agricultural land use literature, and other mixed methods studies (Kasule *et al.*, 2016; Wesselink and Wals, 2011). The researchers incorporated an additional qualitative stage along with a transnational element as part of their new methodology ensuring significant depth and breadth was achieved within the study. Hence, this paper contributes to existing theory on exploratory mixed methods designs and is transferable across a range of disciplines. The participative process created by the researchers ensures the framework developed is fit-for-purpose given the involvement of key stakeholders at each stage in the data collection process. The PCF is transferrable within the international VET sector but relates specifically to agricultural teachers. The development of formally recognised teacher education qualifications within the VET sector in Ireland is a relatively new space which previously did not have a recognised qualification. The Netherlands, on the other hand, have a history in providing formally recognised teacher education qualifications for the VET sector. Given the socio-cultural environment within which agricultural teachers function, the need to address global food security and sustainable land use, the culture of farming, and the transformative learning process that occurs within the VET sector, there was a need to develop a PCF for agricultural teachers within this sector. VET has a responsibility towards not only what is taught but why and how it's taught, which this paper aimed to address, through the development and implementation of a participative process.

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Chapter 7: Results

Motivational Factors Influencing Young Peoples Further Educational Choice within Agricultural Education

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Highlights

- The paper explores intrinsic and extrinsic motivators on further educational choice.
- Qualitative, case study approach employed in the data collection process.
- This paper discusses implications of policy instrumentation on educational choice.
- The financial nudge as a primary motivator.
- Cultural and familial norms function as secondary educational choice motivators.

Abstract

This paper provides a nuanced understanding of the motivational factors influencing further educational choice of young people within farming itself with regard to policy instrumentation and intervention. The ‘financial nudge’ associated with incentives delivered under the CAP act as a primary motivator which extrinsically motivates young people in the direction of a formal agricultural qualification. Equally, secondary, intrinsic motivators associated with cultural and familial backgrounds have both a social and psychological influence on further educational choice, giving consideration to socio-emotional wealth. Findings from this study have implications for educational policy instrumentation and intervention as the paper explores the impact of extrinsic and intrinsic motivators on further educational choice and the teaching and learning process.

Keywords

motivation; educational choice; VET; agricultural education and extension; intrinsic; extrinsic

Introduction

Young farmers represent a highly skilled labour force in terms of technical expertise and farm productivity (Cush and Macken-Walsh, 2016) in rural places, having the potential to impact positively on the local economy (Zagata and Sutherland, 2015), environment (Mills *et al.*, 2017a; Vanslembrouck *et al.*, 2002), and social disposition (Comer *et al.*, 1999; Wynne-Jones, 2017) of rural communities. Young farmer studies detailed in the literature provide evidence of increased levels of productivity, profitability and investment (Cush and Macken-Walsh, 2016; Hamilton *et al.*, 2015), however little is known about the factors influencing young peoples' further educational choice within farming itself. Additionally, Zagata and Sutherland (2015) call for a more nuanced approach to understanding young people in agriculture which surpasses the basic facts surrounding generational renewal to delve deeper into understanding the dynamics of young peoples' needs within agriculture. As a consequence, this paper explores the motivational factors influencing the further educational choice of young farmers, investigating what attracts them to an agricultural education and what motivates them to make the choice.

The European Union recognises the importance of young farmers to the future of farming (Brennan *et al.*, 2016a; Hamilton *et al.*, 2015) and acknowledges the significance of generational renewal to the long-term survival of the sector. Concern has been voiced over the ageing farmer population, often documented in the literature as a "young farmer problem" (Eistrup *et al.*, 2019; Zagata and Sutherland, 2015). The number of young farmers across many developed countries, including Europe and the United States, over the last decade have declined due to social, economic and technological changes (Bednaříková *et al.*, 2016; Duesberg *et al.*, 2017; Leonard *et al.*, 2017; May *et al.*, 2019; Mills-Novoa, 2011; Morais *et al.*, 2017). In Europe, young farmers represent only 6% of the total farming population (Conway *et al.*, 2016; Đurić and Njegovan, 2015; Eurostat, 2016) with every second farm managed by a farmer greater than 55 years of age and almost one-third of farm holders over 65 years of age (Zagata and Sutherland, 2015). The positive association between young farmers and farm efficiency (Howley *et al.*, 2012; Lobley *et al.*, 2010; Potter and Lobley, 1996) have raised concern over the ageing farmer population across Europe. Consequently, under the 2007-2013 Common Agricultural Policy (CAP) Reform, measure 112 was introduced to provide support to the

establishment of new farms. Since 2015, all eligible young farmers are entitled to a 25% top-up on their basic payment under Pillar I of the CAP in combination with set-up assistance under Pillar II (European Commission, 2013a; Zagata and Sutherland, 2015). Eligibility requires farmers to be under 40 years of age when setting up an agricultural holding for the first time, or in the previous five years, with the appropriate skills and training in addition to a business plan (European Commission, 2005; European Commission, 2015; May *et al.*, 2019). In Ireland, the appropriate skills and training are established as a Level 6 Advanced Certificate in Agriculture which, since 2015, has resulted in a considerable increase in numbers enrolling on agricultural education programmes (Teagasc, 2017a) as they seek to obtain young trained farmer status (McKillop *et al.*, 2018). This increase in numbers is mainly driven by policy instrumentation, i.e. the availability of additional funding as a result of young trained farmer status, which is a major contributing motivator in influencing the educational choice of young people within farming itself, which this paper will discuss in detail.

Within the agricultural context, farmers are often motivated by a mix of financial, social, and emotional factors (Burton, 2004; Grubbström and Eriksson, 2018; Howley *et al.*, 2015; Quinn and Halfacre, 2014) which can influence a young persons' decision to pursue a career in farming. Consequently, this paper discusses the implications of policy instrumentation on further educational choice within farming communities while also exploring other motivational factors influencing educational choice in this context. While obtaining young trained farmer status and associated tax relief benefits are noteworthy motivators in the decision making process, additional or secondary motivators beyond the financial incentives are of equal interest in gaining a more nuanced understanding of choices in agricultural education. Therefore, this paper investigates both the primary and secondary motivators influencing further educational choice within farming itself while gaining an understanding of its implications for education in terms of teaching and learning and policy intervention.

Theoretical Framework

Motivation is a stimulus which guides the achievement of a result, goal, or action (Gibson, 2018) which is generally defined as the energy, direction, and persistence

of behaviour (Howard *et al.*, 2016; Pinder, 1998). With regard to choices made in relation to career aspirations, both social and psychological factors have an influence on the choices made. Socially, individuals are influenced by social bonds with family, parents, and history among other situational characteristics. Perception, ideas, beliefs, personality, cognitive and effective intentions influence the choices made (Ahmed *et al.*, 2017). Psychologists have documented the influential role of both intrinsic motivation; where behaviour is driven by internal rewards, and extrinsic motivation; where behaviour is driven by external rewards, on the achievement of an outcome (Gibson, 2018). Intrinsically motivated individuals experience greater interest, enthusiasm, and self-confidence leading to greater performance, persistence, and creativity (Deci and Ryan, 1991; Säfvenbom *et al.*, 2015) in addition to an increased feeling of vitality (Nix *et al.*, 1999; Ste-Marie *et al.*, 2016) plus self-esteem (Deci and Ryan, 1991; Tamir, 2016). Combined, these factors often result in an augmented sense of wellbeing (Bailey and Phillips, 2016; Benedetti *et al.*, 2015; Ryan *et al.*, 1995). The level of satisfaction experienced across the psychological needs will influence whether individuals are intrinsically or extrinsically motivated (Bauer *et al.*, 2019) as the greater the sense of satisfaction the more likely individuals are to be motivated by internal sources (Deci and Ryan, 1995), viewing themselves as autonomously organised as opposed to externally controlled (Ryan and Deci, 2004). On the contrary, amotivation; referred to as a disinterest or lack of desire to engage in an activity, often results in individuals experiencing a feeling of detachment from activities, lacking control over a situation, resulting in reduced investment in relation to time and energy towards activities or goals (Howard *et al.*, 2016). This is a particular challenge within the agricultural context as farmers are motivated by several factors including financial, social, and emotional (Burton, 2004; Grubbström and Eriksson, 2018; Howley *et al.*, 2015; Quinn and Halfacre, 2014) which can lead to the absence of both intrinsic and extrinsic motivation in the educational choice decision making process amongst young farmers.

Broadly, family firm owners accrue economic and non-economic wealth with the potential for it to be transferred to the next generation. Several challenges are faced within this intergenerational transfer of family assets with regard to who, when, and how the wealth will be transferred (Carr *et al.*, 2016). The choices made and the actions taken will have an impact on both the behaviour and performance of the next

generation, which are crucial to both the economic and non-economic sustainability of the family wealth transferred given that the success is bound by the ability and commitment of the next generation family heir (Carr *et al.*, 2016). Intergenerational transfers reflect the emotional understanding between parents and children and the parent's desire to benefit their heirs, endorsing upward mobility (Albertini and Radl, 2012; Benton and Keister, 2017; Spilerman and Wolff, 2012). This represents socio-emotional wealth which encompasses the activities and challenges associated with family firm management giving consideration to the outlook, actions, and idiosyncratic perceptions which strengthen or hamper with the family's relationship amid the family firm (Carr *et al.*, 2016). In this context, both choices made and actions taken, with regard to the intergenerational transfer of the family asset, will have an impact on the further educational choices made by members within the family. Family firm management does not occur in the absence of traditions and responsibilities towards past, present, and future generations (Price and Evans, 2009). Often, a successor is identified within the family farm gate for reasons such as labour and a motivated workforce (Grubbström *et al.*, 2014), with farm transfer to the farmer's son occurring in the majority of cases (Hennessy and Rehman, 2007; Lobley, 2010). However, recent research suggests the traditional prototypes of succession such as primogeniture are fading (Brandth and Overrein, 2013; Wheeler *et al.*, 2012) from the perspective of patrilineal succession and gender. Patrilineal succession has contributed to the invisibility of women in farming (Alston, 2004) as the cultural norm of male succession continues to govern the family farming community, particularly in the Irish context (Cassidy, 2019; Shortall, 1999). Males adopt a strong sense of belonging and attachment to place within the farming context as a consequence of important family tradition and sustaining the farm family name (Grubbström *et al.*, 2014). Females on the other hand adopt a supportive role which compliments and assists their husbands (Price and Conn, 2016), often entering farming through marriage (Shortall, 2002). Within the Irish family farming community, women are often encouraged to obtain educational qualifications outside the agricultural context in their position as non-successors (Cassidy, 2019). Traditionally, farmer's daughters were directed away from farming life by their mothers towards a professional lifestyle (Cassidy, 2013; O'Hara, 1998), leading to the transformation of female educational involvement at farm level. Often, females' off-farm income contributes to the continuation of the family farm (Kelly and Shortall,

2002) assuming the role of breadwinner. Within this study, gender influences further educational choice within the agricultural context and contributes to the formation of a higher education pathway as a consequence of the cultural and familial norms associated with the family farm.

Lastly, the concept of "nudging" refers to the process of steering people in a certain direction while allowing them to make their own decision and choose their own path (Sunstein, 2014). This notion has an influence within the agricultural context. Many nudges are effective in changing behaviour with many countries attracted to the idea of influencing behavioural economics and adopting economical nudges in an attempt to exhort children, adolescents, parents, and teachers towards improved education decisions and better educational attainment (Damgaard and Nielsen, 2018). Within health care, financial nudges have been successfully used to create a shift in individuals' choices towards better health-related choices (Heil *et al.*, 2008; Sen *et al.*, 2017; Volpp *et al.*, 2008; Volpp *et al.*, 2009). Within education, teachers and parents are key actors in the education production function and many empirical studies have discovered positive effects of parental involvement (Andersen and Nielsen, 2016) in addition to both the short- and long-term effects of teachers (Chetty *et al.*, 2014; Jackson *et al.*, 2014) on student outcomes. In the United States, Angrist *et al.* (2009) conducted a study on the impact of a $5000 reward on student's grade point average, discovering that the financial reward resulted in a significant improvement in grade point averages across the university. Therefore, financial nudges have the potential to change behaviour within an education system, however, the use of financial incentives to encourage or promote participation or behavioural change is not without concern. Potentially, financial nudges can block out intrinsic motivation (Deci *et al.*, 1999; Gneezy *et al.*, 2011) leading to a reduction in effort (Sen *et al.*, 2017). Within the agricultural context, this is of importance given the financial and intergenerational motivation factors at play with regard to obtaining an agricultural qualification and the impact of these motivators on student engagement and willingness to participate fully within the classroom setting.

In summary, this paper aims to provide a greater understanding of the motivational factors influencing further educational choice within the agricultural context, giving consideration to the influence of intergeneration family firm transfer and financial incentives on education choice. Financially, both national and European policy

encourages young farmer participation on formal agricultural education programmes as a result of financial incentives obtainable following completion of a formal agricultural qualification. Socially, farms are situated within a wider local community (Flemsæter and Setten, 2009) as a place of work, a source of household income, and a home (Cheshire *et al.*, 2013; Flemsæter and Setten, 2009), resulting in social learning interactions with family and friends in addition to first hand experiences (Baron *et al.*, 1984; Grubbström and Eriksson, 2018). Lastly, emotionally, farmers tend to have an emotional attachment to the land, the place, the environment, the family, and the community (Grubbström and Eriksson, 2018) as the farmer creates memories of significant events that occur on the land in the context of both the farm and family life (Cheshire *et al.*, 2013; Riley and Harvey, 2007). The relationship of family farming with place has led to the continuance of generational ownership of farms as a family home and a production site or place of work (Downey *et al.*, 2017; Tanewski *et al.*, 2000). This allows knowledge and information to be passed from generation to generation on the family farm (Riley and Harvey, 2007) highlighting the tacit knowledge of older farmers and the importance of informal education for younger farmers. However, the impact of this relationship with the land and the intergenerational transfer of family farms on young peoples' further educational choices are less well known. Therefore, this paper will explore further education motivators amongst young people within rural farming communities in an attempt to synthesise the nuance of young farmer educational choices beyond the basic agricultural facts.

Methodology

A qualitative case study approach was applied in this study to build a comprehensive, in-depth understanding of the primary and secondary motivators attracting young people into agricultural education and inspiring their further educational choice. The ultimate aim of the case study approach was to articulate a nuanced understanding of young people within agriculture in the context of further education motivators by engaging with participants and making them part of the knowledge production process. The narrative method was chosen as it supports understanding of personal and collective identities (Clandinin and Rosiek, 2007) while giving consideration to place attachment and timely accounts (Clandinin and Rosiek, 2007; Creswell and Poth, 2017; Moen, 2006) of the research phenomenon.

Consequently, this method was appropriate in answering the overall research objective regarding further educational choice within the agricultural context.

In-depth, semi-structured exploratory interviews were conducted with a range of actors within the agri-food sphere to explore the research phenomenon. Participants were selected using a purposive, snowball sampling procedure to select information rich sources (Creswell and Clark, 2018), willing to participate and articulate meaningful, sensitive experiences and opinions (Bernard, 2017) in relation to factors which influence further educational choice. Snowball sampling was used in line with the purposive sampling procedures to recruit informants the researcher did not have direct access to. The empirical material for this study consisted of five key groups of actors within the field of agricultural VET (Vocational Education and Training) education: (i) agricultural college principals (n=6); (ii) agricultural college teachers (n=6); (iii) full-time agricultural education students (n=6); (iv) agricultural education graduates (n=6); and (v) policy leaders (n=4). A total of twenty-eight face-to-face, in-depth, semi-structured interviews were conducted with such personnel over a period of nine months with each interview lasting, on average, one hour. The interview guide consisted of four themes focusing on the importance of an agricultural education to personal and professional development opportunities, the factors influencing further educational choice, the important role and function of VET agricultural colleges in the delivery of agricultural education programmes, and the future of farming in Ireland and its impact on the agricultural education system. However, for the purpose of this research paper, the researchers discuss in detail the primary and secondary motivators influencing a young person's further educational choice. Semi-structured interviews were used as they allowed the researcher to follow unexpected thoughts and opinions with individual participants, supporting a more in-depth exploration of the phenomenon.

All face-to-face semi-structured interviews conducted were audio-recorded and subsequently transcribed verbatim. The data analysis procedure employed by Flannery, (2019) was used in the analysis of qualitative data collected in this study using NVivo12. Large amounts of data collected were separated, analysed, and synthesised using qualitative coding; open coding, axial coding, and integration (Enosh *et al.*, 2015; Strauss and Corbin, 1998). The researcher recorded comments and questions while transcribing interviews in the form of open coding. Axial coding

was used to create subcategories within the dataset, i.e. each individual motivator influencing further educational choice was identified. Finally, subcategories identified were integrated into broader categorisations, i.e. primary and secondary motivators. Thus, concepts occurring in-text were identified, patterns occurring were analysed, and any associations between themes were identified and recorded accordingly.

Results Discussion

While it has been identified that farmers are motivated by a mix of financial, emotional, and social factors within the agricultural context (Burton, 2004; Grubbström and Eriksson, 2018; Howley *et al.*, 2015; Quinn and Halfacre, 2014), reasons for entering agricultural education can be classified into primary (i.e. financial incentives) and secondary (i.e. cultural, familial) motivators. Together these factors have an influential impact on educational choices made by young people within farming itself. This section will discuss each of these factors in relation to young peoples' educational choices with regard to obtaining young trained farmers status and developing a career within the agricultural farming industry.

The Financial Nudge as the Primary Motivator

Under the 2007-2013 CAP Reform, measure 112 was introduced to encourage more young people to pursue a career within the farming industry. The aim and purpose of this measure was to provide support to the establishment of new farms and alleviate the "young farmer problem" across Europe. In the Irish case, eligibility required young farmers to possess a Level 6 Advanced Certificate in Agriculture, entitling them to young trained farmer status, which is commonly known as the 'Green Cert', and will be referred to as such here in. In this study, it was acknowledged that mandatory possession of the 'Green Cert' to avail of financial incentives delivered under measure 112 of the CAP resulted in a surge in numbers attending a VET agricultural college to obtain young trained farmer status:

> *"…we've been so busy, the very high numbers have been scheme driven and that certainly influenced the way we're doing business, it means it's almost a mass production, factory production of 'Green Certs' (Interviewee 1, College Principal)"*

The introduction of this financial nudge had implications for the extrinsic motivators behind further educational choice amongst young people within farming communities. A notable proportion of the student population in VET agricultural colleges in Ireland pursued an agricultural qualification as a result of the financial incentives associated with the qualification:

> *"Unfortunately, a lot of the students come in with the motivation of getting a certificate to maximise schemes (Interviewee 17: College Teacher)"*

> *"…they want the 'Green Cert'. If there was no 'Green Cert' they wouldn't be here and they expect you to just give them the 'Green Cert' (Interviewee 16: College Teacher)"*

> *"It's solely for the 'Green Cert' and the big one is stamp duty exemption (Interviewee 7: Agricultural Graduate)"*

> *"I think there are a small percentage of farmers who are students that are there to learn and become better farmers. The vast majority of them are there to get the piece of paper that will entitle them to grants and that's where the whole structure is wrong because that should not be your motive to go to college (Interviewee 13: Agricultural Graduate)"*

> *"My goal was to get the 'Green Cert' but you also learn all the practical skills and how to do everything correctly (Interviewee 5: Agricultural Student)"*

> *"For some of them they will see merit only in the award from the point of view of being a customer of the Department and getting grants (Interviewee 3: College Teacher)"*

Therefore, it is evident that the financial nudge introduced under measure 112 of the CAP and the associated financial incentives are encouraging more young people to pursue an agricultural qualification at the VET level, which is positive given the declining age of the European farming population and the need to produce graduates with the knowledge, skills and competences required to succeed within a highly competitive and rapidly changing agricultural industry. However, in contrast, whilst the financial nudge extrinsically motivates young people in the direction of a

formal agricultural qualification, it can result in the loss of intrinsic motivations leading to amotivated, disinterested students at the beginning of a course:

> *"…they have no interest, they're incredibly hard to motivate (Interviewee 16: College Teacher)"*

This poses a significant challenge for teachers in terms of providing a valuable, meaningful education for all learners, sparking interest and inspiring learners to adopt best practice with regard to agricultural practices. As a consequence, within this context:

> *"It is very much up to the educator when you're inside the classroom to actually make students interested in the topic or let them see merit in its own right….that (the financial incentives) might be the reason they're there but that's not good enough for us as educators to accept that as the baseline…it's a case of something that's very important to you over the next ten years in farming (Interviewee 3: College Teacher)"*

Thus, the financial nudge is helping alleviate the "young farmer problem" as it is resulting in greater numbers of young people establishing an interest in an agricultural education, however, it is posing challenges for agricultural teachers with regard to students' level of interest and readiness to participate and engage fully with the formal education programme. The evident lack of intrinsic motivation as a consequence of the financial nudge is resulting in declining endeavour in many instances.

Secondary Motivators

While the financial nudge influences the initial motivation for entering agricultural education, this research identifies what can be classified as secondary factors centred around familial and cultural background. Young farmers are socially and psychologically influenced by family culture and expectation as farming is perceived as a way of life. The relationship of family farming with place (Downey *et al.*, 2017; Tanewski *et al.*, 2000) and genealogical attachments to land and place (Low, 1992) have led to the continuance of inter-generational family farming. These non-monetary values and the culture of farming are shaping young peoples' decision

making process with regard to further educational choice, highlighting the influence of socio-emotional wealth and the intrinsic motivations accompanying this wealth:

> *"There's still very much the family farm syndrome, I'm from a farm therefore I'm going to become a farmer (Interviewee 22: College Principal)"*

> *"It's strong, the bloodlines or genetic lines that make up farming; am I going to be the generation that closes this place, that sells this place? To a certain extent maybe it'd be right if it was sold but the vast majority of people will struggle along (Interviewee 2: College Teacher)"*

> *"It's kind of an expectation within the family and part of it is because of individual desires and this is the life they see for themselves (Interviewee 28: Policy Leader)"*

> *"…often they'll (young people) come here (VET agricultural college) because there's a farm at home. It's not that they have great ambitions for it but they are expected to take over the farm (Interviewee 1: College Principal)"*

However, whilst the inter-generational family farming model still very much exists, the succession and inheritance model within farming is changing. Traditionally, the family farm was gifted to the eldest son within the family unit (Grubbström *et al.*, 2014) but nowadays, and certainly within this study, this is not the traditional case as *"A lot of them (farmers) are lucky if they get one son interested, so I think they'd be happy if they got one rather than picking and choosing who inherits (Interviewee 21: Agricultural Graduate)"*. The young person within the farm family unit who is keen to pursue an agricultural career within the farming sector is often the person chosen to obtain a formal agricultural qualification regardless of where they come in the family unit:

> *"Most of my friends that'd be in farming, they're not always the oldest one. I'm the second oldest and it's just whoever is the most interested that usually takes it up (Interviewee 20: Agricultural Graduate)"*

> *"…very naturally maybe a successor was identified, who just showed a huge interest in the farm and wanted to farm (Interviewee 27: Policy Leader)"*

The culture of succession and inheritance is changing as farm families aspire to identify a son/daughter, regardless of where they come in the family, who is keen to take on the role of running the family farm enterprise into the next generation. This represents positive progression in a setting where both the economic and non-economic sustainability of the family firm asset is dependent on the capability and dedication of the family heir. In this context, an interested party is afforded the opportunity to embrace upward mobility. However, gender does have an important role to play in this context as the students in the agricultural VET sector in Ireland are predominantly male:

> *"It's hard, labour intensive work and I suppose the status quo was that the eldest son gets the farm (Interviewee 10: College Teacher)"*

> *"There's a reason why men don't play against women in rugby and it's the same with farming, it's a physical, tough career (Interviewee 1: College Principal)"*

> *"…it may be a cultural thing that agricultural college is seen as for boys and lads actually and that maybe people might be less comfortable going into that environment (Interviewee 28: Policy Leader)"*

These excerpts highlight the challenge facing the agricultural industry in terms of changing mind-set and embracing the role of the female inside the farm gate. The role of women in agriculture is changing as property and power dictate the position of women in farming (Shortall, 1999). In this study, females view an agricultural education at the VET level as a stepping stone to higher education and view agriculture as a career outside farming when compared to their male counterparts:

> *"Girls probably do better at second level so they often go to higher education…higher expectations (Interviewee 28: Policy Leader)"*

> *"Females tend to go to colleges like University College Dublin to do agricultural science (Interviewee 26: Policy Leader)"*

> *"The smarter girls don't come to agricultural college. That's not to say that they're not pursuing an agricultural qualification in University College Dublin,*

Tralee Institute of Technology, Waterford Institute of Technology, etc. (Interviewee 23: College Principal)"

"The females that come in are exceptionally well equipped in terms of skills, knowledge, and competence so they selected a career in agriculture (Interviewee 27: Policy Leader)"

The different career path intentions of females within farming communities compared to males helps shed a light on the gender imbalance that exists within VET agricultural colleges in Ireland. Farm family culture and expectation combined with gender provides an insight into young peoples' intrinsic motives to obtain an agricultural qualification at the VET level, highlighting the males' intentions to enter the farming sector and the females' intentions to further their education and pursue a career within the agricultural industry.

Typically, a farm upbringing results in the involvement of all family members in the running of the farm (Grubbström *et al.*, 2014). Participants in this study emphasised the innate love and passion for farming amongst a proportion of the agricultural student population, signifying that:

"You have students that are interested and want to better the home farm, better themselves, and make it somewhat financially viable (Interviewee 10: College Teacher)"

The majority of young people participating on formal VET agricultural programmes descend from a farming background and have a wide range of both academic and practical ability:

"In a lot of cases they've either grown up on a farm or they've worked on a farm. They're practical learners, they're kinaesthetic learners, they like to learn practically and they like being outdoors (Interviewee 27: Policy Leader)

"The majority, 95% of them (young people), are coming from the home farm. They have a background in agriculture and I would say 50% of them are hoping to pursue that interest in agriculture whether it be on the home-farm full-time, or perhaps part-time farming with an off-farm job, and then the

remainder would be part-time farmers working full-time in a non-agricultural career (Interviewee 17: College Teacher)

However, that said:

"A certain percentage does come from non-farming backgrounds and they just come to build a whole knowledge and be educated about farming (Interviewee 21: Agricultural Graduate)"

VET agricultural colleges have a mix of young people descending from both agricultural and non-agricultural backgrounds, but the majority come from a farm. This depicts the *"huge grá* [love] *or huge love for the industry they're coming from, eager to learn, and passionate about the industry (Interviewee 15: College Principal)"* which may have stemmed from past experiences on-farm given the involvement of all members in managing an enterprise on the home farm:

"You genuinely have an interest in it (farming). If you don't have an interest in farming you're not going to put in the work and the hours that's needed for it (Interviewee 20: Agricultural Graduate)"

The intergenerational transfer of family assets and socio-emotional wealth associated with family farm transfers are intrinsically motivating young people both socially and psychologically with regard to further educational choice within the agricultural farming context.

Further Educational Choice Motivators Debate

The findings of this study provide an in-depth understanding of the social and psychological primary and secondary motivators influencing a young persons' further educational choice. The financial nudge associated with schemes and payments delivered under the CAP and the cultural and familial norms within a family unit act as a stimulus within the further education decision making process. There is a wealth of literature on the young farmer and the intergenerational transfer of the family firm from the farmers' perspective (Conway *et al.*, 2016; Grubbström and Eriksson, 2018; Leonard *et al.*, 2017), documenting the values and norms influencing the succession and inheritance process within family farm businesses, however, its counterpart from an educational perspective is largely absent. The significant contribution of this

paper to existing needs and priorities within further education policy and research lies in the pragmatic insights which demonstrate the importance of understanding the nuance around young farmer education and the intrinsic and extrinsic motivators influencing further educational choice.

The ageing farmer population, documented as a “young farmer problem” in the literature (Eistrup *et al.*, 2019; Zagata and Sutherland, 2015), presents an important challenge to the future of farming communities given the importance of young farmers to the future of farming (Brennan *et al.*, 2016a; Hamilton *et al.*, 2015) and the significance of generational renewal to the long-term survival of these communities. The European Union introduced financial measures under the CAP to tackle the young farmer problem in an attempt to encourage and support young people entering farming itself. This financial nudge resulted in a substantial increase in the numbers of students pursuing an agricultural qualification at the VET level in Ireland. Within this context, young people are extrinsically motivated by external factors, blocking out intrinsic motivation, which presents a noteworthy challenge for the agricultural education sector. Lack of intrinsic motivation in the decision making process can often result in disinterested, unmotivated students, not willing to engage fully with the teaching and learning process, taking for granted the value and worth of a formal agricultural qualification to the success of future farming practices within a hugely challenging sector. Thus, whilst the introduction of a financial nudge is helping alleviate the “young farmer problem”, the influence of such an incentive on motivational choice is not without concern given its impact on intrinsic motivators.

The financial nudge was identified as a primary motivator influencing further educational choice; however, secondary motivators in this context, centred around cultural and familial interests, were also documented within this paper. Within an education system it is important for policy makers to understand and recognise the values and goals present in farming (Grubbström *et al.*, 2014) and the intrinsic motivators and socio-emotional wealth associated with non-monetary values of farming. Socially, family farms are located within a wider local community (Flemsæter and Setten, 2009) where emotional attachments to land and to place have an impact on the further educational choices made by members of the family unit. Gender and the role of the male versus the female within the family farm unit

presents an obstacle with regard to the old tradition of the male successor and gendered division of labour resulting in greater expectations and demands on females compared to males (Grubbström *et al.*, 2014). Such an obstacle was present in this study given the career path intentions of females in parallel to males. Intrinsic motivations influence the males and females further educational choice however, in the majority of cases males pursue an agricultural qualification with the view to entering the farming sector compared to females who view further agricultural education as a stepping stone to higher education, carving a career pathway to the agricultural industry. In the education context, an understanding of the impact of further educational choice on professional life and future achievement is crucial to policy makers in terms of promoting and marketing education programmes. Young people who are intrinsically motivated by internal rewards generally express greater interest, self-confidence, and enthusiasm which are central to the success of the teaching and learning process.

Conclusion

Evidently, the financial nudge as a primary motivator alongside the secondary motivators identified in this study are having an influential impact on the further educational choices of young people within farming itself. Both of these intrinsic and extrinsic motivators will have an impact on education within the context of policy instrumentation and the teaching and learning process. The blend of intrinsic and extrinsic motivations alongside an array of academic and practical abilities within a student group presents a significant challenge to educators and education providers in terms of engagement, promotion of best practice, and the ability to change mind-set and broaden horizons. The establishment of an educational philosophy at the policy level and a teaching philosophy at the individual educator level becomes important in this instance as it will influence the alignment of instructional techniques with both formative and summative assessment. Findings from this study detail the nuance of primary and secondary motivators on further educational choice on an endeavour to shed light on the implications of such motivations on policy instrumentation and the teaching and learning process. In this context, a shift away from the traditional, teacher-centred approach to teaching and learning towards a student-centred learning environment where the teacher acts as a facilitator of knowledge exchange becomes imperative. Incorporating the student voice within the

classroom is important in an environment where both intrinsic and extrinsic motivations are at play within a diverse group of learners in terms of academic and practical ability. In this instance it becomes significantly important for policy makers and scholars to nuance the understanding of motivations influencing further educational choice.

In summary, implications of these findings for agricultural education programme providers and the educators involved are centred around the importance of understanding the nuance of motivations within young peoples' further educational choice with regard to policy instrumentation and intervention. Intergenerational family firm transfer and the socio-emotional wealth associated with the economic and non-economic wealth of the asset is going to remain a dominant feature within family farm units. This combined with the extrinsic motivation of the financial nudge and the intrinsic motivations discussed in detail in this paper will be central to young peoples' decision to pursue an agricultural related career. Thus there is a need for further educational policy to provide attractive conditions and career progression opportunities for those young people that pursue an agricultural qualification.

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Chapter 8: Conclusions

8.1 Introduction

As a starting point, this thesis set out to explore the professional development needs of agricultural teachers in their role as educators. Previously, there was very little known about agricultural teacher professional development needs and opportunities within the vocational education and training (VET) sector both within Ireland and abroad. Several scholars document research findings surrounding the field of pedagogy, education and training, continuous professional development, upskilling opportunities, etc. across several fields including nursing, primary education, secondary education, business management, etc. However, little was known about agricultural education within the VET context. Particularly, a dearth of research in relation to agricultural teachers and their professional development needs was evident. Thus, the study aims and objectives of this thesis set out to address this gap in the literature and provide an in-depth understanding of the professional development needs of this cohort of educators. Additionally, Zagata and Sutherland (2015) call for a more nuanced understanding of young people within agriculture, which this thesis contextualises within the case study approach.

8.2 Contribution to the Literature

Given the lack of research conducted in relation to agricultural teachers' professional development needs within the VET sector and the importance of positioning findings to inform future policy interventions, a comprehensive, mixed methods exploratory analysis was required to address each of the research objectives. Subsequently, this thesis investigated the professional development needs of teachers within the agricultural context with regard to pedagogical competence, motivations, and professional development using a mixed methods research design process. Whilst the study aimed to inform policy intervention and add to empirical knowledge it also contributes to wider theoretical debates surrounding agricultural education and teacher professional development within rural studies. Three distinct research phases as detailed in Chapter 4 support three empirical and theoretical contributions to the literature in the form of academic publications. Such contributions include (i)

the identification of agricultural teacher professional development needs; (ii) development of a pedagogical tool to address agricultural teacher professional development needs using a transnational participative process, employing both horizontal and vertical exploration of the research phenomenon; and (iii) provision of a nuanced understanding of the primary and secondary motivators influencing young peoples' further educational choice within farming itself. The 'common pool' approach to the recruitment of advisors and educators together is potentially having a negative impact on educator career path intentions and occupational choice. Furthermore, the lack of pedagogical competence and the position of Teagasc as policy maker and implementer signifies the importance of the pedagogical competency framework developed. The framework provides new insights to the teaching and learning context where the emphasis is on technical and scientific value. This technical and scientific value is important within the context of agricultural change and agricultural land following development trajectories. Combined, embarking on a journey towards pedagogical competence, giving consideration to the nuances underpinning young people within agriculture, the need to conceptualise the professional development needs of agricultural teachers at the VET level intensified.

8.2.1 Significance of Agricultural Change within the Education Context

Education has a significant role to play in maintaining and developing rural communities worldwide. From the agricultural perspective, agriculture has undergone significant change inside the previous two decades as a shift from productivism on one end of the agricultural continuum to neo-productivism at the other end of the continuum represents significant change within the agricultural sphere. What once was an industry solely concerned with increased mass production of agricultural produce, without regard for the environment, is now a sector concerned with climate change mitigation and protection of the countryside and habitats that reside there. The shift from productivism to post-productivism saw the introduction of agri-environmental schemes to support environmentally friendly farming which guides increased production of food and fibre in the absence of harmful, negative effects on the ecosystem. The productivist era was associated with strong financial state support in the form of farm subsidies, price guarantees, and protectionist and interventionist agricultural policies. This resulted in artificially

inflated prices for agricultural produce. During this era, farmers had little concern for the rural space within which they operated. Over time, the traditional notion of the countryside altered, placing agriculture as a threat to the countryside and the local community. This was as a result of the increasing level of artificial, harmful inputs utilised to sustain increased production. It is within this context that the introduction of agri-environmental schemes became imperative. Hence, there is a strong association between post-productivism and the move towards more environmentally sustainable farming practices. This required replacing physical agricultural inputs with knowledge inputs. Thus, agricultural education and extensions systems have a crucial role to play in this context in terms of horizontally embedding agriculture within the local community. Furthermore, findings within the literature highlight the economic, social, and sustainable development opportunities associated with a formal agricultural qualification. Following the post-productivist period, agriculture entered a transitional phase referred to as multifunctional agriculture. During this era farmers were considered both productivist and post-productivist, depending on agricultural farming practices and the quality of the land being farmed. The more productive lowlands remained in the productivist phase for a greater length of time as land was farmed extensively to increase agricultural production with little regard for the countryside. On the other hand, less productive uplands progressed to the post-productivist phase earlier than the lowlands as the land was farmed in a less intensive manner. This supported the protection of natural habitats and conservation of wildlife, flora, and fauna resulting in a more positive relationship emerging between farming, the environment, and the local community. It can be argued that multifunctional agriculture still very much exists today. The more productive land capable of producing greater agricultural commodities are farmed more intensively than the less productive uplands associated with regions such as Connemara in the West of Ireland for example. It can be said that such farmers engage in more sustainable agricultural practice when compared to their more productive counterparts in the south and east of the country. This brings us to the fourth ‘ism’ of agricultural change processes over the previous two decades; neo-productivism. Whilst progress was made with regard to positioning agriculture within rural communities, giving consideration to the environmental impacts associated with any farming system, little consideration had previously been given to the impacts of agricultural processes on climate change and ensuring sustainability of the sector.

Consequently, the fourth 'ism', neo-productivism, encompasses sustainable agricultural production. The growing global population has resulted in the increased need for increased production of feed and fibre. However, this cannot occur without consideration for the impacts of agricultural production on the climate and the local community within which farmers reside. Therefore, neo-productivism accounts for sustainable intensification of agricultural production and agricultural education has a fundamental role to play in this context. The significance at this point for the research is to understand the broader implications of such 'isms' on agricultural change and rural society overall. Agricultural processes signify multifaceted, complex relationships of significance to the agricultural education sector. In the course of establishing teacher professional development needs within this context, heutagogical practices and consideration of same must be considered.

8.2.2 Motivation and the Teaching and Learning Milieu

Education centres are the nucleus of a local community socially, economically, and institutionally as they function as a source of employment, a knowledge source, and an environment in which to develop a community of practice. In the agricultural context, the socio-emotional attachments to land, place, environment, family, and community form the basis of several studies in relation to farming and rural development. This signifies the collegial relationship that exists between farmers and the environment and the local community. These multidimensional relationships that encompass agriculture help shape agricultural norms within rural areas. Several studies document the influence of such norms on succession and inheritance within family farm businesses from the agricultural perspective, however, this study provides an education perspective to such values and norms. Chapter 7 details the nuance of intrinsic and extrinsic motivators on young peoples' further educational choice. The financial nudge and cultural and familial norms help shape the decision-making process surrounding further education. Farmers are motivated by a mix of financial, social, and emotional factors. Financially, farmers are motivated by both national and European policy intervention which supports young farmers in their establishment within the farming industry. The mandatory possession of an agricultural qualification to avail of financial incentives has resulted in a surge in numbers pursuing an agricultural qualification. However, the implications of such extrinsic motivation is a cause for concern. Externally motivated individuals often

experience a lack of interest and disengagement with educational material. This is of significant importance for the teacher as they strive to achieve a successful, productive learning environment. It also presents challenges in terms of successfully educating young farmers with regard to sustainable intensification and expansion of farming practices. The case of Ireland is quite unique with regard to agricultural education and the possession of an agricultural qualification to avail of incentives. In other European countries, an agricultural qualification is not mandatory to avail of young farmer support. Positively, in the Irish case, the surge in agricultural numbers is resulting in increasing numbers of young trained farmers within the agricultural farming sector. This helps address the aging farmer population across Europe. However, negatively, as mentioned with regard to the impact of extrinsic motivators, young people driven by financial incentives and the availability of schemes as a result of an agricultural qualification often experience disinterest and a lack of engagement. This is significantly challenging for the educator in terms of achieving the desired learning objectives. It is within this context then that pedagogical professional development is significantly important for the educator. Such training will support and guide teachers in creating effective, successful learning environments. Emotionally, farmers are attached to the land, the place, the environment, and the community as the farm functions as a home, a place of work, and a source of income. This exemplifies generational ownership and the culture of succession and inheritance across the rural agricultural landscape. Farmers' and local knowledge make an important contribution to social learning processes as tacit knowledge has an equally important role within the education context alongside formal educational opportunities.

Just as agriculture has undergone a fundamental shift across the continuum of 'isms' so too has education experienced a paradigm shift. The behaviouristic approach to education was the traditional norm in which the educator assumed an expert position within the classroom. In this environment, a teacher-focused learning context was generated supporting the transmission of knowledge from the 'expert' teacher to the 'novice' learner. Within this context, the teacher expects the learners to regurgitate the knowledge obtained in summative assessments. This teacher-focused approach to student learning creates a passive learning environment with little to no responsibility given to the novice learner. However, as learning theories evolved and

educational theorists discovered new educational paradigms, more student-centred learning environments began to emerge. The evolution of the constructivist approach based on cognitivism helped place learners at the centre of the teaching and learning process. Cognitivism was based on the notion that learning had not occurred until information obtained by the students resided in the long-term memory. To successfully achieve and support the conveyance of knowledge from the short-term memory to the long-term memory, student-centred activating instructional techniques are required. Such techniques promote deep learning and encourage use of higher order thinking skills. It is within this space that the constructivist theory emerged. Learners were now expected to construct knowledge based on prior knowledge and experiences in line with new knowledge and information presented to them. Therefore, the creation of the student-centred learning environment is arguably the most significant contribution of the constructivist theory. Within agricultural education, given the primary nudge of the financial incentive, the creation of a constructivist learning environment is imperative to the success of the teaching and learning process. A final paradigm shift within education represented the emergence of technology and rapidly changing technological environments surrounding all parties in today's world. This paradigm shift has been referred to as connectivism. Connectivism contextualises learning within a technological environment. It is no longer acceptable to solely provide learners with the necessary knowledge acquired to successfully complete an education programme alone. Educators must now encourage students to become self-regulators of their own learning and provide them with the skills necessary to self-direct their learning and seek solutions to problems themselves. Thus, education learning theories help shape and guide the teaching and learning process. Therefore, knowledge and understanding of such theories is imperative to successful teaching. Additionally, intrinsic and extrinsic motivators influence how students engage with the learning process. Nudging steers people in a certain direction while still giving autonomy in choice. Nudges are effective in changing behaviour, although within agricultural policy, the financial nudge may have resulted in unintended outcomes. Educational environments support the development of learning communities which contribute to social learning processes. This highlights the importance of tacit and explicit knowledge. Within the agricultural context, given the social and familial norms associated with farming, tacit knowledge has a significantly important role to play

alongside explicit knowledge in the development of the future generation of young farmers.

8.2.3 Qualification and Success of the Teaching and Learning Environment

The purpose of education is multidimensional; qualification, subjectification, and socialisation. Therefore, focusing on academic qualification alone can have negative implications for the success of the teaching and learning process. The rigid nature of policies and regulations can force teachers to teach to the curriculum forgetting about all other important aspects associated with participation on an education programme. The educators teaching philosophy also has an impact on the type of teaching and learning environment created, the choice of instructional techniques chosen, and the utilisation of formative as well as summative assessment. Each of these contribute to successful or unsuccessful student engagement, depending on the educational setting created. Individual teacher's motivators will also have an impact on the teacher's approach to the teaching and learning process. It is within this context then that teacher professional development is significantly important as it brings about change in people, encompassing an on-going process of reflection and self-evaluation. However, teachers' attitude towards professional development and their willingness to engage will determine the success of such opportunities given that professional development and the learning journey is complex. The interrelated aspects of the social, personal, and occupational qualities of the individual, the organisation, and the department within which one works contributes to its complexity. It is within this broad context then that an extensive exploration of the professional development needs of agricultural teachers was required. Chapter 5 details the explanatory sequential mixed methods design employed in identifying the professional development needs of agricultural teachers in their role as educators. A contextual understanding of the challenges facing this cohort of educators within the VET sector was required given the cultural norms associated with farming itself and the complex nature of education. This chapter addressed the gap in relation to educator professional development needs within the VET agricultural sector given the limited number of studies available on teachers' experience in the delivery of agricultural programmes. Following on from that, the second research phase aimed to address agricultural teacher professional development needs through the development of a pedagogical instrument to support agricultural teachers'

pedagogical needs. The development of the framework along the student-teacher axis, giving consideration to the individual, the institutional, the technical, and the instructional aspects of an educational environment, positioned the framework within the needs of the participants involved in the study. The transnational, multidisciplinary methodological approach developed in the creation of the pedagogical competency framework increases the transferability of the framework within the methodological and practical sphere of the VET sector as a whole. Such developments contribute to empirical and theoretical debates surrounding VET educator professional development. The framework provides a theoretical basis for the development of professional development programmes within a technically driven educational environment, supporting the technical competence required but also incorporating the pedagogical competences required to ensure successful teaching within such an environment. Teacher professional development programmes in primary and post-primary sectors are well established. However, the evolution of such programmes at the vocational level is a relatively new space in Ireland which previously did not have a recognised qualification. Across Europe, teacher professional development has been regarded as imperative to any educational setting regardless of the sector, whether primary, post-primary, or VET, and so teacher professional development programmes across all sectors in Europe are well established. Ireland, therefore, is somewhat behind the curve with regard to teacher professional development within the VET sector, particularly the agricultural VET sector. Consequently, the framework can be used to promote and develop this space within Ireland. At the European level, the framework can be used to enhance this space as it provides a blank canvas for agricultural educators' pedagogical competence requirements. Subsequently, the framework has the potential to contribute to the success of the teaching and learning process.

8.2.4 Summary Remarks

Zagata and Sutherland's (2015) call for a more nuanced understanding of young people within agriculture, which goes beyond stats and figures, and the importance of professional development opportunities to the success of the teaching and learning environment directed the research objectives for this study. The philosophical assumptions underpinning social science research; ontology, epistemology, and methodology, guided the researcher's decision to employ an

explanatory and exploratory sequential mixed methods design. This sequential mixed methods design, alongside the addition of a case study approach, was employed to answer each of the research objectives. The significant importance of this research design was in ensuring the research findings were grounded in the views and opinions of the study participants. The multi-actor, multi-scale, multi-method approach provided a powerful lens through which an irresolute landscape could be explored. The integration of qualitative and quantitative methods across the research phases assisted in the establishment of a conceptual understanding of professional development needs within the agricultural context. The three paper publications detailed in Chapter 5, Chapter 6, and Chapter 7 come together to provide an holistic, contextually positioned understanding of the research phenomenon as a whole. The pedagogical competency framework was developed in response to national agricultural teacher professional development needs. A more nuanced understanding of young people within agriculture was conceptualised within the case study approach. This nuanced understanding contributes to educators' comprehension of the teaching and learning environment within the VET context. Individual educator needs within the agricultural context were fundamental to the development of a pedagogical tool to support the professional development needs of teachers positioned within a technically driven VET scenario. Knowledge and understanding of young peoples' further educational choice within farming itself is imperative to the success of the teaching and learning process as both intrinsic and extrinsic motivators impact on student engagement within an education programme. All three contributions combined contribute to the conceptual understanding of the study objectives and the overall aim of the research project (Figure 8.1) providing fresh insight to professional development needs of agricultural teachers within the VET sector, contributing to wider theoretical debates surrounding VET.

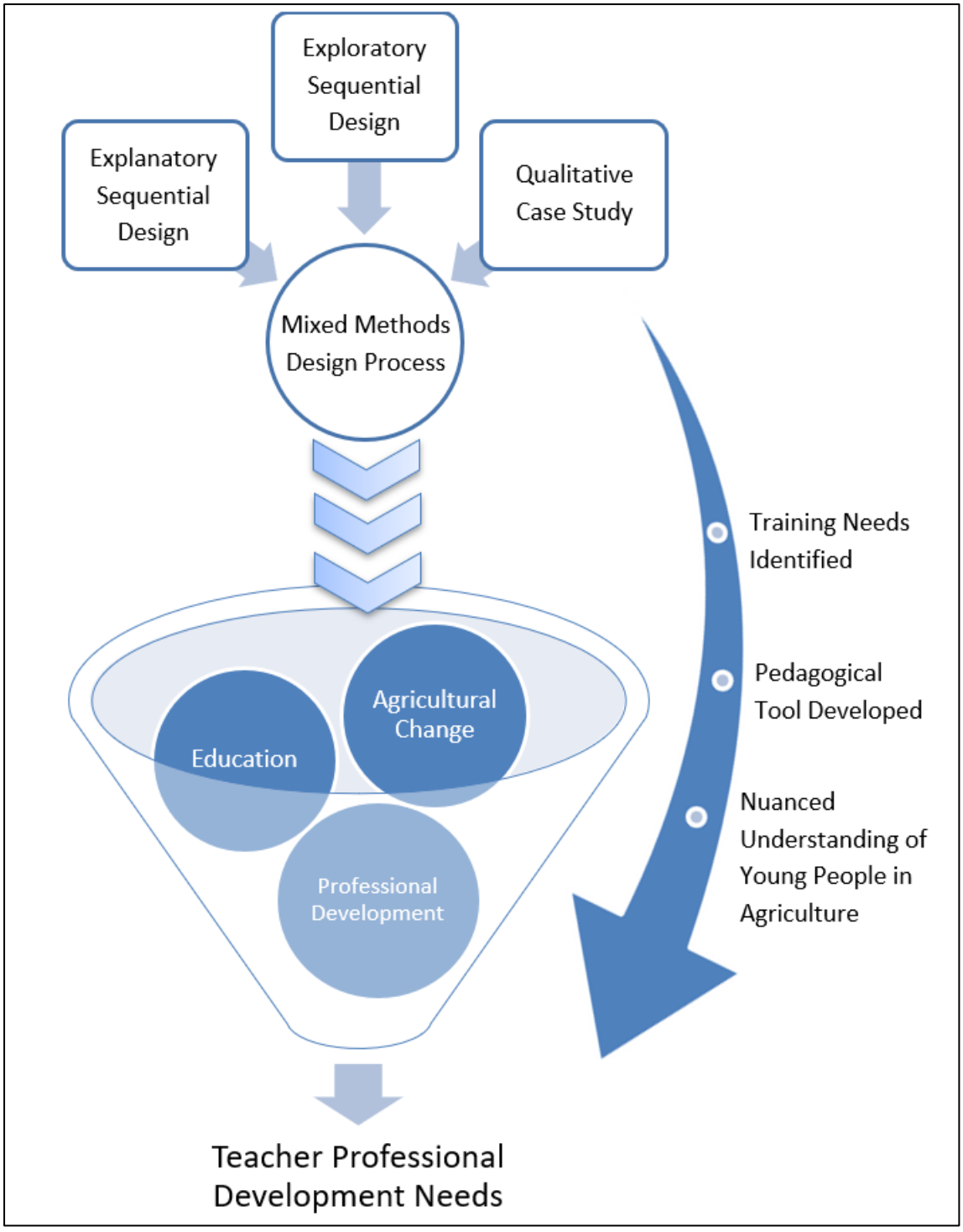

Figure 8.1: Contribution to Agricultural Educator Professional Development Needs (based on Figure 2.1: The Conceptual Framework).

8.3 Institutional Considerations

The institutional environment in which agricultural education programmes are delivered and agricultural educators reside has evolved and has been shaped by a number of factors, including government interventions based on national and European policy. It is evident that agricultural educator recruitment and the professional development protocol in place for Irish agricultural VET teachers are posing significant challenges to the agricultural education system and agriculture as a whole. National and European policy has shaped agricultural education programmes across the rural landscape for a number of years now with no sign of such policy interventions subsiding in the near future. The 'young farmer problem' across Europe and the need to encourage more young people to enter the farming sector is central to national and European policy at present. This will remain the case until such time as the aging farmer population across Europe is rectified. Agricultural education has a significant role to play within this context, inside the rural countryside, as knowledge of farming and agricultural practices become crucial to the sustainability of our rural landscape. Consequently, this section discusses the implications of policy intervention on agricultural education and the role of agricultural teachers in delivering such programmes to rural and urban communities. Additionally, an insight into potential advances and improvements that can be made within the agricultural education sector, in line with international best practice, is discussed. This will assist policy makers and reformers in cultivating an agricultural VET system which addresses the wider rural landscape and community needs within a sustainable environment.

Nationally, agricultural teachers are recruited based on technical expertise and the possession of a NFQ Level 8 agricultural science qualification. Therefore, it can be said that emphasis is placed on the technical knowledge of the candidate with no consideration for the candidates' pedagogical ability. Inferior to this, following appointment to the position of agricultural teacher, there is no onus or requirement on the candidate to obtain a pedagogical qualification or even pedagogical training. This is outside international norms, placing agricultural education providers across Ireland in a vulnerable position given that the majority of educators delivering agricultural programmes in Ireland are not pedagogically trained. Across Europe, the candidate must be pedagogically trained at point of employment or alternatively,

obtain a pedagogical qualification within two years of appointment. European-wide agricultural education programmes place students' learning experience at the heart of their education programmes. Subsequently, education providers and their teachers must be pedagogically trained to ensure a successful learning experience for their learners. The same can be said of the Irish case, students' best interests and learning experiences are at the heart of the agricultural education programmes. However, a strive towards pedagogical competence and the delivery of agricultural education programmes by pedagogically competent instructors is of utmost importance.

One of the barriers to the promotion and advancement of educators towards pedagogical competence is the departmental umbrella under which agricultural education falls in Ireland. In Ireland, the Department of Agriculture, Food, and the Marine (DAFM) are responsible for the delivery and provision of agricultural education programmes across the rural landscape. Teagasc, the national advisory, research, and education authority in Ireland, have primary responsibility for the delivery of such programmes. Consequently, Teagasc are both policy makers and implementers. This poses a significant challenge in meeting the professional development needs of the agricultural teacher cohort. The significant importance of the international perspective in this context then becomes imperative to the successful development of education programmes, providers, and instructors. Additionally, as stated previously, agricultural education falls under the remit of the DAFM in Ireland which is not the case across Europe, in the Netherlands at least, where European agricultural VET programmes fall under the remit of the Department of Education and Skills (DES) equivalent. This presents a significant challenge in itself to Irish agricultural education systems across the VET sector as programme providers are not entitled to the same funding, support, and guidance in the area of pedagogy as received by VET providers under the remit of the DES. This perhaps provides a rationale for the lack of pedagogically competent education providers within the agricultural VET context compared to other VET sectors. Agricultural and technical competence and expertise comes ahead of pedagogical capability given their scientific background. In this context, perhaps a shift away from DAFM towards the DES in an effort to position the agricultural VET sector under the DES umbrella would assist in addressing some of these challenges presented here and support

agricultural education providers and policy makers on their journey towards pedagogical competence.

European policy supports young farmer entry to the agricultural sector, in particular the farming sector, as they aim to inject fresh, young blood back into the industry. Agricultural education is an important developmental aspect of European policy incorporated to alleviate the 'young farmer problem' across the rural landscape. The onus is on individual state entities to implement young farmer policy reform in line with national requirements. In the Irish case, young farmer policy support is guided by the possession of a NFQ Level 6 agricultural qualification. This national requirement resulted in a surge in the numbers of young people interested in pursuing an agricultural VET qualification. This increase in numbers was primarily influenced by the financial nudge, placing immense pressure on agricultural education programme providers as the intake of students grew exponentially across all agricultural colleges. This increase in student numbers resulted in larger class sizes, greater diversity in students' ability both academically and practically, and greater student diversity surrounding learning abilities, needs, and requirements across the island. The need for pedagogical competence became even greater in this instance. Knowledge and ability to cope and manage greater student numbers and vast learning abilities, while still maintaining standards and excellence in teaching and learning and the delivery of agricultural education programmes, became a challenge. Findings in the literature document the significant impact of group size on the learner experience. The need to maintain optimum numbers within a group to uphold excellence in the delivery of an education programme is well documented. In this instance, consideration needs to be given to the staff-to-student ratio across agricultural education programmes as student numbers rise and the recruitment of new, additional teacher's remains stagnant. Positively, increased numbers of young people are becoming professionally competent in the area of agriculture. Consequentially, there is an increasing number of technically trained individuals within the farming sector. However, this increase cannot occur in the absence of consideration for the quality of education provided to these young people. In contrast, young farmer policy support is not implemented in the same way across Europe as discussed here. Subsequently, European agricultural VET providers do not experience the same level of artificially inflated agricultural numbers

based on a financial nudge. It can be argued, based on findings discussed in the literature and within this thesis in Chapter 7 that, European providers attract more interested, committed young people. They attract young people interested in following a vocation to enter the farming industry, compared to the disinterested, unmotivated students that are a product of the financial nudge associated with policy implementation. On the one extreme, agricultural providers attract young people influenced by the financial nudge and the availability of financial incentives associated with the possession of an agricultural qualification, while on the other extreme, young people are motivated by intrinsic motivators alone when deciding on further educational choice. In the Irish case, a mix of intrinsically and extrinsically motivated students pursue an agricultural qualification which in itself presents a significant challenge to the success of the teaching and learning process and the role of the educator in achieving success. Perhaps, in this context, pedagogical competence is even more imperative when compared to international counterparts, given the challenging educational environment within which agricultural teachers feature.

Communication channels including the top-down versus bottom-up approach have an impact on the success of an organisation. Typically, within the Irish education system the top-down communication approach is employed, as policy developed and implemented by the top level must be obeyed and followed by the instructors on the ground. Thus, in this instance, curriculum development policy guides the instructional techniques as teachers are forced to teach to the curriculum based on government endorsement, leaving little room for ingenuity on the teachers' part. The importance of a teaching and learning unit and an education research department within an organisation is paramount in providing an holistic education experience. This environment supports the constructive alignment of an education programme in line with teachers' philosophical approach to the teaching and learning process. In the Irish case, Teagasc as an organisation would benefit from the introduction of an education research department populated within a teaching and learning unit. This unit would co-exist alongside the curriculum development and standards unit, helping broaden educational perspectives for the betterment of agricultural programmes at the VET level. At present, the curriculum development and standards unit spanning the country is concerned with policy development with regard to

curriculum reform and agendas. The students' best interests are the focus of all debates. However, the agricultural teacher and their role in the delivery of agricultural education programmes are often neglected. Therefore, a teaching and learning unit which has the teacher at the nucleus of the teaching and learning process, alongside the students, will help form and create a department at the policy level which gives consideration to all parties involved in successful educational programme delivery. After all, several research scholars have highlighted the importance of using research to inform ones teaching which is not supported by a top-down communication approach. Bottom-up, top-down, horizontal, and vertical communication channels should occupy policy makers' discourse in this regard. Feedback from educators and students, those on the ground formally delivering agricultural education programmes, are equally as important as the knowledge, information, and opinions channelled from more senior positions. Therefore, a more collegial, inter-disciplinary relationship across all agricultural education departments, with the inclusion of a teaching and learning unit, should be considered to enhance and improve the provision of agricultural education programmes.

In summary, the introduction and implementation of young farmer policy across the agricultural sector has been a challenging liberty which created both opportunities and challenging prospects. The intellectual gap and the knowledge deficit associated with the absence of an agricultural qualification resulted in the promotion of agricultural VET programmes to encourage young, fresh blood back into the farming industry. The agricultural teachers' needs and requirements in line with the increased demand for agricultural education at the VET level were overlooked. This resulted in policy which neglected to support such provisions. The findings from this study shed light on the implications of policy interventions on agricultural education programmes as a whole, as it explored the professional development needs of the teaching cohort while giving consideration to student motivators in line with further educational choice.

8.4 Summary Remarks

Education is a fundamental aspect of the sustainable development of rural communities operating as a nucleus for societal developments. In Ireland, agriculture is very much part of the rural landscape with both tacit and explicit knowledge

playing an important developmental role in the education of the future generation of young farmers. This thesis set out to provide an in-depth exploration of the professional development needs of teachers involved in the delivery of formal agricultural education programmes giving consideration to the student perspective with regard to intrinsic and extrinsic motivation. Thus, this study contributes to the scholarly debate encircling teacher professional development and young peoples' motivators.

Previous studies within the VET context focused on education outside the agricultural domain, failing to provide insight into the role of the educator within such a technically driven VET scenario, as is the case within the agricultural VET sphere. Several studies investigated the significance of ensuring a VET qualification meets industry needs, producing graduates with necessary competences required to successfully function within a field or sector upon employment. However, a dearth of research is evident within the professional development domain for VET teachers. Furthermore, an intellectual gap exists with regard to the nuance of young people within agriculture. Consequently, this thesis aimed to address these research gaps within the field of VET by conducting an in-depth explanatory and exploratory sequential mixed methods design process in the exploration of the professional development needs of agricultural teachers within the VET context. Additionally, the researcher employed an explorative case study in the exploration of the primary and secondary motivators influencing young peoples' further educational choice. This research process sheds light on the financial nudge and the role of cultural and familial norms within farm families. Subsequently, the research acted as a catalyst to scholarly debate and policy intervention as the findings impact everyday professional practice.

8.4.1 Future Research

This thesis conceptualised the professional development needs of agricultural teachers within the VET sector using a sequential mixed methods approach. Findings provide interesting insights to the role and function of agricultural teachers at the VET level while exploring their professional development needs. Consequently, this is an interesting topic which requires future work.

Findings from the development of the pedagogical competency framework contributes to and builds upon existing knowledge regarding exploratory sequential mixed methods design processes. However, whilst the framework contributes to existing literature and addresses the gap associated with the professional development needs of agricultural teaching cohorts, the thesis did not provide scope for an evaluation of the tool developed. Therefore, an evaluation of the usefulness of the framework as a tool to develop a VET professional development programme for teachers at this level is an important starting point for future research. The perceived usefulness of the framework is well documented in Chapter 6 however; an extensive evaluation of its actual usefulness has yet to be addressed. Scholarly debates would benefit from such an evaluation as a newfound knowledge regarding successful implementation of the framework would be provided. In turn, this would benefit policy makers in using the framework to guide training and professional development policy within an organisation. An evaluation of the pedagogical competency framework is also significant given the emergence of recognised VET teacher pedagogical qualifications in recent times. This is a relatively new space in Ireland which previously did not have a recognised qualification.

This thesis also postulated the challenges facing the agricultural sphere as a result of the recruitment process employed across agricultural education systems in Ireland. Findings presented in Chapter 5 imply current recruitment processes and procedures are having a negative impact on agricultural teacher retention levels. Whilst the findings presented in Chapter 5 support this claim, a more extensive, in-depth exploration of this research phenomenon is required to fully understand the career path trajectories of employees and the positioning of the career as an agricultural teacher on this continuum. The introduction of an international perspective within this context would help in the positioning of agricultural educator recruitment within the international sphere while acting as a comparative for the intrinsic and extrinsic career path motivators within agricultural education and extension. Consequently, findings from this work would have the potential to influence policy makers' discourse regarding recruitment of teachers within the VET sphere.

Finally, a nuanced understanding of young peoples' motives within the agricultural context regarding further educational choice was detailed in Chapter 7 of this thesis.

This research phase helped shed light on intrinsic and extrinsic motivators influencing further educational career choice, supporting a reflection on the teaching and learning process, in particular, student engagement. However, this research phase presented unexpected thoughts and opinions with regard to personal and professional development opportunities. The formal and informal educational journey encountered by participants featured across participant discourses within the study. However, a more comprehensive examination of this nuance is required to support claims surrounding the personal and professional journey encountered. Farmers' and local knowledge, in the form of tacit knowledge, and the contribution of this informal learning happening outside the formal agricultural education context and within the 'third space', the in-between places of learning, requires further, in-depth exploration. This presents the opportunity to provide a more nuanced understanding of the role of both formal and informal learning processes to the professional development of the future generation of young farmers. This is of significance within the context of agricultural change and the push towards sustainability and climate change mitigation. The future generation of young farmers require the knowledge and support to function in a rapidly expanding sector which is faced with increasing global demands from a political and scientific level.

In conclusion, young farmer development and research in the area of sustainable development within rural studies are ever growing districts within scholarly debate. Therefore, contributions to this field of literature assist in the expansion of knowledge and information in this context, helping address intellectual gaps that exist in the literature. There are several opportunities to build on the foundations of this research project through the authorship of supplementary paper publications based on further, in-depth exploration of the findings presented in this study. This section highlights a number of research areas for investigation based on this thesis, expanding on the current understanding of education and professional development within the VET sector, contributing to rural scholarly debate.

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Publications and Presentations arising from the Research

Peer-Review Publications:

Flannery, S., Keaveney, K., & Murphy, F. (submitted). Motivational Factors Influencing Young Peoples Further Education Choice within Agricultural Education. *Journal of Rural Studies*

Flannery, S., Keaveney, K., Wesselink, R., & Murphy, F. (submitted). Use of a Transnational Participative Process to Develop a Pedagogical Competency Framework for Sustainable Agricultural Teachers. *Land Use Policy*

Flannery, S., Keaveney, K., & Murphy, F. (In-press). An Exploration of the Professional Development Needs of Agricultural Educators within the VET Sector: A Mixed Methods Study. *International Journal of Agricultural Extension*

Conference Presentations:

'An Exploration of the Professional Development Needs of Agricultural Teachers in their Role as Educators', Education Forum Meeting, Tipperary, Ireland, 5th July 2019

'Land-Use Management and the Vocational Agricultural Education Sector', European Society for Rural Sociology Conference, Trondheim, Norway, 24th – 28th June 2019

'Important Role of Vocational Agricultural Education in Developing Rural Communities and Engaging with Rural Youth', 7th EUGEO Congress on the Geography of Europe, National University of Ireland, Galway, 15th – 18th May 2019

Developing a Pedagogical Competency Framework for Agricultural Teachers', Teagasc Education Staff Conference, Cavan, Ireland, 26th April 2019

'The Training and Preparation of Agricultural College Teachers', UCD Knowledge Transfer Conference, Dublin, 29th September 2017

'Agricultural Education: An International Comparison of Delivery and Recruitment', International Comparative Rural Policy Studies Summer Institute, Barcelona, Spain, July 2017

‘Agricultural Teachers’ Experiences’, Teagasc Education Staff Conference, Dublin, Ireland, April 2017

‘Can Agricultural Teachers and Education Officers Be Better Prepared for their Role?’, UCD Knowledge Transfer Conference, Dublin, 4th November 2016

Poster Publications:

‘An Exploration of the Professional Development Needs of Agricultural Educators within the Further Education Sector: A Mixed Methods Study’ presented at the 7th European Forum for Agricultural and Rural Advisory Services (EUFRAS) Conference held in Hungary

‘The Training and Preparation of Agricultural College Teachers’ presented at the UCD Knowledge Transfer Conference held in Dublin in September 2017

‘Agricultural Teachers’ Experiences’ presented at the Teagasc Education Staff Conference held in Dublin in April 2017

‘Analysis of Agricultural Teachers’ Experience of their Role as Educators and Identification of Improvements to Better Prepare them for their Role’ presented at the 5th European Forum for Agricultural and Rural Advisory Services (EUFRAS) Conference held in Limerick in June 2016

‘Can Agricultural Teachers and Education Officers Be Better Prepared for their Role?’ presented at the UCD Knowledge Transfer Conference held in Dublin in November 2016

‘Analysis of Agricultural Teacher/Education Officer Experience of their Role as Educators and Identification of Improvements to Better Prepare them for their Role’ presented at the UCD Knowledge Transfer Conference held in Dublin in October 2015

Newspaper Publication:

‘Should they be taught to teach’, article in a December 2016 edition of the Irish Farmers Journal

Appendices

Appendix One: National Survey Instrument Employed in Research Phase 1

National Survey of Agricultural Teachers within Irish Agricultural Colleges

This Research Questionnaire is part of a thesis for MAgrSc Innovation Support Programme in association with Teagasc and UCD. The Questionnaire will take approximately 15 - 20 minutes to complete. Thank you for taking the time to complete this survey

*Required

AGRICULTURAL TEACHERS - YOUR ROLE AND EXPERIENCES

All information submitted in this questionnaire will be treated confidentially and used purely for research analysis purposes. Your privacy as a teacher will in no way be infringed upon. Individual data will not be identified - only summaries of all teachers' responses will be reported on.

Demographic Information

1. Gender *

Mark only one oval.

- ◯ Male
- ◯ Female

2. What age category do you fall in to? *

Mark only one oval.

- ◯ 20 - 30 years
- ◯ 31- 40 years
- ◯ 41- 50 years
- ◯ > 50 years

3. Which college are you located in? *

Mark only one oval.

- Ballyhaise College
- Clonakilty College
- Gurteen College
- Kildalton College
- Mountbellew Agricultural College
- Pallaskenry Agricultural College

4. What is your employment status? *

Mark only one oval.

- Temporary: < 6 month contract
- Temporary: 6 - 12 month contract
- Temporary: 12 - 23 month contract
- Temporary: 2 Year Contract
- Temporary: > 2 Year Contract
- Permanent
- Other:_____

5. How many years of teaching experience do you have? *

Mark only one oval.

- 0 - 2 years
- 3 - 5 years
- 6 - 15 years
- > 15 years

6. Which of the following courses listed are you involved in teaching material to?*

Please tick all courses relevant

Tick all that apply.

- [ ] Level 5 Certificate in Agriculture
- [ ] Level 6 Advanced Certificate in Agriculture (Dairy, Drystock, Agricultural Mechanisation, Crops & Machinery Management)
- [ ] Level 6 Specific Purpose Certificate in Farm Administration (Teagasc Green Cert)
- [ ] Part-Time Level 6 Specific Purpose Certificate in Farm Administration (Teagasc Green Cert)
- [ ] Teagasc Distance Education Green cert
- [ ] Other:_____

7. What is the HIGHEST level of education/training (full-time or part-time) you have completed to date? *

Tick all that apply.

- [ ] Higher Certificate (NFQ Level 6)
- [ ] Ordinary Bachelor Degree or National Diploma (NFQ Level 7)
- [ ] Honours Bachelor Degree / Professional Qualification (NFQ Level 8)
- [ ] Postgraduate Diploma or Degree (NFQ Level 9) [Postgraduate diploma, Masters Degree or equivalent]
- [ ] Doctorate (PhD) or Higher NFQ Level 10
- [ ] Other:_____

8. Do you have an accredited teaching qualification? *

Mark only one oval.

- ◯ Yes I do
- ◯ No I don't *Skip to question 15.*
- ◯ I am currently completing a teaching course/qualification *Skip to question 12.*

9. What is your Teaching Qualification?

Title of Qualification *

For example; Postgraduate Diploma in Teaching in Further Education

Level of Qualification *

For example; NFQ Level 9 (Postgraduate Diploma)

Awarding Body of Qualification *

For example; Waterford IT

Skip to question 15.

10. What TEACHING COURSE/QUALIFICATION are you currently completing?

Title of Qualification being pursued *

For example; Postgraduate Diploma in Teaching in Further Education

Level of Qualification being pursued *

For example; NFQ Level 9 (Postgraduate Diploma)

Awarding Body of Qualification being pursued *

For example; Waterford IT

TEACHING CAREER

11. Did you deliberately pursue a career as a teacher in an agricultural college? *

Mark only one oval.

- ◯ Yes
- ◯ No

12. Did you see a job as a teacher in an agricultural college as a route to advisory?

Mark only one oval.

- ◯ Yes
- ◯ No

13. Do you intend to remain in education as a teacher for the rest of your career? *

Mark only one oval.

- ◯ Yes *Skip to question 19.*
- ◯ No

CAREER AFTER TEACHING

14. When you move on from your job in education as a teacher, what career path would you like to follow? *

Please select as many as you feel relevant

Tick all that apply.

- ☐ Teagasc Advisory
- ☐ Teagasc Research
- ☐ Teagasc Curriculum Development & Standards Unit
- ☐ Private Agricultural Sector
- ☐ Full-Time Farming
- ☐ Other:_____

Training for Agricultural Teachers

15. Are you satisfied with the current level of In-Service Training (IST) you receive? *

Mark only one oval per row

	Extremely Unsatisfied	Unsatisfied	Don't Know	Satisfied	Extremely Satisfied
Technical IST e.g. Beef Skills	◯	◯	◯	◯	◯
Teaching & Learning IST e.g. Teaching Methodologies, Classroom Management, etc.	◯	◯	◯	◯	◯
Teagasc Policy & Processes IST e.g. Verification, Teagasc Memoranda, DMS & EMS use, etc.	◯	◯	◯	◯	◯

16. Do you feel you have received sufficient training in Teaching & Learning skills and strategies (pedagogy) for your current role? *

Mark only one oval.

- ◯ Yes
- ◯ No

17. Would you be interested in receiving additional training in Teaching & Learning (pedagogy)? *

Mark only one oval.

- ◯ Yes
- ◯ No *Skip to question 23.*

ADDITIONAL TRAINING

18. What type of additional training in Teaching & Learning (Pedagogy) would you be interested in receiving?

You can select more than one option

Tick all that apply.

- [ ] Additional In-Service Training
- [ ] 3 - 4 day Course
- [ ] Formal Teaching Qualification
- [ ] Other: _____

The Beginning of your Teaching Career

19(a). Please indicate whether the following would be helpful or not at the start of a teaching career to assist a new teacher in their role as an educator? *

Mark only one oval per row.

	No Help	Little Help	Helpful	Very Helpful
Teaching & Learning In-Service Training				
Shadowing another teacher				
A Teaching & Learning Handbook				
Mentoring				
Classroom Observations				

19(b). Are there any other supports (not listed) you believe would be helpful at the start of a teaching career?

_____

_____

_____

_____

_____

20. Please RANK the following supports listed (in the order of 1 - 5) based on how helpful you think they would be to an Agricultural Teacher at the start of their teaching career? *

1 = Most Helpful 5 = Least Helpful

Mark only one oval per row.

	1	2	3	4	5
Teaching & Learning In-Service Training					
Shadowing Another Teacher					
A Teaching & Learning Handbook					
Mentoring					
Classroom Observations					

Support Available to Agricultural Teachers

21. Are you satisfied with the level of support you receive from colleagues as an Agricultural Teacher within your college? *

Mark only one oval per row.

	Extremely Unsatisfied	Unsatisfied	Don't Know	Satisfied	Extremely Satisfied

22(a). In your role as a teacher how often do you SEEK support from the following? *

Mark only one oval per row.

	Never	Rarely (Once or Twice a Year)	Sometimes (Once a Month)	Often (Once a Week)	Very Often (More than Once a Week)
Principal					
Vice-Principal					
Other Teachers					
Technicians					
Curriculum Development and Standards Unit					
Peers i.e. friends outside work					

22(b). Are there any other supports (not listed) that you currently use?

23. Are there any other supports (not available) you would like made available to you? *

Mark only one oval.

- Yes *Skip to question 30.*
- No *Skip to question 31.*

24. Please indicate what supports you would like to see made available: *

Support Available to Agricultural Teachers

25. As a teacher, how often do you engage in the following practices? *
Mark only one oval per row.

	Never	Rarely (Once or Twice a Year)	Sometimes (Once a Month)	Often (Once a Week)	Very Often (More than Once a Week)
Read Scientific literature (i.e. journal articles, etc.) to keep up-to-date with current affairs and the latest developments in agriculture					
Observe other teachers teaching and give professional feedback					
Reflect continuously on teaching methodologies					
Seek new knowledge and constantly find better ways of teaching					
Experiment with new teaching approaches and methodologies to improve teaching					

26. Do you read agricultural publications to keep up-to-date with current agricultural affairs and the latest developments in agriculture? *

Mark only one oval.

- ◯ Yes
- ◯ No *Skip to question 34.*

27. Which of the following agricultural publications do you read regularly? *

Please select all relevant publications

Tick all that apply.

- ☐ Irish Farmer's Journal
- ☐ Farming Independent
- ☐ Irish Farmer's Monthly
- ☐ Agriland
- ☐ Tnet
- ☐ Today's Farm
- ☐ Teagasc Advisory Newsletter
- ☐ Other:_____

Teaching Methodologies, Knowledge and Attitudes of Agricultural Teachers

28(a). Do you like teaching? *

Mark only one oval per row.

	Really Dislike	Dislike	Neither Like nor Dislike	Like	Really Like
	◯	◯	◯	◯	◯

28(b). Please comment on your answer given to the above question i.e. 'Do you like teaching?':

_____

_____

_____

_____

29. How would you rate your overall technical knowledge on the core agricultural enterprise(s) relevant to the modules you teach? (e.g. beef, sheep, dairy, tillage, machinery, etc.) *

Mark only one oval per row.

	Very Poor	Poor	Neither Good nor Bad	Good	Very Good
	⬭	⬭	⬭	⬭	⬭

30. How would you rate your overall knowledge on the Teaching & Learning skills that enable effective teaching? (e.g. using blended learning, problem-solving techniques, lesson planning, enhancing learner engagement, etc.) *

Mark only one oval per row.

	Very Poor	Poor	Neither Good nor Bad	Good	Very Good
	⬭	⬭	⬭	⬭	⬭

31. Please indicate how often you use the following Teaching & Learning approaches: *

	Never	Rarely (Once or Twice a Year)	Sometimes (Once a Month)	Often (Once a Week)	Very Often (More than Once a Week)
I use a wide range of teaching approaches (collaborative learning, direct instruction, inquiry learning, problem-based learning, etc.)	⬭	⬭	⬭	⬭	⬭
I adapt my teaching style to different learners	⬭	⬭	⬭	⬭	⬭
I select technologies that enhance what I teach, how I teach, and what students learn	⬭	⬭	⬭	⬭	⬭
I use resources to facilitate higher order cognitive level thinking (problem solving, critical thinking decision making, knowledge and creative thinking, etc.)	⬭	⬭	⬭	⬭	⬭
I create lesson plans prior to every class	⬭	⬭	⬭	⬭	⬭

32. HOW have you changed your approach to teaching since you started as a teacher?

Active Learning

NOTE: Traditional methods of teaching include "chalk and talk" and little to no interaction in the classroom; active learning methods on the other hand include role play, brainstorming, etc.

33. Please indicate your own level of agreement with the following statements in relation to your attitude towards active learning: *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The quality of education can be improved if teachers shift their instruction from traditional methods (e.g. “chalk and talk”) to an active learning approach (e.g. role play)					
Active learning enhances ability to problem solve					
Active learning creates the opportunities to share experiences and encourage friendship among students					
Teaching is the sole responsibility of the teacher					
Active learning decreases students and teachers work load and saves time					
Overreliance on active learning can frustrate behavior of students					
Active learning enhances active student involvement in learning					
Active learning enhances self-confidence and independent learning among students					

34. How often do you use these active learning strategies? *

Mark only one oval per row.

	Never	Rarely (Once or Twice a Year)	Sometimes (Once a Month)	Often (Once a Week)	Very Often (More than Once a Week)
Lecture Presentation					
Problem Solving Methods					
Role Play					
Group Discussion					
Brainstorming					
Peer Teaching					
Educational Visits / Field Trips					
Group Work					
Student Independent Work through Assignments/Projects/etc.					
Audio Visual					
Demonstration					

35. How have the following affected your ability to use active learning strategies e.g. co- operative learning, brainstorming, etc. *

Mark only one oval per row.

	Great Effect	Moderate Effect	Little Effect	No Effect
Inadequate Training				
Lack of Materials				
Shortage of Time				
Large Class Size				
Your own personal attitude				
Student's Attitude				
Diversity of Student's Abilities				
Some student's dominance during group activities				
The Design of the Teaching Module				

Future Communication

36. Are you willing to participate in a follow up interview or focus group? *

I wish to reiterate at this point that ALL information submitted in this questionnaire will be treated in confidence and your privacy as a teacher will in no way be infringed upon. The focus group will be a group discussion expanding on some of the main points of the survey.

Mark only one oval.

- ◯ Yes
- ◯ No *Stop filling out this form.*

37. Please provide the following details:

Name: *

_____

College Location: *

_____

Email Address: *

_____

Contact No: *

_____

Appendix Two: Research Phase 1 Focus Group Guide

Introduction (2 mins)

- Thank everyone for taking the time to participate and help me with my research
- Outline what I have done to date, results thus far and plans going forward

Theme 1: Current Level of IST Received (10 mins)

- Do you feel you have received adequate training in teaching and learning skills and strategies? Would you be interested in training in this area?
- On average, how many days of IST would you attend in the year?
- What are the main limitations when it comes to attending IST/Barriers to attendance?
- Are there ways/things that could be done to try and facilitate training for all teaching staff across the colleges? E.g. online tutorials (helpful/useful????)
- Should education staff be informed of advisory IST days in addition to education IST days? Is there a gap?

Theme 2: Teaching Skills and Strategies (10-15 mins)

- What range of teaching techniques/methods do you use in the classroom? (e.g. group discussion, peer teaching, lecturing/presentation, problem-solving, etc.)
- How do you develop your teaching skills or how have you changed your approach to teaching over the years?
- Do you think completing the level 9 course in WIT has influenced your approach to teaching? What changes have you made as a result of the course (if any)? How did you benefit from the course?)
- Are you aware of different learning styles? (e.g. VARK, Bloom's Taxonomy, etc.)? Do you incorporate these into your lesson? What are the benefits of/reason for doing so?

Theme 3: Future Professional Development Needs (10-15 mins)

- If Teagasc were to put together an IST program (e.g. workshops) for teachers in teaching and learning skills and techniques what areas do you think IST should be provided in? What areas would you like support in? (e.g. classroom management, increasing student engagement, different teaching techniques that can be used, etc.).

Conclusion (2 mins)

- End the discussion with a brief outline of the main points discussed and ensure everyone is in agreement.
- Thank everyone for their participation. Wish all a Happy New Year!!!

Appendix Three: National Survey Instrument Employed in Research Phase 2

National Survey of Agricultural Teachers within Teagasc Agricultural Colleges

This research survey is part of a PhD thesis with Teagasc and UCD. The survey will take approximately 10 minutes to complete. Thank you for taking the time to complete this survey.

*Required

Professional Role

1. Which of the following best describes your role within agricultural education? *

Mark only one oval.

- ◯ Education Management Role i.e. Head of Department, CDSU, College Principal, Assistant Principal, etc. *Skip to question 26.*
- ◯ College Teacher Agriculture
- ◯ College Teacher Horticulture *Skip to question 19.*
- ◯ Education Officer Agriculture
- ◯ Education Officer Horticulture *Skip to question 19.*
- ◯ Other: _____ *Skip to question 26.*

Demographic Information

2. Gender *

Mark only one oval.

- ◯ Male
- ◯ Female
- ◯ Gender Non-Binary
- ◯ Self-Declare
- ◯ Prefer Not To Say

3. What age category do you fall in to? *

Mark only one oval.

- 20 - 30 years
- 31 - 40 years
- 41 - 50 years
- > 50 years

4. Which college are you located in? *

Mark only one oval.

- Ballyhaise College
- Clonakilty College
- Gurteen College
- Kildalton College
- Mountbellew Agricultural College
- Salesian Agricultural College Pallaskenry

5. What is your employment status?*

Mark only one oval.

- Temporary: < 6 Month Contract
- Temporary: 6 - 12 Month Contract
- Temporary: 12 - 23 Month Contract
- Temporary: 2 Year Contract
- Temporary: > 2 Year Contract
- Permanent
- Other: _____

6. How many years of teaching experience do you have? *

Mark only one oval.

- 0 - 2 years
- 3 - 5 years
- 6 - 10 years
- 11 - 15 years
- > 15 years

7. Which of the following Further Education Agricultural courses listed are you involved in teaching material to? *

Tick all that apply.

- Level 5 Certificate in Agriculture
- Level 6 Advanced Certificate in Agriculture (Dairy, Drystock, Agricultural Mechanisation, Crops & Machinery)
- Level 6 Specific Purpose Certificate in Farm Administration (Teagasc Green Cert)
- Teagasc Part-Time Green Cert Programme
- Teagasc Distance Education Green Cert Programme (For Award Holders)
- Other: _____

8. What is the HIGHEST level of education you hold on the National Framework of Qualifications (NFQ) Levels 8-10? *

Mark only one oval.

- NFQ Level 6 - Higher Certificate
- NFQ Level 7 - Ordinary Bachelor Degree or National Diploma
- NFQ Level 8 - Honours Bachelor Degree Professional Qualification
- NFQ Level 9 - Postgraduate Diploma or Degree (Postgraduate diploma, Masters Degree, or equivalent)

- ◯ NFQ Level 10 - Doctorate (PhD) or Higher
- ◯ Other: _____

9. Have you completed an accredited teacher training qualification? *

Mark only one oval.

- ◯ No, I have not completed a teacher training qualification *Skip to question 13.*
- ◯ No, I am currently completing a Level 9 teacher training qualification e.g. Postgraduate Diploma in Teaching in Further Education *Skip to question 13.*
- ◯ Yes, I have completed a Level 9 teacher training qualification e.g. Postgraduate Diploma in Teaching in Further Education *Skip to question 13.*
- ◯ Yes, I have completed a Level 6 teacher training qualification e.g. WIT 3/4 day course *Skip to question 13.*
- ◯ Other: _____

Please provide details of the other teacher training qualification you have completed:

10. Title of Qualification *

For example; Postgraduate Diploma in Teaching in Further Education

_____

_____

_____

_____

_____

11. Level of Qualification *

For example; NFQ Level 9 (Postgraduate Diploma)

_____

_____

_____

_____

_____

12. Awarding Body of Qualification *

For example; Waterford IT

_____

_____

_____

_____

_____

Teaching Career

13. Have you received sufficient training in Teaching & Learning skills and strategies (pedagogy) for your current role? *

Mark only one oval.

- ◯ Yes
- ◯ No

14. Did you deliberately pursue a career as a teacher in an agricultural college? *

Mark only one oval.

- ◯ Yes
- ◯ No

15. Did you see a job as a teacher in an agricultural college as a route to advisory? *

Mark only one oval.

- ◯ Yes
- ◯ No

16. Do you intend to remain in education for the rest of your career? *

Mark only one oval.

- ◯ Yes
- ◯ No *Skip to question 18.*
- ◯ Not sure *Skip to "Pedagogical Competencies."*

Educational Career

17. What role in education do you see yourself pursuing? *

Tick all that apply.

- [ ] College Teacher
- [ ] Education Officer
- [ ] Assistant Principal
- [ ] College Principal
- [ ] Curriculum Development & Standards Unit
- [ ] Other: _____

Skip to "Pedagogical Competencies."

Career After Teaching

18. When you move on from your job in education, what career path would you like to pursue? *

Tick all that apply.

- [ ] Teagasc Advisory
- [ ] Teagasc Research
- [ ] Regional Manager
- [ ] Specialist Role
- [ ] Private Agricultural Sector
- [ ] Full-Time Farming
- [ ] Other: _____

Skip to "Pedagogical Competencies."

Demographic Information

19. Gender *

Mark only one oval.

- ◯ Female
- ◯ Male
- ◯ Gender Non-Binary
- ◯ Self-Declare
- ◯ Prefer not to say

20. What age category do you fall in to? *

Mark only one oval.

- ◯ 20 - 30 years
- ◯ 31 - 40 years
- ◯ 41 - 50 years
- ◯ > 50 years

Teaching Career

21. How many years of teaching experience do you have? *

Mark only one oval.

- ◯ 0 - 2 years
- ◯ 3 - 5 years
- ◯ 6 - 10 years
- ◯ 11 - 15 years
- ◯ > 15 years

22. Have you received sufficient training in Teaching & Learning skills and strategies (pedagogy) for your current role? *

Mark only one oval.

- ◯ Yes
- ◯ No

23. Do you intend to remain in education for the rest of your career? *

Mark only one oval.

- ◯ Yes
- ◯ No *Skip to question 25.*
- ◯ Not sure *Skip to "Pedagogical Competencies."*

Educational Career

24. What role in education do you see yourself pursuing? *

Tick all that apply.

- ☐ College Teacher
- ☐ Education Officer
- ☐ Assistant Principal
- ☐ College Principal
- ☐ Curriculum Development and Standards Unit
- ☐ Other: _____

Skip to "Pedagogical Competencies."

Career After Teaching

25. When you move on from your job in education, what career path would you like follow? *

Tick all that apply.

- [ ] Teagasc Advisory
- [ ] Teagasc Research
- [ ] Regional Manager
- [ ] Specialist Role
- [ ] Private Horticultural Sector
- [ ] Other: _____

Skip to "Pedagogical Competencies."

Demographic Information

26. Gender *

Mark only one oval.

- ◯ Female
- ◯ Male
- ◯ Gender Non-Binary
- ◯ Self-Declare
- ◯ Prefer not to say

27. What age category do you fall in to? *

Mark only one oval.

- ◯ 20 - 30 years
- ◯ 31 - 40 years
- ◯ 41 - 50 years
- ◯ > 50 years

Pedagogical Competencies

The researcher is developing a pedagogical competency framework which will identify the knowledge, skills, understanding and values all educators should strive to achieve in order to improve and enhance their experience as teachers. This section contains a list of potential competencies that will be included in the framework. Each competency has been identified through semi-structured exploratory interviews with college teachers, principals and policy leaders both nationally and internationally. The researcher would like you to score each competency based on its degree of importance. The score you give will have an influence on whether competencies are included or excluded from the framework.

Curricular Knowledge

28. How important do you think it is for teachers to have a knowledge of the following educational practices: *

Mark only one oval per row.

	Not At All Important	Of Little Importance	Of Average Importance	Important	Very Important
Teagasc Quality Assurance Policy & Procedures	◯	◯	◯	◯	◯
Module Learning Outcomes	◯	◯	◯	◯	◯
Assessment Procedures	◯	◯	◯	◯	◯
Verification Procedure	◯	◯	◯	◯	◯

Curricular Knowledge

29. How important do you think it is for teachers to: *

Mark only one oval per row.

	Not At All Important	Of Little Importance	Of Average Importance	Important	Very Important
Communicate what is expected from students	◯	◯	◯	◯	◯
Be aware of what students expect from teachers	◯	◯	◯	◯	◯
Establish learning goals for each lesson/class	◯	◯	◯	◯	◯
Provide on-going constructive feedback to students	◯	◯	◯	◯	◯
Informally assess student learning in the classroom e.g. ask questions, in-class quizzes, etc.	◯	◯	◯	◯	◯
Formally evaluate student learning at the end of a module	◯	◯	◯	◯	◯
Be able to accurately correct student assignment, exam papers, etc. within a required time frame	◯	◯	◯	◯	◯
Ensure quality record keeping	◯	◯	◯	◯	◯

Modern Teaching Practices

30. Do you understand the following educational terms? *

Mark only one oval per row.

	I have heard of the concept and believe I understand it	I have heard of the concept but do not think I understand it	I have never heard of the concept before
Differentiated Instruction			
eLearning			
Problem-Based Learning			
Action Learning			
Scaffolding			
Facilitation			
Universal Design			
Peer-to-Peer Learning			
Blended Learning			
Alternative Teaching Strategies			

31. How important do you think it is for teachers to be able to: *

Mark only one oval per row.

	Not At All Important	Of Little Importance	Of Average Importance	Important	Very Important
Teach the same material to all students using a variety of instructional techniques					
Deliver each lesson at varying levels of difficulty based on the ability of each student					
Teach online using eLearning platforms e.g. Moodle, Blackboard, etc.					
Teach students about real-life problems by presenting them with real-life examples					
Teach students using a variety of teaching methods or instructional techniques					
Use technology/ICT within the classroom as an aid for teaching students					
Break up the learning into smaller chunks for students					
Provide support/assistance to students as they work on material outside their comfort zone					
Facilitate learning by encouraging students to take greater control of their learning					
Allow students to teach each other and learn from one another					
Encourage students to solve open-ended, real-life problems by researching the problem themselves					

Learner Diversity

32. How important do you think it is for teachers to be able to: *

Mark only one oval per row.

	Not At All Important	Of Little Importance	Of Average Importance	Important	Very Important
Understand the diversity of the learners they are teaching					
Provide support to students who may be suffering from mental health issues					
Support students with special education needs i.e. dyslexia, dyspraxia, dyscalculia, ADHD, etc.					
Teach a diverse group of students at the same time					
Provide one-to-one support to students					
Develop and operate a 'buddy system' for students where required					

Interpersonal Skills

33. How important do you think the following skills are to the success of teachers: *

Mark only one oval per row.

	Not At All Important	Of Little Importance	Of Average Importance	Important	Very Important
Time Management Skills					
Leadership Skills					
Teamwork Skills					
Non-Verbal Communication Skills					
Verbal Communication Skills					
Organisational Skills					
Management Skills					
Collaboration between colleagues					
Collaboration between other agricultural colleges					
Collaboration with industry					

Professionalisation of Teachers

34. How important do you think it is for: *

Mark only one oval per row

	Not At All Important	Of Little Importance	Of Average Importance	Important	Very Important
New, inexperienced teachers to be guided and supported by more experienced, knowledgeable teachers					
Teachers to be supported and guided in developing their own performance as teachers					
Teachers to reflect on their actions once they complete a class					
Teachers to reflect, think quickly, and react to actions during the class					
Teachers to come together and learn from each other in a supervised peer-to-peer learning environment					
Teachers to shadow a more experienced teacher to learn on-the-job e.g. sit in on classes					
Teachers to network with individuals within the agricultural sector e.g. colleagues, industry, agricultural colleges, etc.					
Teachers to be observed in the classroom as a tool for professional development					
Teachers to keep up-to-date with new findings within the agricultural sector					
Teachers to attend professional development days i.e. conferences, seminars, in-service training, etc.					

Classroom Management

35. How important do you think it is for teachers to: *

Mark only one oval per row

	Not At All Important	Of Little Importance	Of Average Importance	Important	Very Important
Have the ability to manage student behavior within the classroom					
Have good presentation skills					
Engage with students and maintain an increased level of engagement throughout the class					
Have a knowledge and understanding of how the layout of a classroom can influence student learning					
Have an ability to deal with conflict if and when it arises within the classroom					
Develop a positive relationship between the teacher and the student					
Have an ability to manage and cope with student-teacher ratios					
Have a detailed lesson plan for each lesson which includes what is going to be taught and the learning goals for each lesson					
Have a detailed plan for each lesson which includes the instructional methods that will be used, the materials needed, the length of each lesson, and how students will be assessed					

Philosophy of Education

36. How important do you think it is for teachers to: *

Mark only one oval per row

	Not At All Important	Of Little Importance	Of Average Importance	Important	Very Important
Establish and understand their teaching values and beliefs, how they relate to student learning, and their impact on their teaching					
Have a knowledge of education theorists					
Understand how students absorb, process and retain knowledge during learning					
Understand that every student learns differently					
Understand how individual students absorb, understand, express, and remember information					

Authentic Education

37. How important do you think it is for teachers to: *

Mark only one oval per row

	Not At All Important	Of Little Importance	Of Average Importance	Important	Very Important
Create an active student learning environment					
Teach student practically through hands-on experience					
Support and encourage students to reflect on their practical learning experience to develop new skills, new attitudes, and new ways of thinking					
Give students responsibility for their learning					
Create a student-focuses learning environment where students and teachers interact equally					
Encourage collaboration and communication amongst students within the classroom					
Have a detailed plan for each lesson which includes the instructional methods that will be used, the materials needed, the length of each lesson, and how students will be assessed					

Intrapersonal Skills

38. How important do you think it is for teachers to: *

Mark only one oval per row

	Not At All Important	Of Little Importance	Of Average Importance	Important	Very Important
Be able to work off their own initiative					
Be able to understand the way people feel and react to situations					
Creative in their teaching					
Be reliable, honest individuals					
Serve as role models for students					
Serve as role models for other teachers					
Be confident					
Be self-motivated					
Be enthusiastic					
Have an ability to communicate and interact with each other both verbally and non-verbally, through gestures, body language and physical appearance					

Opportunity for Feedback

39. Are there any other competencies, not listed in this survey, you think are important and should be included in the framework?

40. Any other comments:

Appendix Four: Research Phase 2 Focus Group Guide

Focus Group Guide Research Phase Two

Date: 18th December 2018 **Location:** Oakpark **Participants:** CDSU

Duration: 1.5 hours

Introduction (15 mins):

- Thank everyone for completing the survey and for being so supportive of my research to date
- Short presentation:
  - ✓ Research Title: Aim of research
  - ✓ Survey Results
  - ✓ Development of Framework

Discussion (1hr 10 mins):

- Q1: Based on the pedagogical competency framework as it stands; if we were to develop a teaching qualification for agricultural teachers what do you think it should look like? **(30 mins)**
  - *Where would you start?*
  - *Would you develop each competency as a module?*
  - *Would you mix bits and pieces from each competency to create a module?*
  - *How many modules would you have?*
  - *What level on the NFQ do you think the qualification should be?*
    - *Level 9 given that all teachers have at least a Level 8 qualification and also with the link to ITs should be qualified a level above what they are teaching so should have a Level 9 if teaching Level 8 students*

- Q2: Based on the discussion we just had what do you think the pedagogical competency framework should contain? **(15 mins)**
  - *What would you change about it as it stands now?*
  - *How would you present each competency and arrange them on the framework?*
  - *Would you change what each competency is called?*
  - *Are there any competencies you would remove from the framework?*
  - *Are there any competencies you would add that you think are missing from the framework?*

- Q3: How would you rank each competency? **(15 mins)**
    - *Write each competency on a sticky note and stick it to a board which has one to nine on it or get them to vote and agree together??*

- Q4: What do you think is the biggest risk to agricultural VET providers if we do not provide adequate pedagogical training to teachers within this sector? **(10 mins)**

Conclusion (5 mins):

- Brief overview of what was discussed and agreed
- Thank everyone for their participation and active involvement. Wish them all a very Happy Christmas and best wishes for the New Year!!!

Appendix Five: Interview Guide for Research Phase 2 and 3

Interview Guide

Introduction:

Background to research: This research project explores agricultural education within the further education sector and is concerned with the training of agricultural educators within this sector in Ireland.

Background to interview: This interview will be divided into two parts.

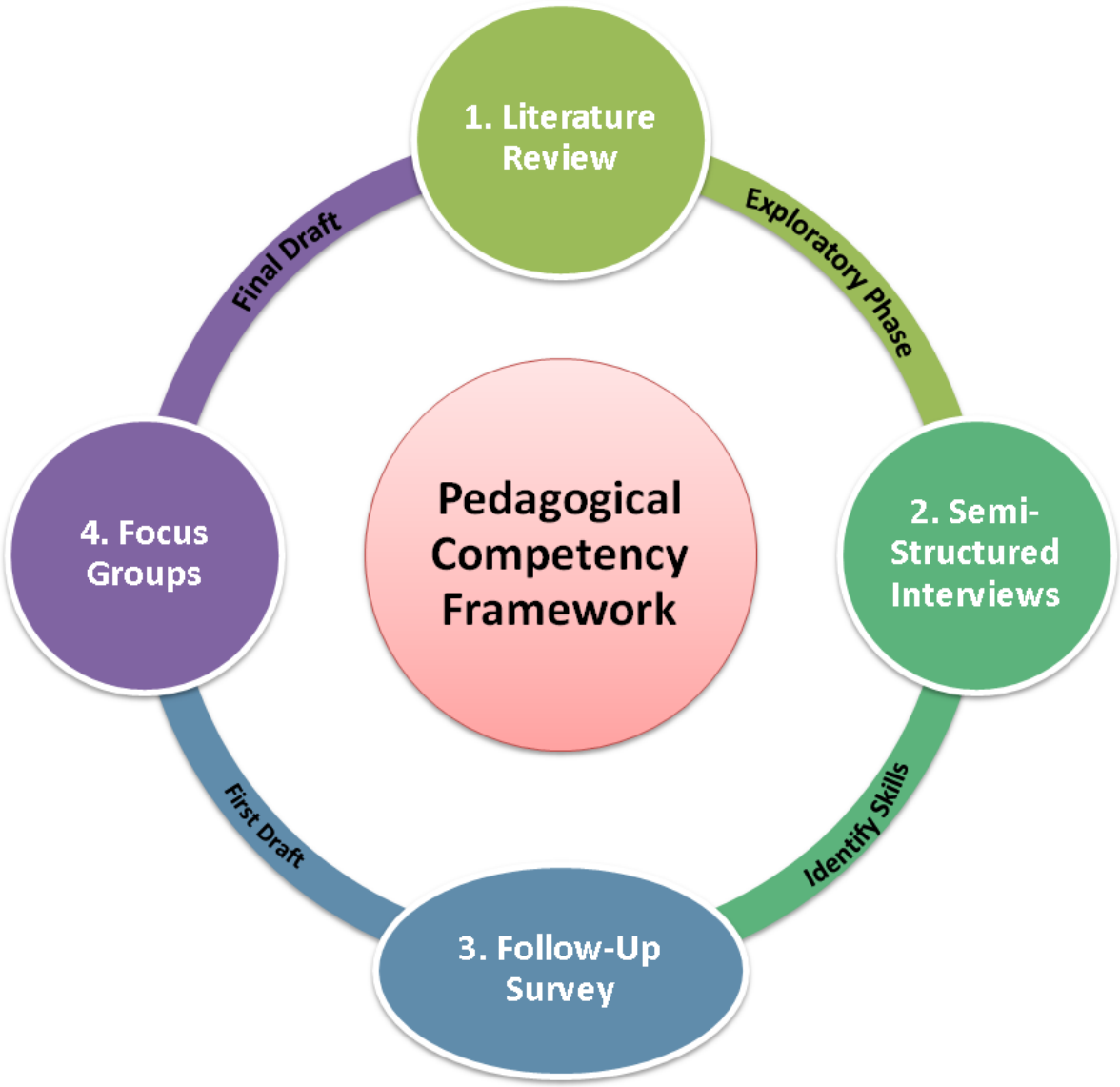
Part 1: The first part will take approximately 20 minutes. For this phase I have a set of questions I will ask you in relation to pedagogies/teaching and learning skills relevant to educators. Research I have conducted to date has highlighted that agricultural educators do not possess a teaching qualification and require training in pedagogical skills. Therefore, this phase of the research will identify the pedagogical skills educators should be competent in and identify how training should be provided to educators so that they become competent in these relevant pedagogical competencies.

Subsequent phases of research (to be 'said' at end of part 1 of interview): Are you willing/happy to participate in subsequent phases of the research in developing the framework?

Part 2: The second part will take approximately 40 minutes. This part is in-depth and there will no follow-up after the interview. Again, I have a set of questions I will ask you but this time they will be in relation to agricultural education and the future of farming in Ireland/Netherlands.

To Begin:

So I will begin first by asking you a set of questions around pedagogical/teaching and learning skills relevant to educators. The questions are relatively simple as this is the explorative phase in developing this framework and so I just want your general opinion at this stage as the framework will be developed over a prolonged period. This part of the interview will take approximately 20 minutes.


1. Literature Review
Exploratory Phase
2. Semi-Structured Interviews
Identify Skills
3. Follow-Up Survey
First Draft
4. Focus Groups
Final Draft
Pedagogical Competency Framework

Theme: Teaching Skills Agricultural Educators should posses

Pedagogical Skills and Strategies:

Requirement for a Pedagogical Framework:

- *Intro:* Agricultural educators do not have pedagogical qualifications and require training in pedagogical skills and strategies. In the Netherlands, for example, they developed a competency framework for enhancing the professional development of educators in the environmental sector by identifying competence profiles for environmental education professionals in the Netherlands. Another example is here in Ireland where the Teaching Council developed a framework for teachers' learning, which they called Cosán. The framework acknowledges, encourages and promotes teachers' learning and recognises their commitment to learning.

  Question: Do you think a pedagogical competency framework, similar to these, would be beneficial or useful for training agricultural educators in pedagogical knowledge, skills, and competencies? Why/Why not?

Pedagogical Skills:

- What pedagogical competencies; knowledge, skills, and attitudes, do you think all agricultural teachers should possess?

Providing Future CPD:

- What is the best way of providing CPD to educators in order that they become competent in these pedagogical skills?
- How do educators learn?

Educators with Pedagogical Qualification:

- What is the best way of providing CPD to educators to ensure these pedagogical competencies are acquired?

❖ Inform them about subsequent phases in development of framework

Theme: Agricultural Education

- What is the purpose of agricultural education and why is it important?
    - What are the benefits associated with completing an agricultural course?

- Why do we educate 'young farmers'?
    - What motivates individuals to pursue an agricultural education?
    - What factors influence an individual's decision to purse an agricultural qualification?
    - What calibre of young farmer is pursuing an agricultural qualification?
        - Why this cohort/group – because it is the done thing/expected of them/they feel obliged/etc.?
        - Is there a gender imbalance in your college? Why do you think there are more men than women pursuing agricultural education? Do you think the reasons for attending an agricultural college are different between males and females?
        - Do you think the culture of succession and inheritance is influencing why and who chooses to pursue an agricultural education/qualification? (*For example, family farms like to transfer the farm to a family member or if that's not an option, to a relative/neighbour/individual from a farming background. Is this obstructing 'new entrants' to farming, people who would like to enter agriculture and begin farming but do not have an agricultural background?)*
    - Has this changed over the years or always been the same and will it change in the future?

- What is the main reason(s) for the existence of agricultural colleges? (What is their purpose?)
    - If incentives delivered under the CAP (i.e. YFS, national reserve, stamp duty exemption, etc.) were removed or didn't exist would agricultural colleges exist?
    - What would happen to agricultural colleges if subsidies were removed?
    - Have policies influenced the way in which agricultural colleges deliver agricultural education? (What drives content?)

- What does an ideal graduate look like on completion of an agricultural course?
    - What would you like them to have achieved or become?

- Does completing an agricultural course prepare young farmers for farming in the future?
    - Take, for example, an individual who completed their agricultural programme at 20 years of age, if they are 40 years of age before they go farming what have they taken from the agricultural course that will benefit them a long-time down the road?

- Where do you see farming going in the future and do you see this having an impact on the agricultural education sector?
    - What will farming look like in 20 or 30 years' time?
    - Will the purpose of the agricultural colleges change?
    - Will agricultural education have to change to meet the demands and challenges you envisage down the line for farming?
    - Will what motivates individuals to pursue an agricultural education at present change in the future as a result?

Appendix Six: Information Leaflet for Interviewee Participants

Information Leaflet for Interview Participant

Title of Study: *An Analysis of Agricultural Educators' Experience of their Role as Educators and Identification of Improvements to Better Prepare them for their Role*

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

Research Team:
This research project is being led by Sinéad Flannery under the supervision of Dr. Karen Keaveney (UCD) and Mr. Frank Murphy (Teagasc). Sinéad's contact details are included at the end of this document.

Objectives of the Study:

1. To investigate the continuous professional development needs of agricultural teachers in their role as educators at the vocational education and training level
2. To develop a professional development tool suitable for supporting agricultural teachers' training needs within the vocational education and training sector
3. To investigate the motivational factors influencing young people's further educational choice within farming itself at the vocational education and training level

The broad aim of the proposed research is to improve both the preparation and training of agricultural educators within Teagasc further education colleges by investigating the strategic training needs of this cohort of educators.

Reason for invitation to participate:
You have been invited to participate in this doctoral study because of your extensive knowledge and expertise within agricultural education.

What will happen if I volunteer?
Your participation is entirely voluntary. If you agree to participate, you will be invited to take-part in an interview with Sinéad Flannery regarding your experience within agricultural education. This interview will be audio-recorded to facilitate analysis. You will not be asked about specific students/staff/colleagues/individuals 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:
I, Sinéad Flannery, will be responsible for overseeing the transcription and the anonymity of the interview. All information collected as part of the study will be stored securely on password protected computers and your privacy will in no way be infringed upon at any stage throughout the study.

Benefits and 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 our understanding of the strategic training needs of further agricultural educators in our competitive agricultural industry. Little research relating to the experience of agricultural educators in their role as teachers within the further education sector has been conducted hence the significant need for a study such as this to be carried out. As such, findings from this study will be presented at university level and at national and international conferences. 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.

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 Sinéad to request this.

How the information provided will be used:
Your views will be combined with those of others and used to develop an understanding of the strategic training needs of agricultural educators in further education. In addition to informing the 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 have 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 Sinéad Flannery (a scanned copy can be sent to the email address below).

Further Information and Contact Details:
If you have any further questions about the research or would like information on the findings, you can contact;

Sinéad Flannery
PhD Walsh Fellow Doctoral Researcher
Kildalton College
Piltown
Co. Kilkenny
Mob: +353876138168
Email: sinead.flannery@ucdconnect.ie

Appendix Seven: Ethics Consent form for Semi-Structured Interviews

Participant Consent Form

Title of Study: *An Analysis of Agricultural Educators' Experience of their Role as Educators and Identification of Improvements to Better Prepare them for their Role*

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 Sinéad)
- 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 this study

Date: _____

Participant's Signature: _____

Participant's Name in Print: _____

Contact Email: _____

Returning the consent form:

We would ask you to please return the attached consent form to Sinéad Flannery (a scanned copy can be sent to her email address below)

Contact Details:

You can contact Sinéad Flannery at the following:

Email: sinead.flannery@ucdconnect.ie

Mob: +353876138168

Address: Kildalton College
Piltown
Co. Kilkenny