CRANFIELD UNIVERSITY

JUDITH CHIVERS

WHAT ASPECTS OF GROUP WORK INFLUENCE LEARNER EXPERIENCE AT CRANFIELD UNIVERSITY?

SCHOOL OF MANAGEMENT

M.Sc. by Research

M.Sc. LEADERSHIP AND MANAGEMENT

Academic Year: 2016 - 2017

Supervisors: Professor Emma Parry and Dr. Sandra Fairs

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This thesis is submitted in fulfilment of the requirements for the degree of M.Sc. by Research in Leadership and Management

ABSTRACT

Employers consider the ability to work in groups essential and higher education has adopted group working in programmes to meet this necessity. However, current reporting fails to identify which aspects are positively or negatively associated with students' experiences. Therefore the phenomena of interest in this study are the use of group working in taught Masters level programmes as preparation for learners' subsequent professional work and those aspects of group work which influence their experience.

An exploratory qualitative study was undertaken using semi-structured, one to one interviews as the primary source of data. Interviews were undertaken with students, module leaders and programme directors from four modules on four different programmes from Cranfield University.

The findings showed how the principle of providing students with realistic experiences of their disciplines in a working environment governed decisions on task and selection. Learners reported varying prior experience of group work, difficulties in understanding how to work in groups and a perception of little support from their instructors. Training on effective group working was inadequate. Descriptions of unequal contribution were widespread, though this was not recounted as being related to the international nature of the groups.

Learners overall had a positive experience and found activities supported their technical learning and familiarity with industry's working methods. The research indicated direct contact with clients was of greater benefit and was a stimulus for students. The assumptions regarding students' previous experiences and learning about group processes, linked to the lack of training they received, resulted in poor experiences in this respect. Training was presented as the area most requiring improvement. Enhancements would offer opportunities to support engagement by students in addressing conflict, interpersonal relations and perceived failure to contribute. Similarly, training instructors on facilitation would lead to better resolution of unacceptable group working practices.

Keywords:

Student experience, learner experience, group work, teamwork

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LIST OF ABBREVIATIONS

BSC	Business Source Complete
CAAS	Centre for Andragogy and Academic Skills
Dr.	Doctor
ERIC	Education Resource Information Centre
GPRES	Group Presentation
GPROJ	Group Project
GPS	Global Positioning System
GREP	Group Report
HEFCE	Higher Education Funding Council for England
ICW	Individual Course Work
IEEE	Institute of Electrical and Electronics Engineers
ILO	Individual Learning Outcome
INS	Internal Navigation System
IPRES	Individual Presentation
IT	Information Technology
M.Sc.	Master of Science
MBA	Master of Business Administration
Ph.D.	Doctor of Philosophy
RAP	Readiness Assessment Process
RP	Reflective Portfolio
SITS	Strategic Information Technology Services
SoM	School of Management
UK	United Kingdom of Great Britain and Northern Ireland
UNESCO	United Nations Educational, Scientific and Cultural Organisation
USA	United States of America
UX	User Experience

1 INTRODUCTION

This chapter identifies the phenomena of interest, the problem under investigation and the general approach to the study. It also explains the format and structure of the thesis.

1.1 Phenomena of interest

The phenomena of interest in this study are the use of group working in taught Masters level programmes as preparation for learners' subsequent professional work and those aspects of group work which influence their experience.

This interest is driven by the changes brought about through the shifting nature of the business environment and the requirement of employers that graduates are equipped with both technical and interpersonal skills to undertake group work. Universities have responded to these changes by incorporating group working in their programmes to develop the necessary skills for learners in preparation for their professional life.

Through direct investigation of learners' experiences this study aims to understand, explain and describe the practice of utilising group work within taught Masters programmes and identify which aspects of group work influence, either positively or negatively, the student experience.

As careers-related goals dominate students' motivations for taking a postgraduate course (Bradley, 2017), by gathering feedback from them about the importance they attach to different elements of their experience, institutions can make informed decisions about the systems, structures, processes and programme improvements which deliver the most in terms of achieving academic and career goals for students.

1.2 The problem under investigation

Throughout the last thirty years the changing nature of the business environment has seen an increasing reliance on employees working together in organisations to achieve their goals (Stapleton, 2007). This has been to meet operational criteria, deliver specific projects or to develop new products. Working together is

perceived by organisations as delivering better outcomes, reducing the time taken to yield results or producing solutions for problems considered too complex for one person to resolve alone. Additionally, the consensus view was that individuals achieved better results and were more satisfied with their work when engaged with others (Edersheim, 2007), although these views have been challenged (Hackman and Morris, 1975) and statistics on project failures were discouraging *(*The Standish Group International, 1995*)*. However, the rapid rate of change, especially in fields involving technology, and the need for organisations to be adaptable maintained a focus on group working and the criteria which made it effective have continued to be researched (The Standish Group International, 1995; Charles, 2004).

Working together required employees to be able to support the aims of a group through technical knowledge and also to work with others in a collaborative environment. Organisations have invested resources in training staff to operate in this way and develop the necessary interpersonal skills for this type of working, e.g. effective communication, planning, time management, adaptability, critical thinking and conflict resolution (Prichard, Stratford and Hardy, 2004). As training costs were increasingly being challenged, so employers looked to recruit personnel who could already demonstrate such interpersonal skills, experience of group working and their understanding of its importance to an organisation (Prichard, Stratford and Hardy, 2004).

Employer expectations that graduates would have acquired these skills at university has led to both government and industry promoting their development in educational establishments (e.g.Crebert, *et al.*, 2004; Mason, Williams and Cranmer, 2006). Policy documents from different stakeholders involved in higher education showed a commitment to ensuring graduates completed their courses with the skills necessary to work with other employees. Government, employers and professional bodies saw working together as essential to achieving organisational and personal success (e.g. Crebert *et al*., 2004; Prichard, Stratford and Hardy, 2004).

Universities responded by incorporating group working into their programmes of study. Prospective students were shown the benefits of acquiring the skills desired by employers, including group working, in prospectuses. The range of methods for delivery of group working was broad (Slavin, 1981) and their success and effectiveness for students was driven by many factors (Tombaugh and Mayfield, 2014). Execution of this was not without difficulty because the teaching of skills was not always considered by some in the sector to be a function of higher education (Prichard, Stratford and Hardy, 2004).

A second effect during the same period has been the changes to funding of higher education. While postgraduate education has not undergone the same level of radical change to its funding as those at undergraduate level, the increase in the influence of students, especially undergraduates, has resulted in universities having to consider how their students perceive them and a growing requirement for information about their experiences as a student.

The response was the initiation of a number of surveys to collect data on different aspects of student experiences, e.g. The National Student Survey and The Student Academic Experience Survey. Only two related directly to postgraduate students: the Postgraduate Taught Experience Survey and the Postgraduate Research Experience Survey (Higher Education Academy, no date). A response to the introduction of postgraduate loans, particularly masters' loans, was the development of a new national postgraduate survey in response to sector support (Higher Education Funding Council for England, no date).

Internal systems for both module and programme feedback were introduced, often based on the same or similar criteria as the national surveys, to identify unsatisfactory student experiences and facilitate changes to teaching and learning practices and the provision of facilities for students (e.g. Cranfield University, no date; London School of Economics, 2016).

The surveys focussed on students answering questions about pre-selected elements of their university experience. Some open questions were included for comments but they did not identify in detail those elements of programmes students found developed specific skills or were important to their careers, e.g.

group working. However, the primary mechanisms for reporting on students' experiences fail to identify which aspects of group working are positively or negatively associated with that experience (Universities UK, 2016).

Although extensive research has been conducted into the pedagogical benefits of group working in educational environments (e.g. Panitz, 1999a; Stepney *et al*, 2011; Rafferty, 2013) much of it focussed on those aspects of the teaching and learning practices that contributed to academic success and were undertaken in specific educational stages. Despite the wide range of variables applicable to group working (e.g. group selection, assignment, group task) they were often only concerned with one or two variables and the impact these procedural aspects had on the outcome.

A greater amount has been written about group work at undergraduate rather than postgraduate level in higher education (e.g. Prichard, Stratford and Hardy, 2004; Prichard and Ashleigh, 2007) due to several factors. These include the generalisability of findings from studies between the two stages; the changes to funding at undergraduate level which have resulted in a greater focus on this sector of the higher education market, where the number of undergraduates exceeds postgraduates by more than three to one; funding for research has been focused in revealing educational issues for general application (Schofield, 2002).

Despite these considerations, students at postgraduate level are considered as more experienced, either by study or through work, and as they are also at a different developmental stage (UNESCO, 2014) research into their experience of group working should be differentiated from others. This study therefore sought to address the lack of empirical data, in relation to postgraduate taught programmes, on what the learner experience of group work was.

1.3 Approach to the study

This research was considered an exploratory study as no significant research into the practice of utilising group work within taught postgraduate programmes, had been identified which reported on learners' experiences. The research sought to understand, explain and describe these experiences from which the institutions

furnishing the data would be able to make informed decisions about the systems, structures, processes, and programme improvements that deliver the most in terms of influencing learner experiences of group work.

In order to understand these aspects, literature was explored in the postgraduate and group working domains to consider aspects and relationships which impacted on learner experiences. A conceptual framework was developed through a systematic literature review, although recourse to wider literature was undertaken to aid understanding of concepts not sufficiently explored in studies.

Secondly, a rigorous and systematic investigation of group working was undertaken among four different presentations of the practice at Cranfield University, each exhibiting different characteristics.

As well as the collection of materials, interviews were conducted with stakeholders at multiple levels within the organisation to enquire into people's thoughts and feelings about their experiences. Qualitative data collection methods were applied and data were analysed thematically.

Empirical data were combined with the findings from the literature to identify how Cranfield University's application of group work related to other studies and produce an informed view of the aspects, which influenced the learner experience. This resulted in recommendations to enhance learner experiences through improvements to the design and practice of group working for students.

1.4 Format of the thesis

This section describes the structure of the thesis, with brief outlines of the subsequent six chapters.

Chapter 2 reports on the method and approach to the systematic literature review along with the findings from the review relevant to the research. These are presented thematically and supplemented by wider literature to aid understanding of concepts not sufficiently explored in studies. A discussion and conclusion of the relevant features are presented accompanied by limitations of the literature, a conceptual framework and a research question.

Chapter 3 outlines the method adopted for the research, the research design and details of the pilot study.

Findings from the empirical research are outlined in Chapter 4 and discussion of these findings in relation to the literature, identifying consequences for practice, limitations and recommendations are described in Chapter 5.

Conclusions, including contributions made by the study, are described in Chapter 6 followed, in Chapter 7, by personal reflections on conducting the research.

2 LITERATURE REVIEW

A review of the literature is a key objective for researchers because it enables the researcher to chart existing work, assess current theories and, from these, be able to develop a research question to extend the existing body of knowledge on a particular topic (Tranfield, Denyer and Smart, 2003)

This chapter describes the process used to undertake a review of existing literature on the topic of interest. It includes the review question, definitions of terms relevant to the topic, detailed information on the strategy adopted for selection of the literature, a discussion and conclusions on the information presented in the review as well as the limitations of the adopted approach and shortcomings in the findings. The chapter concludes with the presentation of a conceptual framework identified from the literature and the research question for the empirical study.

2.1 Introduction

A systematic review of the literature on group working experiences of postgraduate taught students was adopted as the approach to identify those aspects of group work which provided learners with either positive or negative experiences. The aim was to arrive at a comprehensive view of the topic being studied through the collation of relevant studies by using explicit processes rather than from individual pieces of research. The process was established from the evidence-based approaches used in medical sciences and healthcare and through the adoption of a replicable, scientific and transparent process bias was minimised (Tranfield, Denyer and Smart, 2003). Where the systematic review identified broader areas of literature which might be of interest, a wider review in these specific areas was utilised. This included literature on the theoretical perspectives of learning, the roles and responsibilities of tutors, methods of group working, group allocation and group dynamics.

This section outlines the method and approach adopted during the review and summarises the findings. The review was used to generate a specific research

question relating to the researcher's empirical study and informed the design of the research described in Chapter 3.

The current research was centred on students' experiences of group work in a postgraduate taught programme, so the literature included in the systematic review focussed on the variables which provided such a learner with either a positive or negative experience.

It could be argued that the same features which appeared in studies at undergraduate level would have a universal impact and should therefore have been included. However, three key drawbacks illustrated why these were not appropriate to every environment.

The approach and application of group work is relevant to the age of the students, the development of their learning skills and the appropriate teaching practice relevant to the preceding variables. As age indicates a stage or phase of life we can see that students at the postgraduate level, considered by the Higher Education Statistics Agency to be over twenty-one and therefore 'adult', are in a different developmental stage to undergraduates. Students pursuing a Masters programme will be expected to have already achieved 'intermediate academic and/or professional knowledge, skills and competencies leading to a first tertiary degree or equivalent qualification' (UNESCO, 2014) and therefore the educational approach should be different from those at lower stages. Bruffee (1995) supports this notion since he considers approaches to group work, specifically cooperative or collaborative learning, as dependent upon the level of sophistication of the student, with the most sophisticated taking control of the learning process.

Additionally, experiential learning theories postulate we are changed by our previous experiences (Kolb and Fry, 1974; Kayes, Kayes and Kolb, 2005). While it cannot be assumed all postgraduate students will have experienced group work there are instances of its use, both in secondary education and at undergraduate level, as well as in the workplace. A postgraduate student is differentiated by their previous experiences. Jarvis (2012) also posited that previous experiences provide the reference points for new learning. Even in studies at undergraduate

level the impact of students' prior experience with group work is a factor to be considered when deciding on the suitability of approaches to group work (Livingstone and Lynch, 2000) and there is a significant difference between those with and without work experience (Gatfield, 2006).

Finally, it is thought to be good practice when planning a course to consider students' prior knowledge, intellectual development, cultural background and sets of experiences and expectations (Yale Centre for Teaching and Learning, 2016), all of which students on postgraduate courses will have at a level above that of undergraduates. This is supported through studies involving both undergraduate and postgraduate students where the results have been distinguished in areas such as interdependence, self-directed learning and reflections on collaborative learning (Murray-Harvey, Pourshafie and Reyes, 2013) and those demonstrating development in understanding of the social interactions of learning, control of the learning process and their ability to assess the process they have gone through (Pantitz,1999a).

2.1.1 Definition of terms

The following key terms which have been found in the literature are defined for a better understanding of the readers. It is important to define these terms before discussing the literature in more detail.

Generally the terms group, group work(ing) and learner experience are used throughout the thesis as defined below apart from when the literature utilises different terms in which case these will be identified.

2.1.1.1 Group

This term is a central component of the study and therefore requires a definition. The Collins English Dictionary (2017) provides several definitions of group as a countable noun but the following represents its use in this study:

> *'A group is a set of people who have the same interests or aims, and who organize themselves to work or act together.'*

2.1.1.2 Team

While this term is incorporated in Team Based Learning, a specific pedagogical approach to the delivery of group working with a competitive element, unless specifically referred to in that context the term is considered to refer to:

> *'a group of people organised to work together'*.
>
> (Collins English Dictionary, 2017)

2.1.1.3 Group work(ing)

Several terms were often used interchangeably in the literature to mean the same or similar pedagogical styles, e.g. cooperative and team working. Some argued there was a minimum number, three, for a group to exist (e.g.Jaques, 2000).

The term was applied in many different environments but since this research was enquiring in an educational setting a definition appropriate to its application as a learning tool was thought to be most suitable.

According to the Collins English Dictionary (2017), group work for education purposes is '*teaching or learning in a group setting with the aim of developing students individually through group cooperation.'* However, cooperation is a term used to define a method of group working (Johnson, and Johnson, 1999), so Jaques and Salmon's (2007) definition, which offers better clarity of language, was adopted for this review:

> *'People who come together to share knowledge for personal development or to learn from each other through discussion.' (p. 6)*

2.1.1.4 Collaborative learning

Due to the range of academic disciplines which use the term collaborative learning it is difficult to determine a definitive description but its broadest definition, provided by Dillenbourg (1999, p. 1) states:

> *'it is a situation in which two or more people learn or attempt to learn something together'.*

2.1.1.5 Collective learning

This is a complex concept that is generally studied in organisations or industries where people are collected into groups, often from different departments, venues, etc., to pursue a common goal utilising their individual skills and knowledge. The individual's contributions are separate, as each is working individually, but can be aggregated in pursuit of the goal. In this way, learning is brought about through sharing knowledge and understanding concerning something that was not previously known or understood among the collective. Collective learning involves both:

> *a "collective process," which may include acquiring new knowledge through diverse actions (e.g., trial and error), assessing information and disseminating new knowledge or opportunities across individuals in a collective, and "collective products" that emerge from the process, such as new shared ideas, strategies, rules, or policies'.*
>
> (Gerlak and Heikkila, 2011, p. 623)

2.1.1.6 Group learning

Gill and Mataveli (2017) combine ideas from two researchers, Edmondson and Ortega *et al.*, to consider a definition of this complex and dynamic phenomenon of group learning:

> *'a set of activities in which the group acquires and processes the knowledge that enables it to improve, as in group processes such as reflection and action, questioning, seeking feedback, promoting experimentations, reflecting on results and discussing errors'.*

2.1.1.7 Learner experience

A search of the literature for this term indicated variations which could be interpreted to refer to the same condition, e.g. student experience and learning experience. Unlike the term group work, neither learner nor student experience appeared in the dictionary (Collins English Dictionary, 2017).

The expression ‘student experience’ was dominant in publications from the Higher Education Funding Council for England (HEFCE), the main funding body for the United Kingdom’s (UK) universities. HEFCE defined it as *‘the totality of a student’s interaction with the institution’* (Temple *et al.,* 2014, p3).

The Times Higher Education Student Experience Survey (2017) assessed twenty-one measures in eight areas: academic experience, facilities, societal experience, student welfare, accommodation, industry connections, security and Student Union to evaluate the ‘student experience’. The alternative use of ‘learner’ for ‘student’ did not appear to be significant except for the removal of the location of the act (Collins English Dictionary, 2017).

In this study the term was understood thus:

> *‘Learner experience refers to any interaction, course, programme or other experience, in which learning takes place.’* (Abbott, 2014)

2.2 Review question

Moving on to the literature review itself, this review examined the occurrences of group working in relation to postgraduate environments and attempted to identify those factors which impacted learners’ experience.

Review question:

> *What is the influence of group working on the postgraduate learner experience?*

2.3 Search strategy

This section outlines the strategy adopted in searching for key papers, assessing them for relevance and quality, and data extraction procedures.

2.3.1 Key Words, search strings and justification

The following key words, see Table 1**Error! Reference source not found.**, were selected from the review question as the basis for conducting database searches.

Table 1: Key words, search strings and justification

Key Word	Search String	Justification for Inclusion
Learner experience	UX, user experience, learn* experience*, student* experience*, student reflection*, student* feedback	Within the area of educational and training delivery this phrase is a standard term which has alternative phrases. Broadening the search parameters provided increased results of meaningful studies.
Group work	group learn*, group work, team learn*, cooperative learn*, group develop*, team develop*, collective develop*	Phrases used within the literature to describe the general concept of working in groups.

These terms were then combined into two different search strings to investigate the learner experience of group work: see Table 2**Error! Reference source not found.**.

Table 2: Search string combinations

Number	Search String
1	(UX OR “User experience” OR “learn* experience” OR “student experience” OR “student reflection*” OR “student feedback”)
2	(UX OR “User experience” OR “learn* experience” OR “student experience” OR “student reflection*” OR “student feedback”) AND (“group learn*” OR “group work” OR “team learn*” OR “cooperative learn*” OR “group develop*” OR “team develop*” OR “collective develop*”)

2.3.2 Initial inclusion and exclusion criteria

Filters were applied to the database searches using the inclusion and exclusion criteria specified in Table 3.

Table 3: Inclusion and exclusion criteria

Category	Criterion	Reason
Inclusion	Peer reviewed and scholarly journals	Provides an evaluation of quality, accuracy, validity, methodology and procedures.
	Web of Science Core Collection: selected categories	Due to the range of categories in this database results were limited to include results relating to business, management and education.
Exclusion	Research in a foreign language	The researcher is only fluent in English and translation of studies would impact on the time constraints of the study.
	Research undertaken outside the Western economy	Social and cultural differences which potentially have a different perspective to the geographic area of the research.
	Duplicated studies	Studies which appeared in more than one database search.

2.3.3 Databases

The following three databases (see Table 4) were used for finding literature since they provided a range of published material that covered the main areas of business, education and health in which groups operate.

Table 4: Database selection

Database	Content and Justification
ABI/INFORM Global	This collection is comprised of three databases: Dateline, Global and Trade and Industry. Dateline covers local and regional perspectives, Global takes a comprehensive approach while Trade and Industry focusses on in-depth coverage of companies' trends and developments.
EBSCOhost Research Databases	This consists of five databases of which two, Business Source Complete (BSC) and Education Resource Information Centre (ERIC) were chosen. BSC claims to be the leading collection of business scholarly articles while ERIC provides access to education literature and resources.
Web of Science Core Collection	This database focusses on publications relating to leading scholarly literature in the sciences, social sciences, arts, and humanities.

2.3.4 Additional information sources

Other information sources were investigated, journals and professional organisations specific to the area of research, and an additional twenty articles were recorded in the sources of review studies: see Table 5 for details.

Table 5: Other information sources

Information Source	Name of Journal or Organisation
Specific to area of research	Academy of Educational Leadership Journal
	Australian Educational Researcher
	British Journal of Psychology
	College Teaching
	Educational Psychology Review
	Educational Research Review
	Educational Researcher
	Educational Studies
	European Journal of Training & Development
	European Management Journal
	International Journal of Lifelong Education
	Journal of Accounting & Finance Research
	Journal of Adult Development
	Journal of Information Technology Education
	Journal of Studies in International Education
	Small Group Research
	Teaching in Higher Education
Professional Organisations	The Higher Education Academy

2.3.5 Cross-referencing

Three articles cited by authors were identified as being of possible interest and relevant to the research and these were followed-up. As with the additional information sources, they were subjected to the same criteria before being included in the literature. See Table 6 for details.

Table 6: Cross-referenced sources.

Information Source	Name of Journal or Organisation
Cross-referenced	Academy of Management Journal
	Assessment & Evaluation in Higher Education
	Management Learning

2.4 Selection criteria

2.4.1 Relevance

The second stage of selection was a manual review of the citations and abstracts of the studies which had been included or excluded using the criteria identified in Table 7 below.

Table 7: Relevance criteria

Category	Criterion	Justification
Inclusion	Characteristics relevant to student experience of group working	Relevant to the review question.
	Groups solely involving postgraduates	The setting of the research is primarily directed at postgraduate students.
Exclusion	Groups in early childhood, primary or secondary education	Not relevant to the context of this research.
	Environment and running of the group exclusively involved technology	Not relevant to the approach of group learning in the context of this research.
	Groups solely involving undergraduates	The setting of this research is primarily directed at postgraduate students.

2.4.2 Quality appraisal

An approach to the process of applying a quality appraisal to the individual full papers was adopted based on Rose's ABCDE model (1982). Two sets of criteria were developed from the model for application to either empirical or conceptual papers with a four-scale rating specified for each criterion: non-existent, inadequate, reasonable or excellent. Each paper was judged against these criteria and their rating recorded. Only those papers with a medium or high level of quality were deemed suitable for inclusion in the full review: see Table 8 for a list of the criteria.

Table 8: Criteria for papers

Criteria for Empirical Papers
Clear discussion of the issue, the background and its relationship to theory and practice
Comprehensive literature review and critical analysis of relevant theoretical arguments
Clearly reports research design and links to key theories and philosophical approaches
Adequate detail about sample and data collection techniques
Unambiguous reporting of findings with explanation of appropriate graphs and tables
Satisfactory discussion of the findings in terms of relating back to the original issue and including limitations of the study
Conclusions linked to the original issue with recommendations for further research
Overall exhibition of extent of knowledge, methodological rigour and strength of argument
Clear indication of contribution to the field
Criteria for Conceptual Papers
Valid initial statement of the purpose of the paper and its intended contribution
Clear discussion of the issue, the background and its relationship to theory and practice
Comprehensive review of relevant philosophical and methodological theories and approaches backed up by literature citation
Clear representation of what the paper proposes, ideally with diagrammatic representation (new model)

Persuasive suggestions as to how the model or theory might be utilised and applied in theory and practice
Strengths and weaknesses and limitations of the theory or model
Recommendations for further research, either conceptually extending the paper or applying the model or theory
Overall exhibition of extend of knowledge and strength of argument
Clear indication of contribution to the field

2.4.3 Data extraction and synthesis

To ensure consistency of approach to the critical analysis and synthesis of the data contained in the selected literature, a review of each text was undertaken. This used critical analysis questions (see Appendix A), based upon those suggested by Wallace and Wray (2011) as providing a structured format for a comparative review of multiple texts. These questions were incorporated into a form on which the researcher's assessment of each text was recorded. While not being able to eliminate completely any of the researcher's possible bias, it did provide a rigorous, transparent and potentially replicable process which is at the core of a systematic review.

The synthesis process involved using the completed critical analysis form to identify any patterns in the studies and to support the development of the researcher's argument on the literature.

2.5 Findings from the literature

This section outlines the results from the application of the extraction and analysis methods detailed in the previous section.

2.5.1 Characteristics of the studies

The following table summarises the results of the database searches, indicating the number of studies included at each stage of the systematic review.

Table 9: Sources of the review studies

Selection Process	ABI	EBSCO	Web of Science	Total
Articles from search string 1	12,648	11,936	13,835	38,419
Articles remaining after applying search string 2 to the results from search string 1	125	469	311	905
Articles remaining after de-duplication, exclusion and inclusion criteria, title and abstract screening and removal of duplicates				113
Articles remaining after full text-based screening and quality appraisal process				24
Quality appraised additional articles from research specific journals and professional bodies		20		44
Quality appraised additional articles identified from cross-referencing		3		47
Total articles selected for the review				**47**

2.5.2 Descriptive analysis

The following tables analyse the literature reviewed by the decade of publication, country of publication, the nature of the enquiries undertaken and the sources.

Table 10: Publication year of articles

Year	Number of Studies
1995 – 1999	4
2000 – 2009	17
2010 – 2017	26

Table 11: Country[1]

Country	Number of Studies
Australia	5
Australia / Holland (*sic*)	1
Canada	1
Denmark	2
Finland	1
Germany / Holland (*sic*)	1
Holland	2
Italy	1
Portugal / Holland (*sic*)	1
Spain / Chile	1
United Kingdom	11
United States of America	20

Table 12: Categories of enquiry

Category	Number of Studies
Case Study	1
Literature Review	5
Mixed Methods	1
Qualitative	39
Theoretical	1

Table 13: Sources

Journal	Number of Studies
Academy of Education Leadership Journal	1
Academy of Management Journal	1
Accounting Education	1
Administration in Social Work	1
American Journal of Pharmaceutical Education	1
Assessment and Evaluation in Higher Education	1
Australian Educational Researcher	3
British Journal of Psychology	1

[1] Refers to the country in which the research was undertaken

Journal	Number of Studies
College Student Journal	1
College Teaching	1
College Teaching Methods and Styles Journal	1
Education and Training	3
Educational Psychology Review	1
Educational Research Review	1
Educational Researcher	1
Educational Studies	2
European Journal of Training and Development	1
European Management Journal	1
IEEE Transactions on Education	1
International Journal of Electrical Engineering Education	1
International Journal of Lifelong Education	2
Journal of Education for Business	2
Journal of Applied Research for Business Instruction	1
Journal of Problem Based Learning in Higher Education	1
Journal of Engineering Education	1
Journal of Adult Development	1
Journal of Studies in International Education	1
Journal of Accounting and Finance Research	1
Journal of Information Technology Education	1
New Directions for Teaching and Learning	1
Management Learning	1
Revista de Psicodactia	1
Simulation and Gaming	1
Studies in Higher Education	1
Small Group Research	1
The Qualitative Report	1
Teaching and Learning in Medicine	1
Teaching in Higher Education	1
Professional Organisation	
The Higher Education Academy	2

2.5.3 Thematic analysis

2.5.3.1 Introduction

Having reported on the strategy adopted for the review and the characteristics of the studies, this section provides a critical review of what the literature tells us about the facets that are relevant in relation to learner experiences of group work.

A thematic approach was deemed most appropriate to convey the synthesis of the texts as it lent itself to the nature of the enquiry. Eleven major themes were identified as having either a direct or indirect impact on the learner experience. These twelve themes can be combined into five broad areas.

1. The section on theories of learning illustrates the requirement for an understanding of how learners acquire and use knowledge in order to determine the best design, implementation and delivery of group work.

2. Instructors are a key component of group work. They are involved in all the stages of the process and what the literature tells us about their roles and responsibilities helps to distinguish which features can impact on learning and interpersonal outcomes.

3. Group selection, involving elements of diversity and group size, and task can be considered as elements of pre-activity planning because they cover aspects which can impact on a learner's experience, but which are determined or undertaken prior to the start of the group work, e.g. the design of the task.

4. Once an activity begins, and learners are interacting with each other and the instructor, various themes appear. These can be the group's dynamics, consequence of or necessity for training or levels of facilitation which might have an impact on learner experiences.

5. The process is not completed when the task has been accomplished. The literature reports on the level of learning outcomes and discusses the utilisation and impact of reflection as a tool for professional and personal development as well as the issues associated with assessment.

Each of the themes is presented in more detail in the following sections. A summary of the studies and their aspect of provision is included in Appendix B.

The data formed the foundation for the empirical research into which experiences of group work have an impact on learner experiences. This will inform future practice. In addition, identification of any gaps in the selected literature or existing research should support ideas for future research into the sources of variability in student experiences.

2.5.3.2 Theoretical perspectives of learning

This section reviews the learning theories presented in the literature, which underpin the design and implementation of group work. The importance of this theme to the study is claimed in two separate papers: Brown and McIlroy (2011) and de Hei *et al*. (2016a). In the first, the authors discuss points presented by other researchers in the field about the necessity to understand how students learn in order to decide on how to teach effectively and achieve positive outcomes. In the second, a failure to achieve intended learning outcomes is identified as the result of not grounding the design in theories of learning and teaching.

Neither of these works provides strong evidence to support their arguments. Despite the importance these features imply the relationship between learning theories and effective teaching of group work or learning outcomes is not evidenced in the remaining studies. Within the 47 pieces of literature identified, only three papers were written from a theoretical perspective, with each one reporting on a different underlying learning theory for their approach to group work and the benefits it brings. These three theories are experiential learning, social interdependence theory and cognitive load theory.

Kayes, Kayes and Kolb's (2005) research outlines the application of experiential learning to teams. Kolb's model of experiential learning and its subsequent learning styles is probably the one most associated with this type of learning. In Kolb's theory, the impetus for the development of new concepts is provided by new experiences. It is represented by a four-stage cycle in which learning is an

integrated process with each stage being mutually supportive of, and feeding into, the next. It is possible to enter the cycle at any stage and follow it through its logical sequence. However, effective learning only occurs when a learner can execute all four stages of the model.

As this type of learning is through experience and reflection, it is adults' life experiences that provide them with an advantage over children, teens and undergraduates because they provide many reference points for exploration, new application and new learning. It is this factor which makes its application suitable for postgraduate students with their classification as adults within the UK educational system.

The application of social interdependence theory in education provides the foundation for cooperative learning according to Johnson and Johnson (2009). The premise of the theory is that social interdependence exists when the outcomes of individuals are affected by their own and others' actions. The theory posits two different types of social interdependence, positive and negative. Positive, when the actions of individuals promote the achievement of joint goals, and negative, when the actions of individuals obstruct the achievement of each other's goals.

Unlike experiential learning, this theory does not necessitate learners to have pre-existing requirements to be effective. It is how participants' goals are structured that determines the way they interact and the interaction pattern determines the outcomes of the situation. Johnson and Johnson's (2009) paper does not distinguish between learners' status in applying the theory.

A different approach is taken by Janssen *et al*. (2010). They argue that by bringing together cognitive load theory, which considers groups as information processing systems that have more capacity than individuals, and process orientated approaches, it may be possible to identify the processes that may or may not contribute to the effectiveness of collaborative learning. No references were made to the educational stage of the students, though it might be inferred they were at least in higher education because the study refers to complex

problem solving, the purview of undergraduate or postgraduate learners in education.

Twelve other papers make reference to the theoretical basis of their group learning. Little explanation of the theories' principles is provided, possibly with the expectation that readers are sufficiently knowledgeable to understand the concepts behind each theory and able to appreciate the application to the research. Three papers subscribe to more than one theory, which possibly indicates an overlap between them or the application of separate concepts to achieve specific learning objectives.

A constructivist view was the most common, the basic premise being that learning is a process of constructing new knowledge based on previously learned, existing knowledge. Learning progresses once an instructor activates existing knowledge in the learner and motivates the creation of new knowledge based on the activated existing knowledge. More precisely Carriger (2015) cites Dewey's premise that learning occurs in the activity of the learner, not the activity of the instructor.

What is surprising is the absence of two theories strongly associated with learning in adults, transformative theory (Kitchenham, 2008) and andragogy (Knowles, Holton III. and Swanson, 2015). This was an unexpected result because the classification of the learners in this study as adults qualifies the inclusion of these as theoretical approaches. This deficiency merits exploration of the wider literature to identify their application to postgraduate learning environments.

In transformative learning, the basis is a change in frames of reference by critically reflecting on assumptions and beliefs and consciously making and implementing plans that bring about new ways of defining the learners' world. This theory was developed by Jack Mezirow who was interested in understanding what makes people change their views of the world (Kitchenham, 2008). He maintained that adults seem to realise personal and professional growth when confronted with dilemmas that challenge their existing views of the world. When faced with this, people are forced to reconsider their beliefs in a way that will fit

the new experience into their world view. This often happens through critical reflection in the context of dialogue with other people.

To foster transformative learning, the educator's role is to assist learners in becoming aware and critical of assumptions. This includes their own assumptions that lead to their interpretations, beliefs, habits of mind or points of view, as well as the assumptions of others. Educators need to provide learners with opportunities to participate effectively in discourse. This dialogue has the goal of assessing reasons behind competing interpretations through critical examination of evidence, arguments and alternate points of view. Learners are able to validate how and what they understand, as well as develop well-informed judgments regarding a belief. Group work potentially offers opportunities to promote this form of discovery learning.

Andragogy is the most common theory used in relation to the learning of adults. The broader literature presents this as a theory that adults learn differently than children, proposed by Malcolm Knowles, an educator in the early 1970s. He coined the term andragogy to describe his philosophy (Knowles, Holton III and Swanson, 2015).

Knowles presented a set of core assumptions from which implications were drawn for the design and practice of learning activities for adults. Four assumptions were originally proposed, though these were later expanded to six. The andragogic model is concerned with providing learners with procedures and resources to acquire information and skills.

The assumptions and their impact on learning design are:

> adult learners must be motivated to learn so effective practice should exclude those settings where adults are coerced or intimidated into learning;
>
> as learners, adults have a greater volume and quality of experiences compared to those at younger educational stages and therefore

teaching in this environment requires more emphasis on the individualisation of teaching and learning strategies;

an understanding of the requirement for the learning improves adult learners' enthusiasm for learning. A tool for raising the awareness of the need to learn is to include real or simulated experiences in which the learners are able to discover for themselves gaps in their understanding and knowledge;

adults need to see the immediate application of learning so they seek learning opportunities that will enable them to solve problems;

whether or not an adult is ready to learn depends on what they need to know in order to deal with life situations, e.g. how to learn to cook healthy meals or access career opportunities restricted by lack of formal qualifications;

adults have a self-concept of being responsible for their own decisions and being self-directed. However, a re-introduction to learning might create internal conflict because of previous learning experiences. Educators must therefore create learning experiences which help learners make the transition from facilitated to self-directed learning (Brookfield, 2001).

In summary, the studies have presented in total ten theoretical approaches to learning and how they can be used to enhance student learning and experiences (Andragogy, Behavioural, Constructivist, Cognitive Load, Creativity, Experiential, Social, Social Interdependence, Situated and Transformative). Each has its own merits, although there is a degree of overlap between them. None of the individual theories fully explains what is happening when adults are engaged in learning. Merriam *et al.* (2007) suggest that the more we read, the more we realise there are many ways of explaining how adults learn. It is highly individualistic and fluid. As such it requires instructors to be flexible and to utilise a range of teaching approaches and methods to enhance learning.

2.5.3.3 Roles and responsibilities of instructors

Having discussed the requirement for instructors to have an understanding of learning theories, this section examines what the literature tells us about the roles and responsibilities of instructors. These were multi-faceted and as not all of them were relevant to the context of group work; only those elements related to group work are represented here. The analysis of this theme was only in relation to the roles of instructors and their responsibilities, not the impact of decisions made by instructors on specific themes which is assessed separately in the reporting of the individual themes.

The literature presented a range of roles and responsibilities fulfilled by instructors. However, a main weakness of the information offered was the variety of terms used, especially with regard to the design role. Initial investigations showed there was some crossover between the criteria for the different terminology. Rafferty (2013) proposed several elements, e.g. guiding desirable behaviours, providing meaningful intervention, and individuals who were involved in facilitating delivery of a positive experience whilst in the analysis by de Hei *et al*. (2016a) a coaching role, which supported learners in their collaboration, was defined as guidance.

As an instructional method, group working offered many challenges since it was not the role of an instructor in group work to dispense information but to develop learner autonomy and independence by emphasising the utility of active learning over the traditional lecture (O'Connor and Ferreri, 2013). It was through the non-participative roles that an instructor must consider how this was to be achieved.

One paper stood out in specifying the roles in which the instructor acted: instructor, moderator/evaluator, knowledge expert (Dunaway, 2005). Taken in its literal interpretation this failed to explain the other elements that instructors were involved with. An alternative interpretation of the role of instructors was to distinguish between those roles which included contact with students and those which were non-participative, e.g. design and planning.

There was no agreed definition of what these roles included, the processes involved or terminology. The terms design, instructional design, curriculum design or planning were applied, with diverse emphasis, to describe the processes of determining learning objectives and anticipated outcomes for the group work and considering how to achieve these (Dunaway, 2005, Janssen *et al*.,2010; de Hei *et al.*, 2016a).

However, some components did support differentiation of the terms. Planning generally involved students as well as instructors, although these were connected to specific aspects of the group work, e.g. meeting deadlines (Santos, Passos and Uitdewilligen, 2016), study time (Drake, Goldsmith and Strachan, 2006) and implementation (Myllymaki, 2012).

Different perceptions of what design represented were similarly shown although de Hei *et al's* (2016a) study established a comprehensive interpretation. Their analysis of a thematic study on this topic indicated various approaches, featuring different design components, existed but they did not provide a comprehensive framework on which instructors could rely regardless of their educational setting. The study established eight components for inclusion in a design for face-to-face, online and blended contexts: interaction, learning objectives and outcomes, assessment, task, structuring, guidance, group constellation and facilities. These were then structured in a framework of five steps: analyse, design, develop, implement and evaluate. This study was a good illustration of the components and design decisions for group work activities. Some of these were presented in other studies, e.g. making pre-instructional decisions (Johnson and Johnson, 2009), reflection and analysis of previous experiences (Dunaway, 2005) and instructional interventions (Rienties, Alcott and Jindal-Snape, 2013). However, there were few references to aspects such as facilities, instructor characteristics or theories of learning.

The final point has been referred to in the previous section where an understanding of how the students will learn is necessary to achieve an optimal design. The lack of learning theories considered in the reviewed designs were a significant point, considering de Hei *et al*'s (2016a) thematic analysis where a

criticism of designs had been a failure of them being grounded in theoretical knowledge.

Educators can significantly contribute to a negative appraisal of group work by failing to understand the theoretical underpinnings of their design, approach and the components which are critical for successful outcomes (Brown and McIlroy, 2011). Comments from Brown and McIlroy's (2011) study indicate that students will not give a positive response to poor design

> *"It's not enough just to assemble students and groups and tell them to 'discuss the article'."*

Since the existing accounts offered conceptual differences, an investigation in the broader literature ascertained that, whilst planning includes educational materials and instruction, a design portrayed the educational process. Not just the material but the whole teaching and learning experience (The Open University, 2018).

On the question of an instructors' role as a knowledge expert, the literature covered not only the technical information on the topic of group work but also the knowledge and skills of group working. The primary non-technical role an instructor fulfilled was that of teaching group work skills to learners. Snyder's (2010) research illustrated this point clearly by suggesting techniques for teaching these skills and reporting on how poor instructional planning can lead to students' negative views of group work. Another example of pre-activity instruction was offered by Johnson and Johnson (2009) in their operationalisation of the instructor's role as defining the assignment, specifying positive interdependence and individual accountability, teaching the required concepts and strategies, giving the criteria for success and explaining the expected social skills in which to be engaged. For positive outcomes, the merits of instructing learners on the benefits of this mode of learning, assessments and how non-participants would not place other learners at a disadvantage were concluded by Dunaway (2005).

Another role for instructors was that of facilitator. Brown and McIlroy's (2011) research concluded that positive, meaningful results from group work required

careful facilitation. Their concept of facilitation necessitated explicit discussion with learners about the likelihood of conflict and its consequences on a group. Other literature responded with a much broader understanding of the term involving tutoring, guidance, support of groups, providing feedback (e.g.de Hei *et al*., 2016a), resolving conflict (e.g Underwood, 2003), guiding desirable behaviour and group norms (e.g.Rafferty, 2013).

Instructors should also consider their responsibility for their own personal development. This was not solely relevant to group work but, as an educational approach which is multi-dimensional and dynamic, instructors faced a more demanding role than that of the traditional lecturer (.Greenan, Humphreys and McIlveen, 1997; Brown and McIlroy, 2011).

Previous commentary on the theoretical perspectives, design, implementation and delivery of group work has shown the impact these can have on learner outcomes and experiences, but skilled and professional instructors were necessary to achieve this. In Brown and McIlroy's (2011) discourse on the complexity of group working they warn of the risk of negative learning outcomes if group working is operated on a best endeavours basis.

This argument was given further weight by Greenan, Humphreys and McIlveen (1997) who suggested that if students were to be taught the interpersonal skills necessary for success in the work place, and have positive learning experiences while doing so, universities will require appropriately trained staff, especially in the development of team building, conflict resolution and negotiation skills. Instructors involved in the process of group work will face a changing and more demanding role than that of the traditional lecturer. Endorsement of the need for instructor training on how to accomplish successful group working was expressed by academics and students (Elliott and Reynolds, 2012; Tombaugh and Mayfield, 2014).

One of the ways for instructors to improve their professional development was thought to be through obtaining student feedback (Myllymaki, 2012). This provided opportunities for instructors to adjust teaching materials, improve their own teaching and make closer contact with the students (Myllymaki, 2012;

Zhang, Hansen and Andersen, 2016). This could present a problem for instructors where development of learners' reflective skills and feedback can place a greater emphasis on instructors to improve (Greenan, Humphreys and McIlveen, 1997).

In summary, the literature relating to the roles and responsibilities of instructors, confirms the greater involvement of instructors in organising and conducting the groups and activities than in traditional lecture based approaches (Dunaway, 2005; Murray-Harvey, Pourshafie and Reyes, 2013; Rafferty, 2013) with a requirement for appropriate skills. These centre on the roles instructors must undertake: designer (de Hei *et al*., 2016a), facilitator (Bovill, 2010), counsellor (Gabriel and Griffiths, 2008), lecturer, moderator of student participation and knowledge expert (Dunaway, 2005). Although the terms used to describe the type or level of involvement by instructors vary, the studies establish the pivotal role of instructors in being an active agent in the process and this is key to positive experiences for learners (Rafferty, 2013; Atxurra, Villardón-Gallego and Calvete, 2015).

2.5.3.4 Methods of group working

The aim of this section is to explore in the literature the methods of group working used in the studies and where a main method is not included investigate in the wider literature the benefits and disadvantages of it.

Previous research has established the first action in designing group activities is to determine which type of interaction the group work should follow (de Hei *et al*., 2016a) as it is from these interactions many of the intended learning outcomes, especially behavioural ones, hinge and influence learner experience (Baldwin, Bedell and Johnson, 1997; Stepney *et al*., 2011). The intent in reviewing the different methods is to understand the structuring of each approach to identify which presents positive outcomes for learners. It is important to bear in mind that whilst a considerable amount of the literature indicates the method of group work this theme is not always a feature of the investigation and other factors can influence outcomes.

2.5.3.4.1 Case study

Stemming from the teaching of medical students, where the cases presented are from those seen on medical wards, they are descriptions of real life or imaginary events given to illustrate characteristics of a problem (Jaques, 2000). The case provided should be in a context relevant to a future profession if possible. It is usually presented after direct instruction to help demonstrate learning and the application of learning following the lecture and discussion (Beaty, 1999). Case Studies lend themselves to group work where different perspectives of a case support critical thinking.

The academic literature did not provide any research into the utilisation of Case Studies as an approach for group work. This is noteworthy as a third of the studies reviewed were situated in a management or business studies environment where they are a standard technique (Jaques and Salmon, 2007). This situation may be due to the demands on the instructor and its time-consuming requirements though this is often reported as a limitation of group work generally. Its failure to appear in any of the studies might be more related to the characteristics of the students because it requires mature and experienced students to be effective.

2.5.3.4.2 Collaborative learning

In the conceptual literature about the Collaborative Learning concept, in its most wide-ranging definition, collaborative learning involves two or more people learning or attempting to learn something together (Dillenbourg, 1999). As an educational approach to learning it moves the emphasis from the teacher, as the expert, to the student. Student talk is stressed and at its centre is the sharing of authority and acceptance of responsibility among group members for group actions, which is founded on a consensus built through the cooperation of the members (Panitz,1999b). By supporting one another in learning and sharing in the process of knowledge creation, a crucial element, Collaborative Learning is viewed as successful (Bruffee, 1973; Kozar, 2010).

The research literature shows different aspects of the points raised in the conceptual literature. The impact of students having control over the direction of their own actions is reported by Bovill (2010) where, despite the challenging

nature of the task presented, students reported high levels of positive experience. A key role for the instructors was acting as a facilitator and guide, not to direct them. While difficulties were experienced, they did not detract from the overall experience. Interestingly, a smaller cohort of students was sufficiently engaged with the task to develop it for a peer reviewed paper. The only indicator from the author for this reaction was the learners' high level of engagement. The maturity and ability of the students to respond to it as an approach (Panitz, 1999b) was possibly a factor in determining the use of this method. Being aware of the learners' characteristics may have provided a better understanding of why this sub-group formed and its degree of engagement.

Hersam, Luna and Light (2004) show how the selection of the task provides suitable opportunities for students to meet the requirements of Collaborative Learning: self-governing, self-teaching and mutually responsible (Gokhale, 1995). Their task was for students to work in an interdisciplinary group on evaluating an approach to a nanofabrication scheme. The task represented a real-world[2] problem but the interdisciplinary nature of the groups, necessary to achieve the task, ensured levels of self-teaching between the students from different backgrounds and disciplines. While this study also employed other pedagogical practices, the experience of the course and teaching strategy generated enthusiasm for the subject and the teaching practices. The highest increase in scores from the evaluation method was for the effectiveness of the instructor in stimulating interest in the subject. As it was the same instructor from the previous year when more traditional teaching methods were used, the argument might be put forward that it was the change to Collaborative Learning, which impacted on students. Alternatively, the instructor may have been challenged and motivated by the change and the increased motivation impacted on delivery of the teaching.

[2] a scenario, situation or problem which is representative of those experienced outside of educational establishments and which employees have to deal with in their employment.

2.5.3.4.3 Cooperative learning

As with Collaborative Learning, this approach has a high frequency of use in the reviewed literature, which includes two conceptual papers.

Johnson and Johnson (2009), considered as two of the leading authors in the field (Slavin, Hurley and Chamberlain, 2003), discuss the application of Social Interdependence Theory to the education practice of Cooperative Learning. They posit that there are five variables which can mediate the effectiveness of the approach: positive interdependence, individual accountability, promotive interaction, the appropriate use of social skills and group processing. By applying these and developing skills in structuring them, teachers should be able to adapt cooperative learning to their situations and students and prevent many of the issues associated with students working in groups (Johnson and Johnson, 1999). Other research agrees these are necessary factors contributing to the success of cooperative learning in relation to the impact of intrinsic motivation on students (Panitz, 1999a).

The academic view regarding differences between the Cooperative and Collaborative Learning methods is the degree of authority or teacher intervention accepted. Panitz (1999b) suggests that in collaborative working the responsibility for learning moves from the teacher to the student whereas cooperative learning is more directive and controlled by the teacher. An alternative argument is about the nature of knowledge and how it is generated but the same point about the degree of intervention by the teacher is made. It is because of the level of responsibility placed on learners in collaborative learning that it is recommended for higher education students.

The presence of different techniques for conducting cooperative learning, e.g. Jigsaw, were reported in one piece of empirical research in an educational setting (Morgan, Rodriguez and Rosenberg, 2008), the only one in which different terminology was used to describe a different technique for organising and conducting cooperative learning. Slavin (1981) concurs that the differences in cooperative methods are merely alternative ways of dealing with the same problems.

From the empirical studies, the students indicated that cooperative learning was an effective model for teaching (Morgan, Rodriguez and Rosenberg, 2008; Myllymaki, 2012). They were very positive about the effects on their involvement, motivation (Myllymaki, 2012), communication and performance (Morgan, Rodriguez and Rosenberg, 2008).

Researchers have attempted to evaluate the degree of cooperation promoted by instructors by developing a scale based on seven essential theoretical elements: positive interdependence, interaction, social skills, group reflection, assessment, heterogeneity and tutoring. This was on the basis that the success of cooperative activities does not occur automatically by grouping students. The level of effectiveness depends on how teachers guarantee the conditions of cooperation. As a large study with data collected from 71 groups involving 1,470 students across two universities in different countries, the results should present information on the elements instructors need to develop. They showed interaction and heterogeneity were the better implemented elements with group reflection being the least implemented (Atxurra, Villardón-Gallego and Calvete, 2015).

2.5.3.4.4 Problem based learning

The facets of this approach are that professional, real-world problems provide the stimulus for student-driven learning that occurs in small groups. As with Small Group Learning it should be effectively facilitated, not directed, by tutors and focus on building content knowledge in tandem with developing problem-solving, self-directed learning and collaborative skills (Murray-Harvey, Pourshafie and Reyes, 2013).

As the tutor's role is only to facilitate, students are expected to direct their learning at collating information relevant to their existing knowledge, identify the core issues, determine what is required to solve the problem and how to fill the gap (Carriger, 2015). From its origins in medical teaching these essentials have since developed and different researchers have delivered variations on the initial ideas. Two variations are presented in the reviewed literature where Problem Based Learning was used in addition to other teaching strategies to meet a series of learning objectives. Both sets of research were in the engineering environment

where the use of real-world problems supported the aim of learners being able to transfer theoretical knowledge to practical applications (Zhang, Hansen and Andersen, 2016).

The other application was similarly concerned with the application of theory in an educational environment where teacher students were required to transfer their learning about group work through being involved in the practice themselves by resolving problems which represented relevant and meaningful classroom issues (Murray-Harvey, Pourshafie and Reyes, 2013). In this application of Problem Based Learning the researchers argue that if group work is to enhance the learning experience, positive process-related and content-related outcomes are both necessary because group work experiences are affected by dissatisfaction with them (Murray-Harvey, Pourshafie and Reyes, 2013).

The self-learning aspect of Problem Based Learning was reported as presenting some difficulties in the beginning for students; they found a lack of clarity on how to resolve the problem (Murray-Harvey, Pourshafie and Reyes, 2013). Balancing the workload was a challenge of working with this approach because it is a demanding undertaking, for teachers as well as learners (Zhang, Hansen and Andersen, 2016)

Results of all the research show learners' experience was generally positive with students being more motivated, having improved communication and a positive impact on learning. Their enthusiasm for delivery of their course in this way was also expressed (Hersam, Luna and Light, 2004; Zhang, Hansen and Andersen, 2016).

2.5.3.4.5 Project based learning

Similar to both Case Studies and Problem Based Learning, this approach is organised around achieving a shared goal (Savery, 2006). This type of learning is considered to be an overall approach to the design of learning environments and five key features are thought necessary for its application in a curriculum: have a driving, real-world question which requires resolution; involve students in a constructive investigation; involve students, teachers and others to mirror the

complex social situation of problem solving; use the scaffolding of learning technologies; create tangible products or artefacts (Krajcik and Blumenfeld, 2006).

By drawing on these criteria it has been possible to view one study from the review which appears to meet them (Long and Shobe, 2010). The project was relevant to the real world as students were asked to develop a grant proposal to obtain funds for the subsequent year's class in support of local social service community needs. Students were required to undertake an investigation of the situation using their individual knowledge, skills and contacts in support of their application. The project mirrored the complexities involved and produced a tangible product. Students received lectures on the facets of grant writing which corresponded with Savery's (2006) assessment that from the generation of the problem the teacher is able to provide learning opportunities, guidance and suggestions for moving towards an effective conclusion.

Project Based Learning's differentiation from Problem Based Learning lies in defining the question. In this approach the question is selected by the teacher, sometimes in conjunction with the students (Krajcik and Blumenfeld, 2006). The key feature is the students' role in the setting of goals and outcomes for the problem (Savery, 2006) which generates development of the ability to define a problem and develop solutions, a skill required in working environments.

As an approach for learning, the example presented was effective with learners expressing how relevant it was to their practice and that it contributed to their education and was rewarding and empowering. However, some students were unable to embrace the autonomous nature of the project and struggled with the lack of specificity in direction, objectives and structure for the project (Long and Shobe, 2010).

2.5.3.4.6 Small group learning

This methodology is open to a variety of forms, e.g. seminars, tutorials, and syndicates. The broader literature presents its core aims as those of talking, thinking and sharing with communication as its basis. It is this aspect which is

presented in the reviewed literature, though often only as an element in conjunction with other approaches (O'Connor and Ferreri, 2013).

Its strengths are flexibility in allowing tutors to respond to a group's learning as it develops, the intensity of interaction between students and their tutor, the level of engagement and the development of reflexivity (Mills and Alexander, 2013). However, students must be prepared for working in this way because there has to be a willingness to share views and opinions with each other and the tutor so that personal and intellectual development occurs (Exley and Dennick, 2004). This concurs with an investigation, using international groups, by Elliott and Reynolds (2012) into this type of learning where the unfamiliarity with this as a pedagogy for most of their students meant it was not appreciated by many. Others argue that the ability of the tutor to use facilitatory teaching skills is a major determinant in overcoming the difficulties of small group learning (Savery and Duffy, 1995).

Small Group Learning is difficult to define as an approach since the number of students in the group is the criterion that determines whether a group can be categorised as small within a learning environment. In the wider literature numbers range from two to twenty students (e.g. Griffiths, 1999) and the optimum size is considered to be six (e.g Mills and Alexander, 2013). Numbers greater than this present openings for students not to interact while fewer students might not provide sufficient diversity and personal interaction falls (Exley and Dennick, 2004). The priority for the tutor is to ensure the size of the group permits effective teaching of the topic and achieves the benefits of this type of learning.

2.5.3.4.7 Team based learning

The term 'team learning' is probably the one which is used most generically to describe any approach that involves students working together. Slavin's (1981) development of Student Teams Achievement Divisions is only a vehicle for the use of cooperative learning but one which addresses the 'team' label since it is designed to utilise competition in its encouragement of students to learn. The phrase is also used in The Kolb Team Learning Experience (Kayes, Kayes and Kolb, 2005). This is an approach, developed from Kolb's Theory of Experiential

Learning (Kolb and Fry, 1974), to help develop the essential competences for successful team learning. However, while the process is related to components of teams, e.g. purpose, membership, etc., it does not utilise competition as a basis for learning.

Four pieces of literature exhibit research utilising teams in a competitive structure. A business simulation was the setting for each one, presenting the benefits of group work in a competitive setting (Verreault, 2007; Drake, Goldsmith and Strachan, 2006; Ceschi, Dorofeeva and Sartori, 2014a; Santos, Passos and Uitdewilligen, 2016). While each piece of research investigated different variables within group work, the adversarial approach to the task was considered to be an element which impacted team behaviour and performance. The concept of belonging to a team and aiming to win, affects cognitive mindsets and changes perceptions from 'my' to 'our' (Drake, Goldsmith and Strachan, 2006). Impacts on performance are improved through better communication (Ceschi, Dorofeeva and Sartori, 2014a), team relationships (Santos, Passos and Uitdewilligen, 2016) and social cohesion (Verreault, 2007). Although improved performance was reported, this cannot be directly correlated to a learner's experience and in assessing learners' experiences of teams the only report was from Verreault's (2007) accounting valuation module which was 'highly positive'.

A further qualitative study revealed similar learner experiences, *'a very positive educational experience'* (Dunaway, 2005, p. 60) when Michaelson's Team Learning Model (Michaelsen and Sweet, 2008) was applied to graduate medical students. The issue of terminology is again presented as, though the team model is being operated in the study, the allocation of students is described as being to 'small groups.'

This model has a structured approach which requires each team to learn the same material and undertake the same assignments. The essential components are the formation and management of groups, students being accountable for themselves and their team, assignments including elements for learning and working in groups and frequent and timely feedback.

These requirements are similar to other approaches although there are differences in the application of the method. The process requires students to be exposed to the learning material prior to the class; group selection is accomplished within class from students' responses to questions; it does not permit individuals to complete a part of the team task, and final assessment is based upon both individual and team assignments plus a grade for contribution to team success. A significant component is the use of a Readiness Assessment Process (RAP) in which individuals and groups undertake regular tests to determine their levels of knowledge and understanding. This process shows instructors the learning points that need additional attention and provides feedback to students to encourage involvement in the preparation work to improve individual and group marks. The impact of interaction in groups is immediate.

2.5.3.4.8 Implementation of methods to group working

The previous sections have described the methods of group working used in the studies but a broader perspective of the utilisation of these methods is also presented in the ways they were implemented, adapted and consequences reported on in the literature. The following portrays examples of these conditions.

While each method offers benefits and disadvantages to instructors and learners the dominating influences were the requirements of professional bodies to improve professional education (Verreault, 2005); course evaluations highlighting professional weaknesses in students (O'Connor and Ferreri, 2013); demands of industry and employers (Hersam, Luna and Light, 2004) and previous research indicating the benefits of more attractive methods to improve education (Zhang, Hansen and Andersen, 2016).

As the theoretical approach to learning and teaching of the instructor has previously been reported as a factor in determining the choice of method (O'Connor and Ferreri, 2013; Knowles, Holton III and Swanson, 2015) it was noteworthy that only one directly reported their theoretical stance as an explanation for their choice of approach (Bovill, 2010). While several of the papers reported the underpinning theories of the approach chosen (Stevens-

Long and Trujillo, 1995; Morgan, Rodriguez and Rosenberg, 2008; Murray-Harvey, Pourshafie and Reyes, 2013) it was not a decisive criteria for deciding on a method.

The majority of the papers undertaking research into appropriate methods of group working were based on changes being instigated by instructors in their teaching practice. While results were compared to previous approaches, the range of variables within each study made comparisons with alternative methods presented in other papers difficult. This did not offer any insight into which of the many methods available might be more appropriate

Instructors often adapted the approaches to provide a better fit in delivery to students. The range of these changes was variable. Dunaway (2005) removed the application of the RAP to his pharmacology cohort believing alternative methods of observing individual methods of preparation were possible and its removal conserved class time despite this being fundamental to the process of Team Based Learning. A simple Project Based Learning method was sufficiently adapted through specific activities and tools, such as inclusion of pre-tests and peer evaluation, for it to be considered *'unique'* (Zhang, Hansen and Andersen, 2016, p. 32). These adjustments add to the difficulties of generalisation.

The adaptation of the method was uniformly seen to be effective, both from a lecturer's perspective (Verreault, 2007; O'Connor and Ferreri, 2013) and in teaching module objectives (Verreault, 2007). These views were confirmed via stakeholder feedback, external examiners and peer observation of instruction.

The issue of time is often referred to in various ways and could be considered by some as an impediment to adopting particular methods (Dunaway, 2005; Morgan, Rodriguez and Rosenberg, 2008; Zhang, Hansen and Andersen, 2016). Concerns about the enactment of Team Based Learning, with its emphasis on applying the RAP, were dismissed by Michaelson due to the reduction in in-class teaching since this material is studied by students individually as pre-class study. Dunaway (2005) resolved this issue by replacing the process with observations on the quality and quantity of class participation; a practice only effective due to the small group of students involved. Panitz (1999b) details the time which is

necessary for both students and facilitators to master Cooperative Learning while in Small Group Learning the move to pre-class study for learners increased the class time to develop non-content skills, such as communication, problem-solving and interpersonal skills (O'Connor and Ferreri, 2013).

Time impacted on instructors as their hours increased during the initial phase of redesigning courses and shifts to different activities were reported as planning increased but lecture preparation decreased (O'Connor and Ferreri, 2013). This concurred with the view of group working approaches being effective when classes were well structured, requiring instructor preparation and planning (Morgan, Rodriguez and Rosenberg, 2008).

The time factor has other implications for educational organisations because it impacts cost and facilities for teaching. The growth in student numbers in many institutions has put pressure on the use of Small Group Learning because staff numbers have not been increased in the same proportion to maintain the ratio. The availability of more flexible or appropriate teaching spaces for group work activities in organisations set up for more traditional teaching also creates obstacles to its implementation and effectiveness (Jaques, 2000)

Critical to the success of many approaches was the crafting of the problem or task students were required to resolve. In case studies which involves learners uncovering important elements of the issues presented in the case, which the instructor deems important, the quality of the case needs to be well defined and constructed (Taylor and Miflin, 2011). Similarly, Problem Based Learning requires the problem to stimulate the learners, motivating them to engage in behaviour which will produce a solution (Zhang, Hansen and Andersen, 2016).

2.5.3.4.9 Summary of methods of group working

This section has provided a brief summary of the literature relating to the different methods of undertaking group work and other factors which impacted on the implementation of approaches.

Neither the educational discipline nor the country appears to be influential in method selection in the studies with a range of types utilised across Europe,

North America and Australasia. There are many common attributes in the approaches presented. They are all learner centric, in which students are active contributors, and the aim is consistent in using group work to improve the achievements of students.

The literature showed a mix of methodologies, of which collaborative and cooperative learning were the two most dominant though in nearly half of the academic literature the terms describing the methods used were merely the generic application of a label to situations where learners worked interdependently, over a period of time, sharing responsibility for achieving a task (Rafferty, 2012). Consequently, the generalisability of much published research on this issue is problematic.

Specific reports were made about the forms being used as an effective teaching model which improved student learning, engaged and motivated them (Morgan, Rodriguez and Rosenberg, 2008; Myllymaki, 2012; Zhang, Hansen and Andersen, 2016). The use of authentic practical exercises was positively received (Myllymaki, 2012) especially where they offered opportunities to practise professional requirements (Dunaway, 2005).

The use of real-life events was promoted in Project Based Learning, Collaborative Learning and Case Studies, although in case studies imaginary events can be presented to provide students with the depth and complexity of problems to engage them. This engagement was considered beneficial in providing students with opportunities to generate meaningful experiences (Murray-Harvey, Pourshafie and Reyes, 2013; Zhang, Hansen and Andersen, 2016).

The majority of negative reactions were aligned, not with the interactive approach, but with the impact any type of group working can bring, e.g. high workload (Zhang, Hansen and Andersen, 2016), domineering personalities or non-participation (Gabriel and Griffiths, 2008).

Whichever method was adopted, the issue of changes to the roles of both instructor and student were raised. If an instructor was uncomfortable with the group work process, or the students were uncooperative, a successful

experience for either was less likely (Dunaway, 2005). The quality of implementation and application represented difficulties if instructors were not trained or prepared for participative work (Elliott and Reynolds, 2012).

Some methods were more open in the amount of freedom students were given, e.g. Collaborative Learning, which can be a challenge for them when previous experiences of educational processes have not been set up to work this way and individual academic success is valued. Some approaches were therefore more suitable for advanced students who were able to take control of their learning. The mental stress of adjusting to new ways of working, especially in cross-disciplinary groups, was reported owing to the interactive nature of lectures, showing the difficulties students experienced in adjusting to less structured approaches. (Verreault, 2007; Myllymaki, 2012).

Benefits from some methods, e.g. Small Group Learning (Exley and Dennick, 2004) were only effective when learners were willing to speak to the instructor and each other. Students had to be willing to talk, think and share because without discussion the range of benefits and positive experiences would not materialise.

Regardless of the method chosen, students recorded positive experiences with few negative points. Positive opinions were expressed as fun, enjoyment, rewarding, enthusiastic and successful (Hersam, Luna and Light, 2004; Dunaway, 2005; Morgan, Rodriguez and Rosenberg, 2008; O'Connor and Ferreri, 2013; Zhang, Hansen and Andersen, 2016).

2.5.3.5 Group allocation

Having discussed the literatures presentation of methods of group working this section reports on aspects related to how learners are allocated to groups and the impact on outcomes and experience these elements can have.

2.5.3.5.1 Group selection

Selection choices offer no guarantee of an effective student experience so consideration of how and why these are made are both factors in encouraging collaboration and shaping the outcome. The effectiveness of this will determine

the experience and level of success realised (Hersam, Luna and Light, 2004; Elliott and Reynolds, 2012).

The criteria for selection were frequently referenced although they were not necessarily related to the outcomes being studied. Reported features considered were age, gender (Ceschi, Dorofeeva and Sartori, 2014a), educational attainment (Elliott and Reynolds, 2012), work experience (O'Connor and Ferreri, 2013), ethnic diversity, degree of expertise (Dunaway, 2005), area of discipline (Hersam, Luna and Light, 2004), student classification, learning style (Drake, Goldsmith and Strachan, 2006), personal qualities (Jewels and Ford, 2006) and cultural background (Rienties, Alcott and Jindal-Snape, 2013). Additionally, the application of these variables in both homogenous and heterogeneous groups was deliberated. Such a variety of criteria offers a multitude of permutations.

Researchers in these studies have not related the application of selection by team role. Belbin's (1981) model where individual team skills are identified and applied in selection to produce a team with balanced skills, is referred to in only two studies. Neither of these studies applied the theory to their selection method but considered its use, either as a reflective tool for learners to investigate the role they played (Drake, Goldsmith and Strachan, 2006) or as an approach for further research into communities of practice in support of helping members improve interpersonal skills (Chalmers and Keown, 2006).

Further options in relation to self-selection (Elliott and Reynolds, 2012), random assignment (Rienties, Alcott and Jindal-Snape, 2013) or systematic composition (Rafferty, 2013) were reported. Only Elliott and Reynolds' (2012) paper discussed the instructor's conflict in deciding if students should have the responsibility to self-select, knowing this would probably result in groups containing friends or students who have previously worked effectively together, possibly leading to the development of groupthink and students failing to expand their experience of working with people they do not know well. Students were reported as being similarly conflicted in preferring to work with those they know while understanding the benefits of experiencing working in random selected groups. Student comments, e.g. '*the whole idea of predetermined groups scares me'* (Elliott and

Reynolds, 2012, p. 312), provided an indication of the anxiety which can be generated by the selection process. Investigations into why this was identified two factors: an apparent lack of commitment to the group and application to the task for graded assignments. The latter point was especially influential for some when obtaining good grades was important. The influence of personal qualities was reinforced in an extended taxonomy for information technology project members where being hardworking and trustworthy were categorised as highly specific from students who had work experience (Jewels and Ford, 2006).

Despite the possible range of variables exerting an influence on experiences, the predominant approach to selection was that of a systematic composition where the instructor selected groups using the variables most appropriate to the discipline and task from the data available in university records. The use of heterogeneous groups prevailed with gender, age and cultural background chosen as the most frequent parameters and whichever of educational level, experience, skills or discipline was deemed most relevant. There was no general agreement as to what constituted a standard approach.

2.5.3.5.2 Group size

A feature in group selection is deciding the ideal group size. Influential in this are the nature of the task, the availability of resources and facilities and the number of students taking part, although only two studies considered the impact of these (Lightner, Bober and Willi, 2007; de Hei *et al.*, 2016a). Group size is considered a factor in the quantity and quality of the interactions between participants though its effect is reported as being inconclusive (de Hei *et al.,* 2016a). Sizes were reported being as small as two (Jewels and Ford, 2006) and up to eight (Yeadon-Lee and Worsdale, 2012), although in a thematic review groups as large as ten were referenced (de Hei *et al*., 2016a). This review also confirms evidence from Lightner, Bobber and Willi's (2007) research where nineteen of a thirty student cohort expressed a preference for three person teams, stemming from logistical and conceptual reasons.

2.5.3.5.3 Diversity of groups

As with the previous section, diversity as a theme has an array of features: age, gender, language, ethnicity, culture, nationality, and experience. These are usually considered in relation to other variables, e.g. selection by age or gender, and are frequently considered as a collection of interconnecting facets, e.g. nationality with language and culture. The limitation of the studies which research any or some of the facets is in determining how any one of the elements influences results and poses difficulties in generalising results for other situations.

2.5.3.5.3.1 Age

A drawback of this diversity element is that while it is always reported in empirical studies, this is because it is a requirement of reporting the characteristics of a study's population. Diversity is infrequently used as a variable in the study.

The range of ages available in any cohort undertaking group work was broad and was frequently cited as a characteristic utilised in group selection but almost always applied in heterogeneous groupings with other characteristics (Rafferty, 2013).The populations involved in the empirical studies were often small, possibly due to the qualitative research methodologies adopted by researchers and selecting groups with small age ranges would not be practicable.

This approach presents both problems and benefits. Othering by age (Moore and Hampton, 2014), greater dissatisfaction with group assessments and issues of hierarchy and social status are negative aspects (Nordberg, 2008). Conversely the maturity, experience, social behaviour and better reflexivity of higher ages are deemed to show improved connections with learning and teaching (Murray-Harvey, Pourshafie and Reyes, 2013). Nonetheless, Stepney *et al.* (2011) stated age was not a significant difference in collaboration although they reported this as contradicting previous research. A possible explanation for this might be the seven-year difference in conducting the research because more adults had entered higher education during this period.

2.5.3.5.3.2 Gender

The empirical literature presents the impact of gender from diverse perspectives: propensity towards unacceptable group working practices, group work in a gender dominated profession, the performance of gender heterogeneous groups. As with age, it is a criterion of groups reported in the populations.

Since groups in higher education are assessed on their outputs, the impact on performance of heterogeneous or homogenous groups is an important factor for research, but a determination of performance might include not just outputs but also group functioning. In the study by Ceschi, Dorofeeva and Sartori (2014a), monetary value alone determines the success of particular groups so its value is limited when considering generalisability for other group environments. However, the study provides a greater number of groups than most studies, fifty of varying size. The groups were self-selected and in this feature gender was a selection preference over age, education or background. It should be noted the age range of the sample was narrow, 18 – 24 years, and because the sample was drawn from economic and business institutions, education or social background might not have presented enough variation. Analysis of their results showed no difference in performance between mixed gender groups or homogenous groups.

Much has been written and researched about the difficulties learners find in working with others and particular behaviours which group work presents. Underwood (2003) in a paper to investigate how gender is a factor in acceptance of such behaviours reports some unsurprising results. Males were significantly more tolerant of non-collaborative behaviour while females were more likely to involve the instructor in resolving issues. Despite some differences, the overall conclusion regarding gender and group working practices was that it was no longer important for mature and able learners, which confirms the view of Ceschi, Dorofeeva and Sartori (2014b).

Long and Shobe (2010) and Stepney *et al*. (2011) explore gender from two professions where females dominate, nursing and social work. Stepney *et al*'s (2011) study of collaborative working in the inter-professional education of nursing fails to present any significant results relating directly to the all-female

study. The research meets its aim of evaluating a collaborative module producing results on the impact of inter-professional nursing education. It might be suggested that the absence of reporting anything gender related is suggestive of gender specific groups experiencing group work in the same way. Unfortunately, a male homogenous group was not included in the studies.

The only point of interest from Long and Shobe's (2010) study is the idea that learning modules in graduate education for female dominated organisations, such as social work, where the learners are being prepared for administrative and management roles should be gender sensitive. This suggestion was based on earlier research which reported important gender differences in managerial approaches, suggesting that women tend to value relationships and interpersonal skills in the workplace and people skills were more essential than management skills. While they reported their results were consistent with this, many of the learners' reported views of the experience learners were typical of other research, although the absence of any criticisms regarding intragroup behaviour might have been significant. However, this could be more related to the professional basis of the students.

2.5.3.5.3.3 International groups

The same issues identified in the earlier sections also applied to groups involving international students but they were magnified, not only by the complexities of being from different nations but also by race, social background, ethnicity, language and culture (Moore and Hampton, 2014). These difficulties often resulted in the release of negative emotions which impacted on the effectiveness of learning and could cause distress to some students (Gabriel and Griffiths, 2008).

While there was a strong view from students that group working and internationalism were essential features of the working environment (Gabriel and Griffiths, 2008), two of the most reported difficulties, language and communication, were common to all disciplines (Li, Clarke and Remedios, 2010; Moore and Hampton, 2014). Language skills dominated the researched literature, especially where the mix of the group was divided equally between domestic and

one other international group (Li, Clarke and Remedios, 2010). As language had an impact on interaction in group work, those with English as a second language often required clarification or confirmation from others that their understanding of points was correct (Li, Clarke and Remedios, 2010). The tensions created through a lack of fluency were evidenced in students' preferences, domestic or international, for working in homogenous groups (Moore and Hampton, 2014).

A lack of involvement in group discussions by international students with weak language skills was often interpreted by domestic students as an unwillingness to participate, or that they had nothing to contribute, leading to negative views of international students' abilities (Melles, 2004; Moore and Hampton, 2014). This perception undermined the confidence of an Asian student as the cultural value of silence and listening, especially in class, was not understood (Li, Clarke and Remedios, 2010; Elliott and Reynolds, 2012).

Additional pressure was put on students through the Western approach of group allocation which necessitated students forming relationships quickly, to aid the group process, although many cultural backgrounds might not support this approach (Melles, 2004). This might similarly explain why attempts to improve communication through social activities failed (Gabriel and Griffiths, 2008). Aspects of communication and cultural background also impacted approaches to task activity where perceptions of priorities (Melles, 2004), differences in commitment to the task (Elliott and Reynolds, 2012) and non-domestic students' understanding of academic requirements (Moore and Hampton, 2014) impaired group dynamics.

While disliking international group assignments and assessments, there were positive views of diversity (Gabriel and Griffiths, 2008), but when workloads increased and tensions appeared, group dynamics deteriorated. Although only a minority of international groups became dysfunctional, the issue of language was viewed as the main cause and even where groups functioned reasonably well it was a source of difficulty (Gabriel and Griffiths, 2008). In taking account of student experiences in international groups, support with aspects which improved these skills, e.g. strengthened induction programmes, a spoken English programme,

encouragement of individual preparation in advance of group meetings (Gabriel and Griffiths, 2008) and preparation by lecturers (Elliott and Reynolds, 2012), were considered to result in an even more positive experience.

2.5.3.6 Group task

Having examined the literature on methods of group working it is necessary to scrutinise the points raised in the literature about group tasks. This section defines what constitutes a task and identifies its effect on the learner experience.

A group task was considered to be an activity, or series of activities, which produce an output. The output may or may not be a part of a group assignment that was assessed e.g. write a report, conduct an experiment or produce an electrical design. The activities performed should achieve the shared learning objectives (Johnson and Johnson, 2009). As teaching about group dynamics in a purely theoretical manner was difficult the choice and structuring of the task to deliver learning on the topic and opportunities for learning about groups was important (Drake, Goldsmith and Strachan, 2006). Due to this dual aim many of the points identified in the literature about a group's task were also the same as for group selection, the basis on which learners are allocated to groups, and it might be considered the two are dependent upon each other.

Assessment of students' academic and intellectual abilities for groups was presented as a factor in determining how challenging the task is to develop student knowledge. The design should be sufficiently thought-provoking to encourage discussion within or among groups (Snyder, 2010) since this supports facilitation of team interactions (Drake, Goldsmith and Strachan, 2006).

Effective communication of the tasks and their objectives should ensure that students understand the efforts required of them, both as individuals and as a group, and that achievement of the goal is not possible individually (Atxurra, Villardón-Gallego and Calvete, 2015). Where multidisciplinary groups were involved, an emphasis on communication was an essential element of the task's structure because explanations from particular disciplines could be challenged

and required defending in their own technical language (Hersam, Luna and Light, 2004; Zhang, Hansen and Andersen, 2016).

The type of task, realistic, real life or abstract, and the environments in which the tasks were employed varies throughout the literature although the consensus of students was that their learning was enhanced when it was related to a real-world situation (Hersam, Luna and Light, 2004; Drake, Goldsmith and Strachan, 2006; Lightner, Bober and Willi, 2007). A similar position was reflected in many of the group working approaches, e.g. Problem Based Learning and Project Based Learning. As the task's objective was to extend knowledge and for students to experience and learn the key skills of group work, its success in engaging students in their learning was positive and often provided additional benefits as students applied their learning outside of the educational environment (Drake, Goldsmith and Strachan, 2006; Long and Shobe, 2010).

2.5.3.7 Group dynamics

This section contains seven sections which consider the different issues which can occur when learners interact or how the choices made by instructors can impact on those interactions. Joseph Luft (1963) provides a very brief definition of group dynamics as '*a term which refers to the study of individuals interacting in small groups'* (1963, p. 1) though the brevity of the definition understates the range of issues involved in the understanding and appreciation of the subject matter; people and groups. Areas covered within this term include the attitudes and behaviour of groups, how groups form and develop, how they are structured, function and deal with the many processes which can be a feature of groups, e.g. communication, cohesion conflict. Its importance to group work is based on the benefits of learning, especially those interpersonal skills which employers' value, and the experiences student acknowledge which are generated during the majority of these actions.

2.5.3.7.1 Development of groups

The broader literature on the study of how groups develop has produced a range of theories, e.g. Bennis and Shepherd's Model of Group Development (e.g Luft, 1963) and Gersick's Punctuated Equilibrium Model (1988). The goal has been to

understand why and how groups change over time and researchers have investigated patterns of change or continuity with some investigating particular aspects of development, such as cohesiveness or types of groups, e.g. therapy, instruction and interest.

All the reviewed literature is concerned with development, in its generic sense, of either learners or groups but less than a quarter discuss their studies in relation to any specific theory of group development. Amongst those that do, Tuckman's Five Stage Model of Group Development dominates where the changes to groups' characteristics are studied as they go through the stages of forming, storming, norming, performing and adjourning.

Two applications of this model are presented: its use as an analytical lens (Yeadon-Lee and Worsdale, 2012; Rafferty, 2013; Moore and Hampton, 2014) and as an instructional tool to help students understand the processes of group development (Snyder, 2010; Tombaugh and Mayfield, 2014). As an instructional tool, Tuckman's model is to be considered as the minimum level to be taught to students about group development since it helps students navigate the collaborative experience, identifies their own roles within the group dynamic and emphasises the importance of effective teamwork skills. Its other use, as an analytical lens, provides a framework for identifying what stage students are at. Results can be analysed against the framework to understand experiences of group work within particular settings and their implications for wider applications.

Tuckman's sequential model is challenged by Kayes, Kayes and Kolb (2005) as while it focuses on learning in six aspects of group development, they are not chronological: purpose, membership, roles, context, process and action taking, Group effectiveness can be improved by concentrating intentional learning effort on them. It applies the framework of experiential learning theory as a means for understanding and managing the way teams learn from their experience.

Contrast is possible between the two perspectives presented but given the range of group development theories available it is surprising to find the dominant use of only one theory. The interpretation of findings from only one phased development model presents limitations with regard to the analysis of group work.

The application of one model to all groups can be problematic because groups function in unique ways and the relevance of any theory can be contested.

2.5.3.7.2 Group structure

Within the literature on group dynamics, the arrangement of relationships, i.e. how these relate to one another and to the group as a whole, is known as its group structure (e.g. Forsyth, 1999). Structure grows out of a need for effective group work and when a group succeeds in establishing its own structure this is an important and useful achievement (Luft, 1963).

An evaluation of the studies into group working presents little information about the concept of group structure but does take account of relationship issues and the impact on student experiences where there is little or no group structure. For some students a lack of structure creates feelings of being uncomfortable and they prefer situations where lecturers are able to provide more concrete steps for learners (Long and Shobe, 2010; Elliott and Reynolds, 2012). Luft (1963) concurs with this, pointing out the anxiety which working in unstructured groups can create.

This is not always the case and it might be a reflection of a learners' level of previous experiences of group work or working environment in not affording the learner the confidence to work in this way. These situations create issues for teachers in balancing a students' desire to be directed while creating a structure in which they learn the necessary skills for future situations.

Many of the other references on this topic are related to the impact of other variables on the structure's organisation and configuration. Some papers discuss structure in relation to the size of groups, the activities of groups, learner attributes, roles or relevance to the workplace (Skilton, Forsyth and White, 2008; Sathe, 2009; Ceschi, Dorofeeva and Sartori, 2014) and how the structuring of these elements can impact relationships in groups.

Rienties, Alcott and Jindal-Snape's (2013) investigation in how adjusting the group selection method can encourage cross-cultural learning is a suitable example. Their investigation examined how intervention in the group selection

method can enhance group learning by understanding how social networks and learning relations with other students develop. This was relevant for their study since they reported that social networks are a key predictor for learning. The research involved pre and post-test analysis of material using Social Network Analysis which allows researchers to make informal relations among learners and groups visible. By assessing relationships in this way researchers were able to determine patterns of relationships with differently selected groups to identify which criteria produced the best outcomes.

A limitation of the literature is the effect of changes to group memberships and its impact on learner experience. This can be accounted for because the nature of the groups being studied is an educational environment where changes in the nature of a task, stage of discussion or technical requirement are not applicable. This contrasts with situations in working environments, particularly for technical groups, where membership can change. Since the patterns of relations within a group begin when they first interact (Jaques, 2000), a change in membership can affect relationships in groups and group structure (Forsyth, 1999).

2.5.3.7.3 Group norms

On the topic of group norms, the literature presents limited examinations of what it relates to, its characteristics, varieties and even its designation. In just over a third of the papers the terms used are ‘rules’ or ‘ground rules’ (Bovill, 2010; Tombaugh and Mayfield, 2014). These alternatives provide an indicator to its function in groups, an instrument which dictates what is or is not acceptable behaviour from members in their group roles (Forsyth, 1999).

Whereas the group structure is concerned with relationships, the norms are relate to how those relationships should or should not be performed in order to maintain social relations. In this aspect it has a bearing on the experience of learners because as they emerge from initially getting to know one another confrontations might begin to surface over agreements regarding the structure and norms that a group will adopt. Results from one study showed there was a significant correlation with a more positive overall experience of group work where a group develops implicit norms (Rafferty, 2013). The development of norms is reported

as desirable in promoting positive experiences and as an attribute for success (Bovill, 2010). Suggestions as to how this can be achieved are by the application of group contracts (Gabriel and Griffiths, 2008; Moore and Hampton, 2014).Tombaugh's paper offers the most comprehensive advice in this area but it considers other areas, e.g. structure, as well as norms. It presents the advice as having been developed from students' own experiences as an advantage because though instructors may explain desirable behaviour, the degree of emphasis varies. The paper strongly presents the difficulties students experience in adapting to group work and if the experience is to be positive it is incumbent on the instructor to take a more active approach in encouraging students to develop norms.

Two other features, which are similarly reflected in aspects of group structure are the individuality of each groups norms, they can have different influences and the effect change can impact on them (Elliott and Reynolds, 2012; Yeadon-Lee and Worsdale, 2012).

2.5.3.7.4 Participant interdependence

Participant interdependence, which facilitated learning outcomes involved individuals interacting with others in the group (Skilton, Forsyth and White, 2008) and signposted the importance of working as a group rather than in a group. Many of the studies reviewed (Sathe, 2009; Rafferty, 2012; Murray-Harvey, Pourshafie and Reyes, 2013) identified and considered separate elements of this feature, e.g. conflict, communication, reflection and cohesion, but the main criterion for success in each one was the element of reciprocity because it was through this that individuals obtained the greatest benefit from group learning (Skilton, Forsyth and White, 2008) and it was reported as a critical factor in students' perceptions of positive experiences (Snyder, 2010).

As this feature existed once groups had been formed, and the elements involved were beyond their control, instructors were advised to consider how construction of elements in the setting-up of group work would support interdependence (de Hei *et al.*, 2016b). Once the task is in progress, the instructor facilitation or

intervention might be reduced, depending upon the approach, and students trusted to function sufficiently well to achieve the required interdependence.

Several of the studies reported on the barriers to realising this and both the academic and personal impact they could have on students. Baldwin, Bedell and Johnson's (1997) research into the networking effects on MBA students was distinctive in the literature because it took a quantitative approach to the impact of student relationships on individual and group success in a programme. Their study identified several outcomes regarding the impact adversarial relationships can have in groups: satisfaction with teams, the programme and student enjoyment. While at an individual level these were a negative factor in students' experiences, their impact was positively associated with team performance. This appeared to confirm the conceptual design of crafting interdependence by encouraging dissent, as tool of understanding (Bruffee, 1995). It seems dissent frequently moved from the debating of ideas to conflict (Snyder, 2010; Rafferty, 2012) where it impacted group dynamics (Baldwin, Bedell and Johnson, 1997), became a hindrance to learning (Chalmers and Keown, 2006; Gabriel and Griffiths, 2008) and had emotional impacts on students (Gabriel and Griffiths, 2008; Tombaugh and Mayfield, 2014).

2.5.3.7.5 Communication

The impact of positive communication on individual and group outcomes was underlined in two pieces of differing research (Baldwin, Bedell and Johnson, 1997; Gabriel and Griffiths, 2008). While both populations in the studies were from MBA programmes, one was culturally heterogeneous and the other assumed to be culturally homogenous, notwithstanding the failure to report student demographics because it was based in a mid-west American university. Good communication was strongly associated with both team effectiveness and grades while, at an individual level, its importance was associated with learning, grades and enjoyment of the programme.

Opinion from reviews of the other literature was that communication was a skill which should be developed and where courses had been redesigned to encourage cross-discipline communication students reported positive effects

(Hersam, Luna and Light, 2004; Sathe, 2009; Murray-Harvey, Pourshafie and Reyes, 2013). The multidisciplinary aspects of many working environments emphasised the requirement for students to develop communication skills, especially oral ones, to present successfully, explain and sometimes defend points to others (Hersam, Luna and Light, 2004; O'Connor and Ferreri, 2013). Students reported how having the confidence to use these skills in the workplace gave their employers a positive view of their abilities (Sathe, 2009).

2.5.3.7.6 Group cohesion

The concept of group cohesion being related to the interpersonal links which bind a group together was presented from reviews and research in the literature (Kayes, Kayes and Kolb, 2005; de Hei *et al.*, 2016a). Involving emotions, social relations and unity, it strengthened group members' desire to help one another and contribute equally to the task (Janssen *et al.*, 2010; Stepney *et al.*, 2011; Rafferty, 2013; de Hei *et al.*, 2016a). The development of trust and openness in a safe environment were the necessary ingredients endorsed in students' views of effective group experiences (Tombaugh and Mayfield, 2014) and a personal quality of project team members (Jewels and Ford, 2006). Others considered that the recognition of differing opinions, but not conflict, supported group cohesion (Snyder, 2010; Tombaugh and Mayfield, 2014).

Different perspectives were offered on the effectiveness of social activities to help in this area. Accounting students were reported as finding community building activities, designed to increase cohesion, at the outset of a programme to be positive (Sathe, 2009) while the research on international learning groups found non-native speakers were uncomfortable at social events and withdrew from them (Gabriel and Griffiths, 2008). These effects indicated the difficulties in determining standard approaches to aspects of group working because the accounting student cohort included 35 per cent of students from a non-USA origin with only two students speaking the same language but with different dialects. Alternatively, the timing of the activities in a programme might have been the main factor in their efficacy.

2.5.3.7.7 Conflict

In thinking about why conflict occurs, the facets were consistent throughout the literature and often interrelated. The increased workload of some students who assumed the responsibilities of others led to opinions of free riding or unwillingness to contribute about such individuals. The impact of this was anger directed towards a particular student and disharmony in the group. Dealing with members who were obstructive or domineering, displaying extremely assertive or aggressive behaviour, increased stress among group members and a mechanism for coping with poor group dynamics was to withdraw from contributing, although this then attracted comments and hostility from fellow students (Gabriel and Griffiths, 2008; Stepney *et al.,* 2011; Rafferty, 2013).

Negating the effects of conflict is based on the acceptance of its inevitability (Stevens-Long and Trujillo, 1995) and the development of skills to manage it effectively (Snyder, 2010; Tombaugh and Mayfield, 2014). Approaches were divided between those who viewed training on emotional intelligence to develop techniques which would aid emotional maturity in a group environment (Johnson and Johnson, 2009; Snyder, 2010) or training in conflict resolution (Murray-Harvey, Pourshafie and Reyes, 2013; Tombaugh and Mayfield, 2014). A drawback of these was the instructor's experience, willingness and time to deliver training but students supported its implementation (Murray-Harvey, Pourshafie and Reyes, 2013; Tombaugh and Mayfield, 2014).

2.5.3.8 Group training

This feature was viewed in the literature as the preparation a group receives prior to taking up an activity and was concerned with the reasoning for its use, the methods used and the content delivered.

Training was considered a part of one of Johnson and Johnson's (2009) basic elements for cooperative learning: interpersonal and group skills. Their argument was that successful group working required not only task skills but the necessary interpersonal and group skills for high quality cooperation, their view being that as teachers would expect to teach one they should also teach the other. Group working has emerged as a pedagogical approach in higher education due to the

requirement of employers for these skill sets (e.g. Greenan, Humphreys and McIlveen, 1997; McGraw and Tidwell, 2001). The progression of this argument to universities having responsibility to ensure a duty of care in equipping students with the tools to deal with group work was made by McGraw and Tidwell (2001). This is a consideration in an increasingly litigious environment (Adjudicator for Higher Education, 2013) where group working was seen as having many negative aspects (Snyder, 2010).

Various papers reported the basis for training was to stimulate an understanding of the requirements and process of group work (Greenan, Humphreys and McIlveen, 1997; Warhuus *et al*., 2015; Santos, Passos and Uitdewilligen, 2016). Some considered requirements in specific cultures (Elliott and Reynolds, 2012) or educational discipline (McGraw and Tidwell, 2001).

Generally the aspects included in any training about working in groups were consistently presented: team development, communication, conflict resolution, knowing and trusting group members, (Drake, Goldsmith and Strachan, 2006; Johnson and Johnson, 2009; Snyder, 2010). However, perspectives on the duration and form included participative workshops, formal lectures and team advice from peers (Greenan, Humphreys and McIlveen, 1997; McGraw and Tidwell, 2001; Tombaugh and Mayfield, 2014).

In those papers involving the use of group training, the student experience was commonly positive (Hersam, Luna and Light, 2004; Warhuus *et al*., 2015) though a positive correlation between group training and positive experiences was difficult to ascertain among the range of variables which impacted students. One study undertaking research investigating this as a sole variable revealed improvements in a range of skill developments and positive responses on attitudes to group work (Greenan, Humphreys and McIlveen, 1997). Training was also indicated as a factor in providing a foundation on which students reported improvements in their reflective skills (Johnson and Johnson, 2009; Tombaugh and Mayfield, 2014), considered important for continuing professional development (Drake, Goldsmith and Strachan, 2006).

Where conflict occurred and students were unable to resolve issues, their expectation was for instructors, or other staff members, to support a resolution, which required appropriately trained staff. In practice, delivery of instructor training and inclusion of training for students, at either a module or programme level, will increase demands on faculty but at the possible cost of a failure to deliver a positive experience.

2.5.3.9 Group facilitation

This theme covers a broad range of measures and conditions but within the context of this review relates to the skills of an individual in supporting a group or groups with their discussions while maintaining a neutral position.

Facilitation was viewed as necessary, although the level and degree was determined by different situations (Drake, Goldsmith and Strachan, 2006; Rafferty, 2013). Whatever choice was made, the aim was to support students sufficiently to improve learning and develop the key interpersonal skills associated with working with others (Johnson and Johnson, 2009). Implementation of approaches in which groups were not facilitated resulted in some degree of student dissatisfaction where their learning process was insufficiently developed to work without the aid of a guide (Yeadon-Lee and Worsdale, 2012; Moore and Hampton, 2014). The conceptual goal was to achieve student-to-student facilitation (Johnson and Johnson, 2009).

While students were reluctant to take action against other students they did expect instructors to be available to resolve intragroup problems (Underwood, 2003). Instructors should not be reluctant to involve students in discussions on how negative behaviours should be addressed (Brown and McIlroy, 2011; Elliott and Reynolds, 2012), particularly in the inevitability of conflict (Drake, Goldsmith and Strachan, 2006; Tombaugh and Mayfield, 2014).

Instructor-student facilitation was the dominant student experience but other facilitators should not be ignored. In Rafferty's (2013) group working model the facilitator-oriented factors included anyone who might contribute to a student's experience of group working: administrators, student representatives and

technical support. Advice from peers with similar experience could also act in facilitating student groups (Tombaugh and Mayfield, 2014).

Although not explicitly clarified as to why external skilled facilitators were reported as being used, these were in academic environments where instructors might not have the appropriate level of knowledge or skill for facilitation (Drake, Goldsmith and Strachan, 2006). While this might offer a way to achieve facilitation where instructors are not sufficiently trained, increased costs and availability during activities which might take many weeks must be considered. Similarly, facilitation was viewed as time consuming, involving more work than other approaches and running multiple, simultaneous projects was not recommended (Bovill, 2010).

The evidence from these studies suggested facilitation of groups could have a positive effect on overall group performance and student experience. It was a multifaceted characteristic which could involve instructors, students, non-academic and external staff. The organisation of all or some of these, along with the necessary resources of training, time and funding, required consideration to achieve the best result.

2.5.3.10 Reflection

This theme is reviewed through the lens of its impact on the personal and professional development of learners (Sathe, 2009) and its application to the understanding of group work (Snyder, 2010; de Hei *et al.*, 2016b).

Reflective practice is an important tool in practice-based professional learning. Reflection is a method of assessing one's own thoughts and actions for personal learning and development. It is taught in a variety of disciplines as a learning process, with the aim of enhancing abilities to communicate and make informed, balanced decisions. It is often a requirement of professional bodies for practitioners to prepare reflective portfolios as a component for achieving professional status. Recognising it as a skill which requires development, de Hei *et al.* (2016a) included it in group work design.

Reflective portfolios are often used as methods of assessment in group work where they can be structured for reflection on individual learning, role and

outcomes or for reflections on how a group performed and its work outcomes (Stepney *et al.*, 2011; Murray-Harvey, Pourshafie and Reyes, 2013).

Group work was seen to encourage reflection due to its interactive nature where dialogue, questioning, knowledge and ideas were shared (Murray-Harvey, Pourshafie and Reyes, 2013).

Group reflection was considered to improve awareness of a group's strengths and weaknesses, as well as its progress and setbacks, and allowed members to take action for correction and improvement (Atxurra, Villardón-Gallego and Calvete, 2015). This implies reflection is a continuous process throughout the group activity but this contradicts the majority opinion which was for its use at the completion of an activity (Rafferty, 2012; de Hei *et al.*, 2016a). A weakness of this argument was that group process improvements would only be manifested in subsequent group activities and reflective practitioners argued it should be a continuous process (Bolton, 2010). A discrete point was made regarding maximising perceptions of positive group work outcomes at the end of a group activity where they can be affected by the sometimes disparate nature of group work (Snyder, 2010; Rafferty, 2013; de Hei *et al*., 2016a; Zhang, Hansen and Andersen, 2016).

Evidence is presented not just on individual reflection but also that of peers and instructors (Rafferty, 2012; Zhang, Hansen and Andersen, 2016). The use of peer assessment was a particularly helpful teaching and learning activity for training students to reflect on the quality of their own work and assessment of peers is an important skill for students in their employment (Zhang, Hansen and Andersen, 2016).

Opinions on the incorporation of training for instructors and students in reflection at both individual and group levels were presented (Snyder, 2010; Atxurra, Villardón-Gallego and Calvete, 2015). Disappointingly, as reflection has been argued in these studies to be a necessary skill for learners, instructors have not delivered appropriate levels of support in this area (Atxurra, Villardón-Gallego and Calvete, 2015).

2.5.3.11 Learning outcomes

In assessing students' perceptions of their learning outcomes from involvement in group working, of whatever type, there was significant agreement with the concepts of improved learning and knowledge, problem solving, critical thinking, and communication skills and an enhanced understanding of group working (Dunaway, 2005; Murray-Harvey, Pourshafie and Reyes, 2013; O'Connor and Ferreri, 2013). Where grading was used as a measure of learning, the stated improvements confirmed the perceptions of students in this aspect (Myllymaki, 2012; Zhang, Hansen and Andersen, 2016).

Equally reported was the impact group working had on student motivation, confidence and a variety of social skills which were considered to enrich social interactions (Panitz, 1999b; Morgan, Rodriguez and Rosenberg, 2008; Hanshaw, 2012). Broader characteristics regarding the importance of group working in the working environment, the investigation of tasks rooted in real-world issues and the experience it provided for students prepared them for life beyond university (Verreault, 2005; Long and Shobe, 2010; Rafferty, 2012; Murray-Harvey, Pourshafie and Reyes, 2013).

The demonstration of students' overall experiences from the presented alternative learning methods were ones of enthusiasm and enjoyment. However, these positive points did not account for the incongruity that, when offered a choice, there was a strong preference for individual learning (Brown and McIlroy, 2011).

2.5.3.12 Assessment

The following is an account of the texts considerations of assessment in group work which has been an area of some difficulty for academics and students. Academics have voiced concerns about the issue of plagiarism in group work, while students motivations for being involved were significantly reduced when assessment of work was introduced (Underwood, 2003). When offered a choice of individual or group work nearly 70 percent of students preferred to work independently (Brown and McIlroy, 2011).

Concerns about assessments were based on a series of consistently presented drawbacks: uneven contributions, poor commitment and attitude, reliance on others, poor time management and in multicultural groups the additional difficulties of culture and language (Nordberg, 2008). Several studies used individual and group grading structures to overcome these concerns but followed the generally held opinion that assessment should be devised to support the interactions group work required (de Hei *et al.*, 1999b; Johnson and Johnson, 2009). The assessment of interactions should also be assessed but little of this process was included in the literature beyond individual scoring tools to provide instructors with indications on fellow students' contributions (Rafferty, 2012).

In line with the proposals from government and employers that students have to develop reflective skills to assess their own learning and development needs (Greenan, Humphreys and McIlveen, 1997; Griffiths, 1999), and in line with several of the group working approaches, self and peer assessment was studied in several papers (Exley and Dennick, 2004; Michaelsen, and Sweet, 2008; Johnson and Johnson, 2009). Where integration of self and peer assessment was designed into the course, and students were involved in the setting of criteria, this was reported as producing a sense of ownership which supported a significant enthusiasm for the strategies employed (Hersam, Luna and Light, 2004). In contradiction, students reported feeling uncomfortable with evaluating others, citing a lack of skill in the task and the opinion that it is the lecturer's role (Greenan, Humphreys and McIlveen, 1997). An explanation for the strong response in the affirmative situation might have been due to the norm of peer assessment and scrutiny being accepted among scientists and engineers. The unfamiliarity of undertaking assessment of any sort (Elliott and Reynolds, 2012) and a failure to understand its use as a tool for their own development (Greenan, Humphreys and McIlveen, 1997; Rafferty, 2012), showed a failure to provide feedback on performance in a way that contributed to students' learning (Jackel *et al*., 2017).

2.6 Discussion of the literature and conclusions

2.6.1 Introduction

The review of the literature has established a range of approaches and facets of group working which potentially impact on the learner experience of group working. Eleven major themes were identified: theoretical perspectives of learning, roles and responsibilities of the instructor, methods of group work, allocation to groups, task, group dynamics, training, facilitation, communication, reflection, learning outcomes and assessment. This section considers these and any other aspects of the literature which might impact on the findings.

The time period of the studies is skewed towards the last seven years during which 55 per cent of the studies were undertaken. This increase of research during the period suggests a change to the perceived importance of understanding this pedagogical approach in postgraduate education as only nine per cent of studies were undertaken in the decade between 1990 and 1999. There was no relationship between the geographic boundaries or education discipline of the studies and the range of themes being studied was similarly consistent. .

The literature covered a range of methodologies with qualitative research predominant. The nature of this review lends itself to this kind of investigation because its intention is to provide a deeper understanding of the phenomena under study, focussing on gaining an understanding of underlying reasons for increased individual outcomes.

2.6.2 Theoretical perspectives of learning

A key responsibility cited in the non-participative phase was for instructors to have an understanding of learning theory. Theoretical awareness was reported as a function of their role as designers of group work. Without an appreciation of how students learn the structuring of the design and method of group work along with all the many variables may produce an imperfect foundation resulting in a failure to meet intended learning outcomes and reinforce negative attitudes to group work in learners.

However, the contribution of learning theory to the design or method of group work is not convincingly warranted in much of the literature. Some of the research features, e.g. learners' previous experiences, structuring of the task to promote interaction or complex problem solving, the motivations of learners, can be linked to elements of learning theories but this link is not presented as the reasoning for their inclusion in the design or method of group work. They are similarly present in papers where theoretical perspectives are not mentioned. It is therefore difficult to evidence a relationship between an understanding of learning theory by an instructor and learner experience when it is not reported in studies.

2.6.3 Roles and responsibilities of the instructor

As group work is student-centered and the role of the instructor, once the activity begins, is to facilitate and guide the learners the literature considers them to be an active agent in the process with consequent power to affect learner outcomes and experiences. Therefore the instructor must not only be a knowledge expert on the topic of the group work but a non-technical expert in group and interpersonal skills. The literature's presentation of students' requirement to be instructed in many of the interactive elements of group work, e.g. group norms, cohesion, conflict, etc., necessitates development of instructors to deliver this and be able to analyse group and individual behaviours during activities. This imposes an additional responsibility for instructors in being the architect of their own professional development. Reflection by students on their own development is supporting their analysis of the instruction they receive leading to more critical views of their experiences.

2.6.4 Group work design

A significant finding in all the studies reviewed was the degree to which the design process in conceiving the group work could influence academic and interpersonal outcomes. Even the non-process facets, e.g. participant interdependence, had antecedents in the process characteristics, suggesting that how a course was designed was an influential factor in individual experiences. Positive views of working with others indicated it was the level of preparation and the design of the many aspects of group work that impacted the effectiveness and experience for

students (Verreault, 2007; Myllymaki, 2012). Students concerns of group work, especially the negative impacts they can have, were shown in their expectations of instructors to deliver a structured design for the process including accounting for the multidimensional facets of group work.

From the literature a concern for instructors in redesigning programmes to utilise group work was that while student feedback reflected their enjoyment, evaluations of programmes could include more critical comments (O'Connor and Ferreri, 2013). Improvements to programme grades and learning outcomes were not necessarily related to programme ratings and this might have a negative effect on academic success for the faculty involved (O'Connor and Ferreri, 2013).

On the question of the duration of group activities, which was mentioned in the literature on methods of group work, it was not studied as a variable which might impact the learner experience. A common duration in the studies was one academic term, doubtless due to the traditional structuring of learning, and while other time periods were reported, e.g. induction weeks, workshops, two-week summer courses, how this factor might impact groups was not examined.

2.6.5 Methods of group working

The research literature reported on a range of methods for group working. Each had its benefits and disadvantages but the learner experience did not appear to be predicated on any one particular method, with the consensus view being they provided positive experiences.

The evidence does not illustrate any relationship between the suitability of specific approaches to particular disciplines but does indicate that some methods are more appropriate for mature and experienced learners due to the freedom groups are given in managing the group processes and task achievement. This illustrates a relationship with the ideas of andragogy where experiences are valued in providing learners with openings for thinking about things in diverse ways.

An important theme with a bearing for practice was the adaptation of specific methods by instructors or the application of generic approaches to provide

suitable learning experiences. Overall this suggests a positive consideration to the structuring of group work, though it does not support the generalisability of the research.

2.6.6 Group allocation

Indications in the literature were that instructors employed a systematic approach using variables of gender, academic skill, discipline, language, nationality and culture to provide a degree of balance to groups. The ready accessibility of these criteria for the instructors was possibly related to their frequent use. Information on students' previous experiences of group working was also advocated as a factor in determining the design of group work, how effective a student might be and how the anxiety or emotional levels created by group working might influence the success of a group. Only Team Based Learning stipulated the importance of selecting groups while students were present to eliminate student concerns about the reasons of how and why the groups were formed and to improve ownership by the students.

A strong influence on learners' feelings towards group working was the opportunity to work in homogenous groups, be this by culture, language, knowledge or friendship, though heterogeneous groups were viewed as delivering a better experience. These gave them an opportunity to experience working with unknown people, or with limited knowledge of them as individuals, a more realistic manifestation of group working in the real world. Where students expressed their preferences for being able to self-select their groups the results of a study in this area often contradicted the expected outcomes for self-selected groups (Rienties, Alcott and Jindal-Snape, 2013).

Collectively the research agreed that anything from three to eight learners was acceptable in terms of group size. This large enough for the benefits of diverse opinions to be experienced but was not too large for students to indulge in free riding. No mention of sub-groups was discussed, although a possible explanation for this was that group size negated their requirement.

2.6.7 Group dynamics

With regard to group dynamics the literature presents a comprehensive range of the areas which were considered to be contained in the theme. The studies also reported the importance the dynamics of groups' plays in developing interpersonal skills, one of the goals for the use of group work as a pedagogical tool. Positive experiences and learning were delivered when it was effective but it could have far reaching negative effects when poorly structured and managed. Negative personal experiences could become so intense that they impacted on students learning (Gabriel and Griffiths, 2008).

The literature focuses on how decisions made by instructors in structuring and delivery of training on aspects of group dynamics can minimise the impact of any negative experiences. The development of group structures provided the best opportunity for groups to work effectively and manage issues and the studies effectively presented the positive effects of providing training to students to achieve this. Suggested areas were in how groups develop, creating group structure, norms of behaviour, communication skills and an understanding of dependency on one another (Greenan, Humphreys and McIlveen, 1997; Drake, Goldsmith and Strachan, 2006).

In presenting reasons why students prefer not to be involved in group work the most consistent point raised was the issue of conflict whether this stemmed from personality clashes, differing demands or free-riding etc. (e.g Brown and McIlroy, 2011; Tombaugh and Mayfield, 2014). It was suggested learners should be made aware of the inevitability of conflict as acceptance of its inevitability negated some of its impact (Stevens-Long, and Trujillo, 1995). The uncertainty of conflict emerging was a cause of anxiety in students (Tombaugh and Mayfield, 2014) and as this may stem from earlier negative experiences the importance of understanding learners previous experiences was vital in shaping opportunities to allay this. The studies showed that even postgraduate students were not confident in addressing conflict and turned to instructors with any difficulties signifying a deficiency in conflict resolution skills. While the majority of the studies in areas involving group dynamics were focused on student experiences and

outcomes the behaviour of instructors during this period was viewed as being connected to these experiences. Instructors had to balance the level of their intervention in groups with the opportunities for groups to resolve issues independently of instructor involvement as it was in this way learning developed. However, the common view of students was of insufficient involvement by instructors. This suggested instructors' lack of understanding and training in this supportive role or a failure to ensure students have the necessary skills and confidence to achieve resolution of issues without support.

2.6.8 Group training

While the question of training students on how to work effectively in groups was referred to in some of the approaches on group working, there was insufficient research in the literature to state a strong relationship between it and student outcomes, although it was considered effective when utilised. As students were no longer homogenous in terms of educational background, culture and age the use of training about the processes of group work, including the benefits and difficulties, would appear to be appropriate and clarifies the relevance to learners of group working in employment. Consequently, the improved experiences for students were delivered but at the expense of more demanding roles for their instructors (Greenan, Humphreys and McIlveen, 1997).

In all the studies including training, its use was only at the beginning of a programme or module. This presented difficulties where group working existed throughout a year of study, possibly in different forms, and reinforcement of group process principles was not undertaken. It was also problematic where group working existed but, as only one module involved group assessment, the training was only given in the period preceding the module and not used to facilitate other group processes which might occur during a programme, e.g. learning teams and revision groups.

The impact of previous experiences with negative consequences showed the importance of demonstrating how a group working experience would benefit learners and, more importantly, how they would be supported to achieve in a safe environment. Both the literature and the reported approaches indicated the

importance of features upon which the dynamics of groups, communication, conflict and participant interdependence rested. Instructors should not fail to account for students' individual skills and experiences in preparing them for what to expect in group working and to utilise reflection to consider and evaluate their experience.

2.6.9 Group facilitation

With regard to the appropriateness and frequency of facilitation, its application in the literature fluctuated between those where a skilled facilitator was a necessity if group learning activities were to be successful (Kayes, Kayes and Kolb, 2005; Brown and McIlroy, 2011) and *'may be an issue'* (Yeadon-Lee and Worsdale, 2012, p. 184) depending upon an instructor's decision about whether groups should self-facilitate or not. There was little examination of the impact those trained in group facilitation had on groups, although there was a clear expectation from students that this support would be available when necessary. The disparate presentations of this theme do not agree with students' expectations nor with the foregoing literature about the role of the instructor as being an active agent in all aspects of the group work.

2.6.10 Assessment and reflection

Unsurprisingly, it was reported in the literature that students' motivations for group work were negatively associated with a group grade approach to assessment because of their reliance on others. Learners' reported preference for working independently would not appear to be based on their lack of understanding regarding its benefits but rather on it being seen as easier and a different perspective was apparent when group work did not involve assessments though this was contrary to the requirements of a learning environment.

The structuring of a group assessment should be designed to motivate students to take part by rewarding those who apply themselves to the assignment and act in an appropriately professional manner. This learning experience was intended to support students in experiencing group work in a professional environment. Achievement of this would indicate a multilateral design involving assessment of

individual levels of work, application to the group process and interpersonal skills. Team Based Learning implanted these features in their assessment approach to support motivation of students although it hinged on regular testing of students through the RAP. In contrast to these findings, a research study, utilising Team Based Learning, found students suitably motivated even though it excluded the RAP due to time constraints conducting the tests and the instructor finding alternative ways to assess class participation (Dunaway, 2005).

Some of the literature on assessment required students to deliver appropriate personal reflection, which ensured students undertook this task, although most of the research considered it only as a concluding activity in which students and instructors discussed all the aspects of group learning. This approach failed to understand the impact regular personal reflection might have on students. Since students believed assessment was in the domain of instructors, this supported the idea that students did not understand the application, benefits and relevance of this skill to their own development.

Another possible explanation however was the level and quality of the instructors' application of this dimension. Given the deficiencies reported in this area throughout the studies it was disheartening to recognise the research covered a range of seventeen years for indicating the need for improved development of instructors in this area.

2.6.11 Conclusion

The literature has highlighted the many different variables that influenced the learner experience of group working. Together the studies showed the influence of the instructor on the outcome of the experience for students which can be asserted by how many of the variables involved are structured by the instructor before any participation of the students.

The involvement of group work in postgraduate studies offers many benefits but also some drawbacks. The research in these studies confirms wide-ranging improvements to learners' academic and interpersonal skills although the degree and range are not constant: they vary with the nature of the investigations, the

determinations of the instructor regarding the design, development and implementation of the group work and the learners' involvement in the process.

The range of drawbacks is similarly broad and some difficulties should be expected, e.g. communication, conflict. However, the evidence in the literature presents ways to mitigate these and increase the probability of students having a positive experience.

Successful group working was predicated not only on appropriate design features but also the application by students to the many facets involved. Where these two features interacted well, students expressed positive experiences involving improvements in the benefits group working yields.

2.7 Limitations

While the papers reviewed met the selected quality criteria, many indicated relatively small sample sizes as their own limitation which consequently provided a limitation on the results of this study.

The options available for investigation were significant and most studies focussed on one or two sets of variables and their impact on individual, group or both outcomes. A thorough analysis of all the possible combinations of factors would be very complex.

In the studies reviewed there was a lack of studies reporting the theoretical basis on which the group design was based. This lessened opportunities to consider if this was a variable which impacted on learner outcomes and experiences.

The proportion of papers limiting the impact of their results through a failure to offer control groups or analysis of the measurable outcomes for students, such as grade assessment, was disappointing.

2.8 Conceptual framework

The original aim of this research was to identify which aspects of group work influence the learner experience. The first step was to identify and investigate existing studies in areas relevant to the research. Having undertaken this, it has

been possible to discern a framework of various concepts encountered during the literature review. These are shown diagrammatically in Figure 1 below. The model brings together the variables suggested by the literature, the sequencing and proposed relationships to each other.

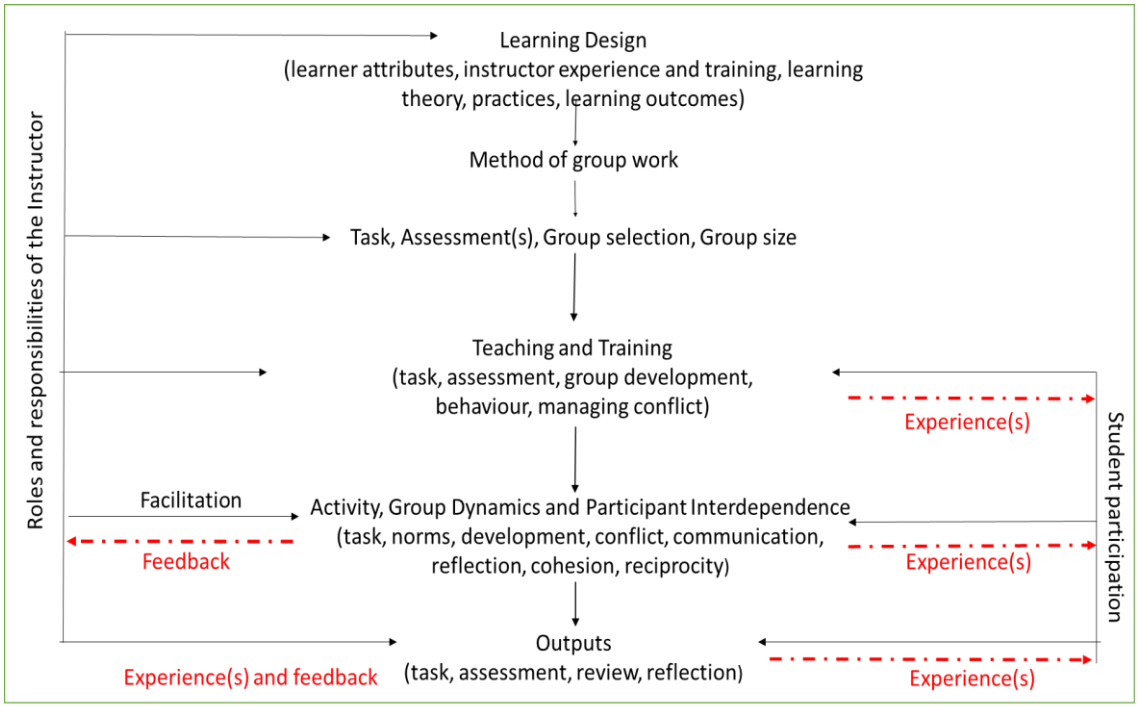

Figure 1: Conceptual framework

The aim of using group work is for students to learn both technical and interpersonal skills and this can only be met if instructors have sufficient knowledge and skill to design and structure group work to realise the necessary interactions for learners to attain these outcomes.

The choice of method for group working should be fashioned from the instructors learning design and take into account the information obtained from the variables in the design. Subsequent to the choice of method are the pre-activity decisions regarding group allocation, task and the form of assessment. Up to this point the instructor has been the sole decision maker.

Teaching and training, by instructors and involving students, on any aspect of the group work was suggested in the literature as the next phase. This was considered to be the minimum requirement necessary to increase the learners in

technical and interpersonal skills as well as the group work process students would be undertaking.

Once the activity begins, the development of the group and its dynamics is the basis of the experiences, particularly the interpersonal ones, which will provide learners with the opportunities to exercise the skills, e.g. communication, participant interdependence, conflict, etc., necessary to make the group work effective and achieve the task.

While in the activity stage facilitation, by both students and instructors, gives the learners support and guidance in the areas mentioned above. In this way instructors are active agents in the process through shaping the learning and development of groups and their dynamics.

Reflection should play an active role in the process for all involved and throughout the whole period of group work. Instructors' involvement is in facilitating the practice of reflection, on both an individual and a group basis, with learners also undertaking personal reflection for their own professional development. Group reflection during and at the end of group work provides opportunities for students to assess the development of the group in relation to their task and functioning. Students likewise need to practice this skill to ascertain their own personal development needs. Reflection also allows opportunities for feedback to instructors for improvements to programmes and materials and it is a necessary skill in the working environment.

In summary the data from the literature shows the degree of impact on outcomes by each variable was inconsistent and there was not always a correlated relationship between the variables and learner experiences. Where positive relationships were reported it was not confirmed by sufficient studies with the same criteria to produce a consistent result that could be applied to the design of future group working. However, to influence learner experiences, these concepts and the underlying activities they represent should be present in any group work undertaken by postgraduate students.

2.9 Research question

While the literature has revealed the importance and impact of each variable, this was from differing standpoints and the relationship to learner experience was not discussed in all aspects. Further research into these aspects from a learner's perspective would inform discussion, allow conclusions to be drawn and influence future practice. Hence the following research question was developed as a result of the literature review:

> *What aspects of group work influence learner experience at Cranfield University?*

3 METHOD

3.1 Introduction

The specific research question for this study was identified in Chapter Two. In this chapter, the methodology, which comprises both the philosophical assumptions and the methods to be used in order to address the research question, is discussed. Diverse philosophical assumptions used in research are set out before the ontological and epistemological positions are specified. The research design is then discussed in which the data collection methods and the analysis process are detailed for the empirical research which addresses the research question.

3.2 Research philosophy

The term research philosophy refers to *'a system of beliefs and assumptions about the development of knowledge*' (Saunders, Lewis and Thornhill, 2009, p. 124). As undertaking research is intended to develop knowledge in a particular field it is important to understand the assumptions a researcher makes about the source, basis and development of knowledge. The researcher needs to be explicit about these assumptions as they inform how the research will be designed and conducted and the findings interpreted (Easterby-Smith, Thorpe and Jackson, 2012).

3.2.1 Ontological and epistemological assumptions

The two philosophical assumptions which underlie the designs of management research are those of ontology and epistemology. They look at and understand the reality of the concept being studied in diverse ways: the nature of social reality and the way in which knowledge of this reality can be obtained (Blaikie, 2007).

There are several varieties of both groups and opinions are divided about definitions and terms. These are often used interchangeably within philosophical domains which can lead to confusion in their meaning and interpretation (Blaikie, 2007; Easterby-Smith, Thorpe and Jackson, 2012). When developing research methodologies different ontological and epistemological assumptions can be

drawn upon (Easterby-Smith, Thorpe and Jackson, 2012) though there is a supposition that they would be reconcilable.

3.2.1.1 Ontological assumptions

Ontology is concerned with assumptions about the nature of reality and our view of what exists (Easterby-Smith, Thorpe and Jackson, 2012). From a researcher's perspective it is the interpretation of what constitutes fact.

Ontologies range along a continuum where the two extremes are concerned with the concept of social entities being considered as either objective or subjective. An objective approach assumes human activity is regarded as observable behaviour taking place in observable, material circumstances (Saunders, Lewis and Thornhill, 2009). The subjective view is concerned with the importance of consciousness as the origin and prerequisite of material phenomena. It assumes that social reality is the product of processes through which human beings together negotiate the meanings of actions and situations (Mallon, 2017). Within philosophical ontological domains, objective approaches are often known as realism and subjective approaches as relativist.

From a conventional position, realists argue that the natural, and indeed the social, world does exist independently from human action and observation (Blaikie, 2007). Relativists advance the position that there is no single reality but many perspectives because of the different views of human beings and the 'truth' of an idea or theory evolves through negotiation between the main characters (Saunders, Lewis and Thornhill, 2009).

The key aim of this research was to understand those factors which influence a learner's experience of group work and discover the individual and shared sense of those experiences. This social phenomenon is created from each learner's perceptions and interactions with other actors in the social world of their group. As the phenomena are closer to a subjective perspective, the ontological assumption for this research study is one of relativism: reality as being socially constructed through multiple and changing situations. It emphasises that humans are different from physical phenomena because they create meanings, which is

the situation in this investigation. Different individuals can experience the world differently and that, at different times and places, an individual can experience group working differently.

3.2.1.2 Epistemological assumptions

Epistemology provides a philosophical grounding for establishing what kinds of knowledge are possible, for deciding how knowledge can be judged as being both adequate and legitimate (Blaikie, 2004) and how this knowledge can be communicated to others (Saunders, Lewis and Thornhill, 2009). The researcher's epistemological position is fundamental to the inquiry because it influences decisions about the method of research.

Epistemologies are similarly presented from two contrasting viewpoints: positivism and social constructionism. These offer different orientations regarding the source of knowledge and the techniques adopted for validating what we know. The positivist assumption is that as the social world exists externally the knowledge obtained is only significant if it is based on objective methods rather than being inferred subjectively (Saunders, Lewis and Thornhill, 2009). Social constructivism challenges this assumption by viewing reality as being determined by people and thus the knowledge obtained from their individual and collective interactions should focus on what they are thinking, feeling and the ways in which they communicate (Saunders, Lewis and Thornhill, 2009).

This study was concerned with accessing participants' perceptions, insights, thoughts and feelings about those aspects of group working which influenced the quality of their experience. These sensitivities and the factors which influence them occurred within the social context of a group work setting and as such learners' experiences were brought about through social exchange. Uncovering knowledge about the phenomenon could only be understood from those who had experienced it. Since this required an examination of the individuals involved, from whom rich data could be collected, to increase general understanding of the situation, the epistemological assumption for this research is one of social constructionism.

3.3 Research design

Both the ontological and epistemological assumptions made in this research require an approach that allows the participants' social and subjective meanings of the factors and process of group working to be exposed in order to discover and give meaning to their experiences. Consequently, a qualitative approach was adopted since the research sought to access students' perceptions, insights, thoughts and feelings on those aspects of group working which influenced the quality of their experience as a learner. This methodology was deemed more suitable because it emphasised words, rather than quantification, in the collection and analysis of data (Bryman and Bell, 2011). It also afforded opportunities to capture the complexities of a situation so that the phenomenon could be studied in greater depth.

Of the many methods associated with qualitative research the use of interviews was thought the most appropriate as they are particularly useful for getting the story behind a participant's experiences. The interviewer can pursue in-depth information around the topic.

A semi-structured interview technique was considered most suitable because this process allowed for flexibility in the structuring of questions and offered opportunities for the interviewer to ask further questions in response to replies thought to be significant. The aim was to develop a rapport with the respondent so the interview became a conversation, with the objective of understanding the respondent's point of view rather than making generalisations about behaviour.

This methodology had drawbacks in that the flexibility of the interview might lessen its reliability and variations in answers to open-ended questions were harder to analyse and compare. However, the varied structure of universities with many schools, disciplines and programmes did not favour a rigid approach.

A structured interview would not provide sufficient flexibility to accommodate the variations while there would be a risk of lack of consistency in an unstructured approach. The use of focus groups was considered but discounted as there was

concern members may not express their honest and personal opinions on their individual experience with other participants present.

Data was collected from one organisation, Cranfield University, selected as the focal organisation on a convenient sample basis.[3] It was believed that the University provided sufficient diversity in disciplines and group work activity to yield sufficient data for the research. Four examples of group working were chosen from across the University in order to achieve maximum variation. The nature of the University's structure meant these four examples were drawn from four modules in different programmes, schools and disciplines. Interviews were conducted with multiple stakeholders from each module. Documentary data was sourced both internally and from external organisations which were relevant to, and supported, the study.

3.3.1 Identification of group work and development of an interview protocol

In order to determine an approach to the research it was necessary to understand current practices but an investigation into existing data identified there was no current collated information for group work. The collation of such information would have supported ideas for the direction of the research and indicated which, if any, of the design characteristics identified from the literature review were important to group work in Cranfield University. This section therefore provides information on the process used to obtain the necessary information and how this has informed the research question.

A starting point was information from the course administration software system, Strategic Information Technology Services (SITS), about the possible population. For the 2015/16 academic year there were 626 modules. Although some of these could be identified as using group work through the assessment method, a field recorded in SITS, the system did not record information on modules where group work was utilised but assessment was at the individual level. It was therefore

[3] Research at Cranfield University was an element of the sponsorship agreement

necessary to identify the most appropriate method to obtain this information on the nature of group work within Cranfield University.

It was determined from information provided by the Centre for Andragogy and Academic Skills (CAAS) that the only effective way to identify how the modules incorporated group work was directly from the Module Leaders. An exploratory investigation was therefore undertaken to support the selection of appropriate samples of group working and development of an interview protocol.

3.4 Exploratory interviews

The exploratory investigation involved semi-structured interviews with selected members of staff. These provided a framework for collection of data while permitting both the interviewer and interviewees flexibility to follow-up on points raised, probe more deeply for details and discuss issues. It offered a way of capturing general concerns and perceptions about group work.

A basic framework of themes ascertained from the literature was prepared and used as a guide for the exploratory interviews: see Appendix C for the themes and associated questions. Identifying candidates for the interviews was supported by advice from the Progress Review Panel. Members of staff considered to be exponents of group work were selected with a minimum participation target of at least one from each school.

A total of ten interviews were completed: see Table 14 for details. While these might not adequately represent the target population, and the information was highly subjective, they were effective in providing a foundation for the full study.

Table 14: Interviews by school, theme and module

Interviewee	School	Theme	Module Involvement
No. 1	Cranfield Defence and Security	Defence and Security	Issues in International Security, Conflict and Development
No. 2	Cranfield Defence and Security	Defence and Security	Defence Economics and Finance
No. 3	School of Aerospace, Transport and Manufacturing	Aerospace	Reliability, Safety Assessment and Certification Aircraft Navigation and Sensors GPS and INS with Sensors and Data Fusion
No. 4	School of Aerospace, Transport and Manufacturing	Aerospace	Reliability, Safety Assessment and Certification
No. 5	School of Aerospace, Transport and Manufacturing	Aerospace	Aircraft Navigation and Sensors GPS and INS with Sensors and Data Fusion
No. 6	School of Aerospace, Transport and Manufacturing	Manufacturing	Business Change Management Project and Programme Management Business Process Analysis and Engineering
No. 7	School of Management	Leadership and Management	Managing people and organisations Organisational Behaviour in an International Context Organisational Behaviour: Developing Leadership
No. 8	School of Management	Leadership and Management	Planning and Resourcing Road Freight Transport
No. 9	School of Water, Energy and Environment	Energy and Power	Risk and Reliability Engineering
No. 10	School of Water, Energy and Environment	Water Sciences	Health, Hygiene and Sanitation

3.4.1 Analysis of the main themes

The taught Masters programmes shared the common structure of a series of taught modules, a group project and individual thesis, although not necessarily presented sequentially. Many of the programmes offered a part-time option but a group activity was not offered in these situations due to the difficulties for students participating in a shared activity when many are not on campus for sufficient periods of time.

A number of themes and sub-themes emerged from the exploratory interviews, *see Table 15 below, which were mentioned consistently by the interviewees,* either prompted by the interview questions or offered from their own experience.

Table 15: Exploratory interviews main themes

Themes	Sub-themes	Sub-themes definition	Illustrative quote
Approach Details of the method(s) adopted by an instructor for delivery of group work	Discipline	The academic aspect of the programme	'*dictated by the module*'
	Relevance	The applicability to a working environment	*'replicates real life'*
Assessment The methods adopted to determine the level of a learner's knowledge	Type	The variety of methods	*'group and individual'*
	Weighting	The level of marks allocated to each type	*'70% individual, 30% group'*
	Learning	The expected outcomes of students undertaking the activity	*'forces students to work out the answers themselves'*
	Peer	An evaluation of a learner by others within their group	*'contribution to the group'*
	Self	Evaluation of one's own learning	*'self-reflection'*

Themes	Sub-themes	Sub-themes definition	Illustrative quote
Conflict Failure to agree	Interpersonal	One to one conflict	*'2/3 per year which are irretrievable'*
	Intragroup	Divisions within a group	*'Yes, in every group to some degree'*
Duration The period of time a group activity runs and the resources needed	Short	Up to one week	*'2 days, usually weekends'*
	Medium	Two to twelve weeks	*'10 weeks'*
	Long	More than twelve weeks	*'October to May'*
	Staff availability	Sufficient staff for the period of instruction and facilitation	*'need enough facilitators to cover the whole period'*
Group Selection The approach to determining how learners are allocated to groups	Tutor	Decisions are made by the tutor	*'tutor selection'*
	Guided	Decisions are influenced by the tutor	*'go through an application process'*
	Random	No controls are applied	*'random selection'*
Group Size Number of learners in each group	Small	5 – 8 learners	*'6-8 in groups'*
	Large	> 12 learners	*'usually 14-15'*
	Resources	Constraints for material resources and teaching staff	*'cohort size impacts the teaching approach'*
Training Delivery of instruction	Student	Training for learners on group work processes and assessment	*'about a week of lectures at the start of the group project period'*
	Staff	Training for instructors on design of group work and facilitating groups	*'annually for about 1.5 hours, mostly procedural'*

Themes	Sub-themes	Sub-themes definition	Illustrative quote
	Best practice	Methods in which practice is shared	*'don't share in school'*

3.5 Main study

The main study reports on the sample selection process and details of the data collection methods as well as the approach to coding and analysing the data.

3.5.1 Sample selection

This section provides information on the selection of the modules chosen to represent the variety of group work in the organisation and the identification of those individuals considered most appropriate for interview within them.

3.5.1.1 Selected modules

In determining criteria for how contributors to the research were chosen, three concerns were addressed: it must be possible to collect appropriate data from them, a specific sampling technique should be used to choose the participants who are appropriate to meeting the research aim and the number required (Saunders, 2012).

Accordingly, a non-probability sampling technique was adopted and a purposive sampling strategy chosen. This enabled the researcher to exercise judgement regarding those aspects of the population which were important to the data required to meet the aims of the research. Purposive sampling offered an illustrative profile that, although not statistically representative, provided satisfactory profiles for study (Saunders, 2012).

The selection of the modules was based upon consideration of which themes, from the exploratory interview analysis, could be identified in existing data. Any module included in the exploratory interviews was excluded from selection to ensure staff responses were not influenced by their involvement in the exploratory interviews (Yin, 2009). A heterogeneous mix of the five factors: school, credit value, assessment type, assessment percentage and duration of activity, was chosen to provide as much variation as possible.

As academic disciplines were organised through schools, as well as the organisation, policy and governance of the programmes, it was determined that each of the modules would represent a different school.

The number of credits allocated to the sub-units, within the range from five to forty, was another factor in determining the selection. This feature impacted the priority a student might apply to their overall view of the module in relation to course grades.

Four assessment types used in modules could be categorised as using group work: group course work, group presentation, group practical and group projects. A module might have more than one assessment type but at least one of each type was considered necessary for the sample selection.

Assessment percentage reflected the proportion of the marks allocated to each element of the assessment. A range of percentages was included since modules involving group work involved more than one assessment type.

The duration of a group working module was a feature for inclusion in the selection process because this ranged from as little as three days to nearly eight months. The selection was based on four periods to cover the range.

The benefit of this selection was to provide contrasts within the sample. The final sample selection for each module is shown below in Table 16.

Table 16: Module selection

Module	School	Credits	Assessment Type	Assessment %	Duration
1	Defence Studies	5	Group Practical Group Presentation	75 25	5 days
2	Aerospace, Transport and Manufacturing	60	Group Project Group Course Work Individual Presentation	90 5 5	6 months
3	Management	10	Group Presentation Reflective Portfolio	50 50	5 days
4	Water, Energy and Environment	40	Group Project Individual Coursework	80 20	11 weeks

3.5.1.2 Interviewees

Interviews with appropriate staff and students were planned from the four modules to provide multiple perspectives of group working. Staff interviewees were selected on the basis of their knowledge or decision-making relevance to the module. Student interviewees were selected randomly, with five from each module determined to be an appropriate number. The profile for the interviews is shown in Table 17 below.

Table 17: Interview profile

Interviewee	Module 1	Module 2	Module 3	Module 4	Total
Programme Director	1	1*	1*	1*	5
Module Leader	1				
Student and Academic Support	1	1	1	1	4
Staff	3	2	2	2	9
Students (% of students on the module) **	5 (45%)	5 (11%)	5 (24%)	5 (50%)	20 (23%)
Total	**8**	**7**	**7**	**7**	**29**

* The roles of Programme Director and Module Leader are performed by the same person.
** One student interviewed also acted as a Student Representative.

The total of twenty-nine interviews exceeded the minimum non-probability sample size reported by Saunders (2012) for collecting qualitative data using interviews. It might be suggested that as the interviewees represented different aspects of the module, those who supplied and those who received, the sample size should have been reviewed separately for the purposes of determining whether it was appropriate. In this respect the student numbers were still within the ranges as discussed by Saunders (2012) and while the number of staff was below the minimum size, this was primarily due to the roles of Programme Director and Module Leader being performed by the same person. It was believed that conducting twenty student interviews would provide sufficient data to meet the saturation point at which all the relevant themes, which were present in the relevant population, had emerged in the interviews and sampling of more data would not lead to more information (Galvin, 2015). According to Galvin's (2015) research the saturation point for this population was five interviews.

3.5.2 Data collection and analysis

Following the selection of appropriate modules, data was collected, coded and analysed. This section explains the process and the criteria used to complete this element of the research.

3.5.2.1 Interview protocol

The interview questions, developed to provide answers to the research question, were established using information from different sources, the systematic review of the literature, topics which emerged from the exploratory interviews with selected staff and those deemed relevant by the researcher to support the investigation. Three different sets of interview questions were developed which were appropriate to the role of the interviewees, i.e. Programme Director, Module Leader or student. See Appendix D for details of these three protocols including annotations to explain the sources of the questions.

An initial set of six interviews, with three students and three Module Leaders, was completed as a pilot study for the protocols to ensure they could be utilised effectively to support the study, that the information obtained would be relevant to the research question and that an interview could be completed within one hour. The appropriate set of interview questions was tested with each interviewee. Unfortunately, it was not possible to conduct an interview with a Programme Director during the pilot.

Piloting the protocols also provided additional experience of interviewing for the researcher. The outcome of the pilot was satisfactory. The interviews yielded an adequate range of responses and these could be interpreted in terms of the information required for the research. An hour was sufficient for all the questions to be asked and for the interviewee to respond. No changes were made to the protocol.

3.5.2.2 Data collection

Requests were sent to the Programme Directors and Module Leaders of the four selected modules upon the completion of the pilot study seeking their support for the research: see Appendix E. Three of the modules responded positively and one declined. A replacement module was then identified which matched as closely as possible the criteria for the original selection and the subsequent invitation to participate was accepted.

Appointments were made for interviews with each of the Programme Directors and Module Leaders and a protocol agreed for contacting students to request their support. This involved a personal appearance by the researcher at a module lecture, arranging a group meeting, posting messages on the University virtual learning environment and using group e-mail: see Appendix F. Students were requested to contact the researcher via e-mail and mutually agreed appointments were arranged for the interviews. Convenience sampling was the method of student selection since they were chosen only after their offer to volunteer and their availability had been confirmed. This might have influenced the results of the research since their offer to support the research might have been because they had strong feelings or opinions about group working which they wished to express and they were not representative of the population.

Semi-structured interviews of up to an hour duration were completed with each interviewee, either face-to-face or via the telephone. Face-to-face interviews were conducted in a private room organised by the researcher. Where interviews were undertaken by telephone the researcher ensured she was in a private location and the interviewee was advised to do the same before commencing interview. However, it was not possible to confirm that this had been done.

Each interviewee was appraised at the start of the meeting on the background of the research, the interview approach, confidentiality, ethical approval, consent, and recording methods. Points regarding the onward use of the data were also described: see Appendix G. Written consent of the participants was obtained and recorded. They were advised of their right to withdraw from the research at any time and were given a copy of the consent form which included information on the process to follow if they wished to withdraw.

Basic demographic data for each interviewee was collected at the beginning of the interview and at the close the researcher thanked them for giving up their time to participate in the interview. Every interview was recorded and written notes were also taken by the researcher. Details of each recording were documented before being uploaded to a professional verbatim transcription service provider.

3.5.2.3 Documentary data

In addition to the interview data a range of other data was collated from internal and external sources, some of which was in the public domain, see Table 18.

Table 18: Sources and type of documentary data

Connection	Source	Documentary Data
External	Cranfield University Web Site	Mission and Aims About Cranfield University
External	Cranfield University	Course Prospectuses
External	Higher Education Academy	Postgraduate Taught Experience Survey Postgraduate Research Experience Survey
External	The Quality Assurance Agency for Higher Education	Institutional Audit
Internal	Cranfield University Intranet	Senate Guide: Assessment of Taught Course Module Specification Course Handbook Centre for Andragogy and Academic Skills Cranfield Student Association Student Charter
Internal	Student Academic Support	Module Feedback Programme Demographic Data

These sought to explain the role of group working within the organisation and, where possible, how this was understood by external organisations.

Data was expected to corroborate and augment information from other sources, provide contextualisation, possibly uncover additional meaning or identify causal effects through illuminating processes, structures or behaviours.

3.5.2.4 Strategy for coding and analysis

Template analysis was used as the approach for coding and analysis of the data (King, 2012). This style of thematic analysis provided a structured and systematic

approach but was not so prescriptive that it could not be adjusted to the needs of the study. It offered a flexible coding structure with the use of *a priori* themes that corresponded to the key perspectives of the study but which could then be refined or discarded as other themes might develop.

The initial template was generated and went through an iterative process as analysis progressed. It was flexible in style and format, unlike other approaches, and did not insist on a fixed number of levels of hierarchy for coding. It provided incorporation of integrative themes and other lateral links were possible as well as parallel coding of text. This had several advantages for the study because its principles were easily grasped by an inexperienced researcher and it could be more time-efficient than other methods which required more specified procedures and fixed stages.

In accordance with the approach outlined, once the transcribed interviews were uploaded into the software each transcript was coded line by line and a pragmatic approach to determining the most appropriate coding applied. This produced a preliminary coding framework, see Appendix H. The data were constantly analysed for emergent themes as interviews were coded and consideration was given to further iterating the coding model. The final coding structure linked the analysis to the findings from the systematic literature review, see Appendix I. Descriptions were added to the nodes and a full coding log was maintained throughout the process.

In order to allow comparative analysis, attributes were assigned within NVivo Pro 11 to each interview to show the age, gender, module, school, nationality, first language and ethnicity of the interviewee. This allowed comparisons to be made between the different groups and across the modules or *'units of analysis'* and enabled the researcher to identify which elements were common and which, if any, were unique to specific modules. Through cross-module comparisons this approach also allowed specific circumstances to be considered from which the underlying mechanisms could also be explored. This approach might also yield insights and ultimately suggest 'best practice' approaches or potential pitfalls, since the interviewee responses in different units could be used to determine the

success or failure of particular approaches. Full data analysis was undertaken before drawing conclusions to add further rigour.

3.5.2.5 Ethical considerations of the research

Permission for the research was sought, and approval obtained, through an application to Cranfield University's Research Ethics Committee.

The application required consideration of the sampling strategy which would be used, specifically who would be involved, the process of consent and confidentiality.

3.5.2.6 Elimination of bias

While it was difficult to eliminate all sources of bias in the conduct of the research, being aware of the following common pitfalls in the practice of research was desirable. A number of steps were taken to eliminate or reduce any potential bias as part of the study.

To counteract any bias which might occur due to preconceived thinking on behalf of the researcher a structured approach to the research design was implemented to ensure objectivity in the process. The actions were documented and detailed records kept for each stage of the process. Regular contact was maintained with the researcher's supervisor to provide clarification or guidance where necessary. Regular meetings were held with the supervisory panel in order that activities could be validated externally and approved, or adapted.

Where possible, factual data was verified from other sources, e.g. websites, university prospectuses, staff interviews.

All the interviews were professionally transcribed and entered into a qualitative data analysis software package, NVivo Pro 11, for coding and analysis of the data.

4 FINDINGS

This section provides descriptive data from the interviews completed as part of the main study and supported by documentary data, explains the development of the coding model and reports the detailed findings.

4.1 Cranfield University

Cranfield University is the UK's only exclusive postgraduate university. Its mission is to create leaders in technology and management and by utilising its expertise in these areas and how they work together to benefit the world. Its education portfolio is renowned for its relevance to business and industry (Cranfield University, 2017a).

One of the UK's top five commercial research led universities 81per cent of its research was classified as world-leading or internationally excellent in the most recent Research Excellence Framework (Cranfield University, 2017b). The strength of the School of Management (SoM) was recognised by it being one of the few business schools to hold the triple accreditation of the Association to Advance Collegiate Schools of Business, European Quality Improvement System and the Association of MBAs. Many of the programmes were accredited by professional bodies or research councils.

In the 2014/15 academic year, 55 per cent of its 4,600 students were from outside the UK and this mixture of international students offered opportunities for all of them to obtain different perspectives and an understanding of the global world in which they will work.

A range of eight academic disciplines were delivered through a structure of four schools: Aerospace, Transport and Manufacturing; Defence and Security; Management; and Water, Energy and Environment, on two campuses. Their aim was to be recognised for outstanding transformational research that met the needs of business, government and wider society and to provide a premier learning experience for students.

Cranfield University believed the use of collaborative learning, including working with other professionals, networking with students from different backgrounds and incorporating a real-world application of its education and research fitted with its concepts of a premier learning experience. Accordingly, research was undertaken to identify whether any of the organisational policies, procedures and practices it adopted or promoted were relevant to group working.

The learner experience was reported by interviewees as requiring mutual commitments from students and staff and it was through working together that a premier learning experience could be created. To achieve this the University worked in tandem with the Cranfield Students Association to provide guidelines, through a Student Charter, on the responsibilities of all the participants. These were categorised by community, university and academic life. The opportunity for feedback on students' experiences was specific to university life and one method for this was the Student Experience Committee. One of the main principles was to support planning and development of services relating to the experience of students and to utilise the outputs from pan-university student satisfaction surveys. No references to learner experiences of group working were reported from recent discussions by the Committee.

Delivery of a premier teaching experience was the responsibility of the University and it was supported through the Education Committee. One of its aims was to enhance the quality of the University's learning and teaching and this could impact the experience of group working by students in several ways. A review of the Education Committee's minutes, and those of the Wider Education Committee, for 2016 found discussions and actions for elements of educational delivery in this respect, e.g. changes in assessment and student language skill requirements, but none with specific references to group working. There were no existing policies or strategies specifically relating to group work since it was considered to be decision for individual Programme Directors. Although the nature and approach of group working was determined at a course level, a group project was included among most, but not all, of the taught courses. The

application of this varied across disciplines and in the approaches taken to group work.

Ensuring the quality of teaching was approached through different aspects. Each programme was required to undertake an Annual Reflective Review. This considered the previous academic year, changes which had been implemented in the current academic year and looked forward to the next academic year. Its aim was to report on any changes within the programme, consider its strengths and weaknesses and to identify any future alterations which would enhance the programme. These records were reviewed for the programmes included in the research and any details relevant to the research modules were reported in the appropriate findings section.

Informing and enhancing teaching and learning was supported through the dissemination of good practice. In briefing the Quality Assurance Agency for Higher Education (2010) for an institutional audit Cranfield's own assessment of its procedures for this was identified as being underdeveloped although no information on how this related to group working was available.

Development of teaching and academic staff was supported through CAAS. They provided educational support activities to promote best practice in teaching such as the Academic Conference, transformed into Education Insights in 2015, delivery of the Postgraduate Certificate in Academic Practice and support for accreditation by the Higher Education Academy. The Academic Conference was a one-day event to which staff and relevant people from other universities and organisations were invited to stimulate debate on pedagogical approaches and support engagement in communities of practice. Areas where conference presentations or discussions directly related to group activities or the literature have been shown to impact learner experiences in group work can be seen in Table 19.

Table 19: Academic conference presentations

Year	Group Working Related	Generic Application
2010	Supporting students working in teams	
2011		What industry wants? Encouraging drive and enthusiasm Developing emotional intelligence
2012	Group project integration into MSc course structure	Assessment and feedback contribution to maintaining high levels of student satisfaction Using assessment to enhance postgraduate student learning
2013		Providing feedback Working with student diversity

Research into the CAAS webinar archive found previous presentations relating to some aspects of group work, problem based learning and the use of shared group portfolios. Academic development workshops were also provided to support lecturers with a range of skills and knowledge, some of which related to group working.

Students were also supported via English language pre-sessional programmes and an online e-learning skills resource has recently been added which was available to staff and students. This resource included training in areas such as project management, team working and communication.

The availability of learning and development resources did not ensure their adoption. The use and application of the skills offered by these development opportunities was dependent on the motivations of the individuals.

Another feature of collaboration which benefited students' experiences was the delivery of real-world experience. The University promoted its strong links to

business and connections with global employers through its website and prospectuses: see Figure 2 below.

Postgraduate Prospectus 2017 – 2018

Figure 2: Organisations associated with Cranfield University

Many of the programmes were directed by an Industry Advisory Panel, as advised in the programme prospectuses, which *'makes sure that the course content equips you with the skills and knowledge required by leading employers.'*

Taken together these findings suggested that the University supported its responsibilities regarding the elements it considered led to collaborative working in delivery of a premier learner experience. However, these elements were relevant to many aspects of the learner experience and not specifically aimed at group working.

4.2 Modules

This section includes information about the role of group working within the programme each module is based and details of the modules, including those

aspects which affect students' experiences. This was obtained from face-to-face interviews with Programme Directors, Module Leaders and Student Academic Support leads as well as documentation sourced from the University.

4.2.1 Module 1

This was a compulsory module in a defence and security school programme. The aim was to provide students with detailed knowledge and understanding of weapons and weapons systems. Graduates from this course should be able to fulfil roles in defence analysis, intelligence research establishments or education and be able to work individually or as part of a team. The programme has been running for over sixty years and has been accredited by a professional body. At the time of this study re-accreditation was being sought with a different engineering professional body.

Reference to group working was only mentioned within the assessment type of the Course Specification and Module Descriptor. Additionally, some group activities were referred to in how the Individual Learning Outcomes (ILO) would be assessed although there were no specific ILOs regarding working in a group. This module was the only one in the programme that involved assessed group work but group discussions and some group activities took place in other modules. Aspects of this group working module were introduced by lecturers earlier in the programme to prepare students for it.

The module was designed to provide the students with an understanding of the multi-disciplinary nature of weapons design and the ability to perform complex trade-off studies according to a fixed set of customer requirements. Factors in the inclusion of group work in the programme were opportunities for learners to experience real-world practice and delivery of a mix of pedagogical approaches. It was completed towards the end of the programme because one of its aims was to bring together learning and theory from earlier modules in a practical exercise. The modular nature of Masters programmes was thought to inhibit students' capacity to connect separate disciplines and it was this educational message the module was aiming to correct. It would not be possible to achieve this without the use of group working.

The task was computer based. It was to analyse a weapon system and modify its characteristics to meet a given set of design objectives. It was conceived to be as realistic as possible for any of the multidisciplinary team working environments students might find themselves in after graduation. The Programme Director saw an aim of the module as strengthening team working for this type of activity, '*a new way of working students will not have experienced before.*' The scenario provided was balanced to challenge the students but also make it achievable. The module was reviewed each year.

Assessment was through the delivery of a fifteen-minute group presentation representing 25 per cent of the grade. All students were required to be involved in their presentation. A group report, representing 75 per cent of the grade, completed the assessment. Each student was required to identify those elements of their work that appeared in the group report. A group grade was given to students for both the presentation and the report. The Programme Director reported assessment was problematic with learners being given the same grade due to the difficulties in assessing individual contributions.

The module lasted one week during which no other lectures were delivered but students might have had other study requirements to complete. The assessment presentation was usually delivered on the first day after completion of the group activity although, at the request of this study cohort, it was brought forward to the last day of the activity. Students were given an additional week to complete the written element of the assignment.

There are eleven students registered on the current programme, all male. The maximum number is sixteen due to restrictions on availability of resources, group sizes and task feasibility. The mean age is thirty-two years and four students are British with the remaining seven from Australia, Canada, Chile, India, Singapore and The Netherlands.

Students were generally able to self-select their own groups but with some direction from the lecturer to balance their abilities and make sure each group had sufficient skill sets to accomplish the task. In this cohort there were two groups of four and one of three. Selection was similarly reported by the

Programme Director as problematical due to personality conflicts and individuals abilities to work together.

The activity was designed to include five hours of contact time which were delivered during the first day. They included an introduction to the problem and the software students would need to be familiar with. The module was supported by three members of staff who were available to facilitate each group by giving advice and guidance for three to four hours every day of the activity.

No training on how the groups should function was provided. This was felt to be inappropriate because of the mean age of the cohort and their predominantly military experience, where group working was a normal part of working life. The view of the Programme Director and Module Leader was that training would not have been beneficial and might have had a negative impact. However, this did not always appear to be evidenced as reported by the Module Leader, '*It doesn't often show.'* Students were considered good at organising themselves and dividing up the work between them with rare instances of free riding or interpersonal issues. A factor in this was the intense period of the group activity requiring students to focus on completing the task and, as a small cohort, any personality issues might have already been resolved earlier in the programme.

The Module Leader reported that he had not received any training on designing, implementing or facilitating group work and relied upon personal experience and guidance from other members of staff.

A constraint for delivering this module was the availability of the necessary software in one location. This created problems for students which were being addressed. Students have requested an expansion of group working within the programme but it has not happened due to constraints in resources for delivery.

The main challenge was in influencing students to look towards a systematic and more thoughtful approach to the problem. The Module Leader described how recent students have adopted a haphazard approach: '*just throw things into the software and think, "Oh that seems to work" rather than applying some systematic logic to it.*' Since this eventually produced an answer that met the assessment

criteria, further exploration was not pursued. Restructuring the assessment to overcome this issue had been considered but no viable alternative option was identified. Two other aspects which consistently appear as challenges to the students were their understanding of the data produced by the software and their interpretation of the results. Each year there was one group that struggled to get to grips with things.

Instructor feedback pointed towards the module being intense but enjoyable and he believed the module achieved its aim of giving students an appreciation of the interdependency required in the discipline and preparing them for working life. Unfortunately, no follow-up with the students after they had left the course was carried out to establish whether this opinion was correct.

The Student Academic Support lead reported very little involvement or contact with students on this module and reported only one or two feedback surveys were completed. No written feedback for the cohort was collated from students but the Module Leader testified: *'In the conversations that I had with the students they generally found the module interesting and useful.'* This was also confirmed by the Programme Director and reported in the Annual Reflective Review report for 2015/16. The Student Representative was very active in providing feedback from the cohort about issues and improvements to the programme. It was noted the sharing of best practice regarding group working was predominantly discussed among other colleagues involved in delivering the programme or possibly with personal contacts on other programmes or in other schools.

4.2.2 Module 2

This was a compulsory module in an aerospace programme which aimed to equip students with the relevant skills necessary for a career in the space industry or in space-related research. The programme has been running, in modified forms, for nearly thirty years and was accredited by a professional body.

The use of group working within this module was clearly articulated to students through the programme website, course specification and module descriptor. Prospective students were encouraged to view previous video presentations to

give them a taste of group projects. The emphasis placed on the presentation of information within this module was reflected by the high proportion of the course marks it represented, 30 per cent. It also ran for the longest time period, from the second teaching week through to April. Students undertook other modules during this period. Although it was the only module on the programme that included group assessment, other modules did have group-based workshops to practise material presented in class.

There had been small changes to the module in the last five to seven years which were prompted by student feedback and the increase in student numbers. One major change prior to this period was the introduction of a more self-driven approach for the students. Students were given guidance but were expected to explore resolutions to technical problems themselves. This was thought to be the way the industry worked and provided opportunities for students to experience uncertainty and how to deal with it in a safe environment. It was reported as being successful because they learned more from this approach, although it was observed as being stressful for them since they were not spoon-fed information. It was often a shock for students to find that academics might not necessarily know the answer to a question.

The programme was oversubscribed and a constraint on expanding student numbers was staff availability to run and manage the group working module which was very time consuming. Pre-programme planning of the assignment must ensure it was both feasible and relevant and once the module started each assignment required an academic supervisor to attend half-day meetings on a weekly basis with their group, when problems were discussed and guidance given. They also had to be available to respond to queries between meetings and undertake associated academic requirements. The Programme Director, who was also the Module Leader, commented *'Marking, it takes up a lot of time.'*

The principal objective was to try and replicate the kind of project-based experience that graduates would encounter in industry or large research projects. Students would become familiar with the technical process, develop team working skills and acquire the problem-solving skills necessary for working in a

project-based environment. These were specified in the module descriptor as well as the process outcomes of personal and group reflection. The assigned tasks were designed to be as realistic as possible and they were proposed or strongly influenced by industry contacts.

The cohort consisted of forty-four students of which thirty-two were in the 22-24 age range and the remaining twelve were in the 25-31 range. The gender split was heavily skewed to males at a ratio of 8:1. The cohort were divided into two groups of fifteen and one of fourteen. A consequence of the group size, and the nature of the task, was the formation of sub-groups of 2-4 students based on work packages.[4] Selection of the groups used a multi-stage recruitment exercise.

A presentation introducing each of the projects was made to the students at the start of the module which included the aims and objectives of the projects available, together with a breakdown of the work packages. They were advised about how the assignment was to be organised, what to expect from it and given an overview of the responsibilities associated with each of the different work packages. Students had the opportunity to ask questions and a week later they had to submit their preferred three combinations of project and work package choices. The module team then tried to allocate individuals to projects in line with these preferences, ensuring all the work packages were covered with a balance of students.

Clarification regarding the balancing of students related to the fact that many of the students came from the same European country, possibly even the same university, and separating language skills ensured opportunities for better integration. However, this was not identified as an issue and students were observed to integrate well. The cohort consisted of fifteen British, fourteen Spanish, nine French and six other students from different countries. Not all students secured their preferences and negotiation was often required to ensure all the work packages were covered. Students were encouraged to resolve issues

[4] Technical discipline

themselves and some did take on additional roles. This was about taking responsibility and recognising that everything has to be completed.

Students were not given any direct instruction on how to work in groups prior to, or during, the activity but were given guidance in the early stages regarding project tasks that needed to be done, e.g. taking minutes. An icebreaker exercise was used as part of their induction period to give students an opportunity to integrate and develop some social cohesion. It was also a chance for the staff to identify which students might be good in particular roles within the group project. The lack of appropriate training was highlighted by the accrediting body several years ago. In response to that a couple of seminars presented by project management specialists were added to the programme, but after the module had been completed. This was not considered ideal.

A preferred approach would be to deliver the initial training at the start followed by in-depth training later, on the basis that the benefit of the discussions and scenarios derives from having actually been through the process. It was not considered practicable, within a one-year course where the group working module takes seven months, to provide all the necessary training and then begin the group project. The process required students to identify gaps in their knowledge and address them as they proceeded. The Programme Director considered it was *'Not ideal, but it still seems to work.'* The experience of participating in a large group project was useful for students because they might already have completed small group projects but not one on such a scale and being more aware about what happens made the post-activity training more informed.

The impact of military training was also touched upon by an ex-military learner from Module 2. He found the group functioning poor but as the sole learner with a military background he sublimated his skills to adapt to the functioning of the rest of the group. Better provision of the necessary skills for the majority might have mitigated the need for this behaviour.

The training was delivered on project management skills after the relevant group activity, which was seen as being too little, too late. The duration of the training

and students' lack of experience applying it to their activity were cited as reasons for this situation.

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Assessment of the task and students' progress within their group was carried out at different points during the year and involved a variety of methods. At the end of each of the teaching periods a peer review questionnaire was completed by the students. They were required to reflect upon their own performance and that of all the other learners in their group. They also had to identify two areas of strength and two areas for improvement. The supervisor of each project went through the feedback obtained from each student and helped them individually try to develop. Indications were of improvements between the two assessments but a negative point was the delay with which feedback was provided, due to its time-consuming nature, the number of students involved and staff availability. The contribution to the project and peer review represented 5 per cent of the total mark.

An individual report on their own work package, worth 90 per cent of the marks, was required but each report also had to have a common collaborative piece about the entire project. Finally, an internal oral presentation assessed at 5 per cent of the total marks was delivered at the end of the project.

Industry Day, held in mid-May, included an unassessed presentation. This was thought beneficial for students' careers because it was given to representatives from industry and the students received feedback from the audience.

While there have occasionally been problems with groups, some fairly serious, the peer review process was felt to act as a spur because students knew their peers would be assessing them and thinking about their contribution. Limiting the group size to fourteen or fifteen was preferable because it afforded opportunities to identify students who were not contributing.

It was reported that some students struggled in the first month or so of the project, especially where a clear leader was not forthcoming in a group, because they did not necessarily appreciate at the time that this was all part of the learning process. This did diminish as they became more accustomed to the process. Students were not advised how to structure their group other than through the technical aspect of the work packages.

Students had opportunities to discuss problems with course representatives, there were three in the cohort, who functioned as an intermediary with academic staff on personal issues. Students approached the Module Leader about academic issues and Student Academic Support for any pastoral issues. The Student Academic Support lead advised they had little input into the module, other than supporting delivery of Industry Day.

A positive aspect of the module was teaching students to understand that it was acceptable to present solutions for problems without having all the facts and that estimating was adequate, provided the assumptions used were clearly stated. A validation of the module came from students at graduation, after six months or more of working in industry, where they commented on the benefits of the module because they saw similar situations arising in their workplace. Student feedback was requested through utilisation of an electronic questionnaire but the response rates were so low as to be negligible.

Industry Day was regarded as the most impressive part of the module's group work where feedback from the audience was very positive about the amount of work completed, the interesting ideas students had and their technical abilities.

The module was reviewed annually and sharing best practice of group working had been done in the past as part of the Annual Reflective Review process. A

difficulty for the process was the lack of time available to identify and consider which aspects might be beneficial to other modules or programmes. Less formal structures for sharing best practice included *'chats over coffee'* which, while beneficial, did not disseminate best practice to a university-wide audience.

Apart from personal experience and the Post Graduate Certificate in Learning, Teaching and Assessment in Higher Education qualification, the Programme Director had not received any training in the design, delivery or facilitation of group work.

4.2.3 Module 3

This module was a compulsory element of a business and management programme recently added to Cranfield University's taught Masters programmes. The school in which it was based was recognised as a member of an elite group of business schools and the programme was accredited by a professional body. The aim of the programme was to equip students with the characteristics, traits and management skills necessary to start and run their own business or to grow a family business.

The utilisation of group work was not referenced in the prospectus although team working, group project work and class exercises were included in both the course specification and the module descriptor. No learning outcomes related to the processes of group work were included in the module descriptor. Within the programme's twelve modules, five included an element of group assessment and two of these represented 100 per cent of the module marks. Group working therefore constituted a major element of the programme.

The determining factor for including group working in a module was its suitability for the subject matter and the balance between group work and individual study within the programme. A concern of the Programme Director, who was also the Module Leader, as to how much group working was in the programme suggested an understanding of the workload associated with group work approaches and the impact that might have on a learner's experience.

The use of Learning Teams, intended to support students' learning and personal development, was unique to this school. Students were allocated to a Learning Team at the start of the academic year based on information provided during the application process. Each team was allocated a member of staff who acted as a tutor and also fulfilled a pastoral role. Students remained in these teams for the entirety of the programme and the same teams were used for any group activity.

A constraint for utilising group work, and for student numbers, was the limited availability of tutors to mentor teams: there were only four. The cohort had twenty-one students with a mean age of 24 years, although ages ranged from 20-42 years. Seventeen students were in the 20-24 range. They were split into one team of six and three teams of five. The Programme Director considered five to be the ideal number. Experience with teams of six has meant the balance in team discussions was not right and the assignment became less manageable.

The aim of this module was to try and engage students with the concepts being taught by the programme and group work was an essential component. There was an expectation that students would engage collaboratively, even when group work was not assessed.

Selection criteria reported to be used were experience, age, nationality and background. The aim was to give each team a reasonable mix and provide them with complementary strengths. Selection in the module under study used only age, gender and nationality. This was administered by the Student Academic Support lead and confirmed by the Programme Director. That was the extent of the Student Academic Support lead's involvement with the module. Learning Teams were employed for all group work in the programme. Consideration was not given to changing the Learning Teams during the year nor using a different approach to select groups.

In both years the programme has been running, one Learning Team produced exceptional performance. Staff have not been able to determine why nor how to achieve a more equal distribution of talent. The selection process was believed to be a better option than utilising aptitude or personality tests.

Icebreaker challenges were employed during the orientation week to introduce students to their Learning Teams and to offer them an opportunity to gain insights into group dynamics. This provided them with an introduction for discussions on the standards of behaviour expected of students. A session was used to deliver the Myers-Briggs Type Indicator questionnaire to help the students understand their own preferences and how they saw themselves and the world around them. It was also used as an introduction to a module which took place in the first term, Managing People and Organisations, that supported students in understanding group working by learning about organisational relationships and the impact they could have upon an individual, the organisation and society. Activities in the module involved students collecting and assessing data about themselves and colleagues in their teams. This was the extent of the training students received for working in groups.

The module was timetabled towards the end of the second term and lasted five days, a change from the first year of the programme when requirements of other lectures interfered with the activity. The Annual Reflective Review, presented for the 2015/16 academic year, conveyed information on this and it was the only change pertinent to group work. The twenty-five hours of contact time comprised lectures which were appropriate to the tasks students performed as part of solving the case problem.

The assignment was to undertake a live case study that included contact with the business person whose business problem they were attempting to solve. Cases were allocated by the Programme Director on the basis of specific qualities within each Learning Team. A briefing was given and there were opportunities to ask questions. Each group reported their progress every day to the whole cohort through a Facebook update. This was an innovation introduced in the second year and was seen as supporting interaction between the groups. A positive point was the openness exhibited at these sessions.

Assessment was through a presentation about the case and the Learning Team's strategies for growth, delivered at the end of the module, and it represented 50 per cent of the marks. This was a group mark although not all of the students had

to have been involved in the presentation. The remaining 50 per cent of the marks was for an individually written reflective essay on the live case study involving a critical assessment of the proposed solution generated by their Learning Team. The essay was submitted three weeks after the activity. Although not assessed, teams provided and received feedback on their proposals from the business person.

The feedback from the eleven students who responded to the end of module questionnaire averaged a score of four on a five-point scale, across eight questions. Their comments, see examples below, indicated positive experiences.

> '*For group assignment, I think it is great thing because we can work with real social enterprise.'*
>
> *'Knowledge of subject was good and the content was relevant.'*

The Programme Director had not received any specific training on designing, implementing or facilitating group working and relied upon previous experience. He was working towards a Postgraduate Certificate for Academic Practice.

Discussions took place between the Learning Team tutors to discuss issues about the programme or students and best practice was shared. However, it was not shared with the wider school or university.

4.2.4 Module 4

This compulsory module was part of an environmental and agrifood programme using computational analytics to address social challenges in the environmental, agrifood and biological areas. The aim was to equip students with the skills required to manage, analyse and interpret large amounts of scientific data. They would be able to design and apply new technology to fulfil the needs of research communities or employers in these domains. The programme was recognised by a research council.

The prospectus clearly identified delivery of a group project as an element of the programme, described as a real-life experience, which constituted 20per cent of the marks. It involved working as part of a team and required the application of

each student's individual expertise, appreciation of the skills of others and experience in recognising and implementing different contributions. The course specification and module descriptor displayed information on the group working element. Individual learning outcomes included two of the process elements of group work, team working and reflective practice.

The timing of the module was chosen to allow students to gain expertise needed to tackle the group task from earlier modules in the programme. Students came from either a programming or biological academic background but the course demanded both skill sets. This meant a steep learning curve in the early modules with students having to undertake significant amounts of self-study. If group working were introduced earlier in the course it could be too much for students already regarded as being out of their comfort zone. The group work was thought to complement the syllabus very well and provided a balance between individual and group assignments. Assessment of individual assignments dealt with defined questions while group tasks were more open-ended to reflect working situations.

A ten-week period was allocated across all the programmes within the school for group projects and no other activities were scheduled for this time. The structure was seen as providing staff with opportunities to assess students and track their progress on both an individual and group work basis.

Students on other programmes attended a lecture outlining how the project would operate, including details on assessment and the Introduction Week, prior to the project period but students on this module followed a different process. The Introduction Week included lectures on elements for successful group projects, including team working and project management.

On the first day of the Group Project Introduction Week, those on this module attended a briefing when they were informed of their groupings and the two projects which would be used for their assessment. The projects presented real-world problems from either a pharmaceutical company or a university research collaborator. The groups were required to spend the rest of that day preparing two presentations, one for each project, outlining how they intended to approach each task. Both groups delivered their proposals and the best presentation

earned that group the choice of which project they would have for their assignment. The selection process itself was not included in any assessment.

Group selection was based on the technical requirements of the projects and grades from individual assignments to provide a balance of skills and academic ability in each group. Gender and age were also criteria. The cohort was split into two groups of five students. The nationality breakdown was skewed with four each of British and Polish, one French and one Taiwanese. Eight of the ten students were in the 23-25 age range.

Although group work was utilised in other modules, where appropriate, this module was the only one where it was assessed. It consisted of multiple parts. The group graded element comprised a presentation, a report and the development of a prototype. Students were required to demonstrate the prototype at the Group Project Exhibition Day. These three elements were weighted at 10 per cent, 30 per cent and 60 per cent respectively of the overall 80 per cent group mark. All the students were required to contribute to the presentation and the subsequent question and answer session.

The remaining 20 per cent of the group mark was divided between a written individual reflective review, weighted at 20 per cent, professionalism during client meetings at 30 per cent and 50 per cent for individual performance at the Exhibition Day. To aid in the reflective review, students were required to consider their current competences and to complete a peer review assessment of their group members at the mid-point of the project. This data was collated and provided to selected members of staff, outside of the current teaching team, and discussed with each student to identify strengths and areas for improvement. The feedback was intended to develop team working skills throughout the remainder of the project, followed by inclusion in the reflection report on how the peer review data had been used to the benefit of the student and their group. This element of the assessment was common to all the school projects but variations existed in other aspects.

Two separate group meetings were held each week with academic staff. One meeting was for discussion of any technical issues and the other was a client

meeting to monitor development of the prototype. The client meetings, attended by an academic team of three people, were intended to replicate similar processes in industry and they supported development of professional skills relevant to students' careers. Presentations, reports and minutes were expected to be produced from these meetings.

Students were not provided with any training on working in groups, either before or within the Introduction Week or during the module. They were instructed about responsibilities for managing their groups including the setting of ground rules, agreeing roles, arranging meetings and being responsible for all the project management aspects of the assignment. The Programme Director, who was also the Module Leader, believed that training to develop these skills was not the best use of the time available and that opinion was endorsed by student feedback: *'not wasting time on that'*. It was not possible to confirm this because feedback from the current cohort had not yet been collected.

A benefit of using group work was its relevance to the modes of working common in industry. It provided students with the professional skills they would require for their career, mixing different skill sets and working in a group to produce a solution to a problem.

Some disadvantages and challenges to providing these benefits were reported by the Programme Director. Students did not like being unable to select their own groups. Problems were seen to develop when stress and tensions within a group led to interpersonal issues. Staff provided advice on technical issues but the responsibility for the running of the group lay with the students and the main learning outcome from these situations was viewed as being how to deal with problems within a group. Students could, and did, approach the Programme Director for support in resolving such problems. The Student Academic Support lead said they had not become involved with the running of the module.

The issue of free riding was also a regular problem. Staff were able to identify those students who were not contributing and had seen situations where three students in a group of five were completing nearly all of the work. In terms of the group mark, this disadvantage could be addressed by changing the module

assessment to a 50:50 ratio but this had not been actioned because the Programme Director did not consider it to be within his authority.

The Programme Director expressed a preference for more specific ILOs for the group work because he thought they were too uniform.

Overall student feedback on the module was reported to be very positive, one of the best in the school, but this is historic since it had not yet been collected for the current cohort.

The programme was reviewed each year because it was a dynamic topic with at least one module going through major changes every year. The course material was updated annually.

A Student Representative was appointed. Their primary role was disseminating information on activities and supporting effective feedback from students to the staff.

The Programme Director had not received any training on designing, implementing or facilitating group working. Prior to taking on the role of Director for the programme he was mentored by the previous Director.

There was no formal process for sharing best practice and when it did happen it was through informal discussions with other colleagues in the team or school. The Programme Director had attended the Annual Academic Conference for the last three years which he sometimes found helpful.

4.2.5 Summary

In summary, group work was employed in programmes where it was considered appropriate either to complement the syllabus, ensured utilisation of different assessment types or offered opportunities to present learning activities which were not possible through other pedagogical approaches. The Programme Directors thought group working enabled students to experience undertaking larger pieces of work, multi-disciplinary working and to learn essential skills in different scenarios.

The most constant view for applying it within a programme was to provide students with an experience which was, or closely resembled, the environment they would be working in after their graduation. Learning outcomes were centred on students demonstrating the ability to determine and achieve objectives, plan, manage, report and communicate on a project. Group working and reflective practice were only included as outcomes for learners in two modules.

Table 20 below summarises the main features across the study's sample.

Table 20: Features in the sample

Feature	Module 1	Module 2	Module 3	Module 4
Students in each cohort	11	44	21	10
Number of groups	3	3	4	2
Students in each group	3 or 4	14 or 15	5 or 6	5
Selection criteria	Self	Programme Director Application	Programme Director	Programme Director
Position of the activity in the programme	Towards the end	At the beginning	End of the 2nd term	In the middle
Activity duration	5 days	6 months	5 days	11 weeks
Concurrent activities	No	Yes	No	No
Task	Scenario	Engineering design	Live case	Research proposal
Training on group processes	None	Post module	Programme module	None
Facilitation meetings	Each day	Once a week	Each day	Twice a week
Assessment types*	GPRES GREP	GPRES ICW PA	GPRES ICW	GPRES ICW GPROJ IPRES

**GPRES: Group Presentation* *GREP: Group Report* *ICW: Individual Course Work*

GPROJ: Group Project *IPRES: Individual Presentation* *PA: Peer Assessment*

The real-world approach then became the basis for other decisions about the design, method and delivery of the group work at the module level. In making the activity simulate the real world, the type and structure of the task dominated many of the other decisions regarding the design of the group work.

Learning theories were not declared by the interviewees as being an inspiration and only the leader of Module 3 implemented a definitive method, a case study, with the others adopting elements of different methods to fit with the real-world approach. Decisions on the selection and size of groups, timing and duration of the activity, functioning of instructor facilitation, etc. similarly followed the decision of a real world approach. While students' skills and levels of learning on the programme were accounted for there was no emphasis on structuring choices to account for different levels of learners' previous experiences or attitudes to group work.

The task in each module was either a real-world problem or an approximation of one, relevant to their discipline. Open-ended problems provided opportunities for free enquiry and encompassed a range of disciplines or skills.

It was necessary for the Programme Directors and Module Leaders to consider restrictions regarding staff numbers and logistical issues in the decision-making process about the inclusion of group work in a programme. It was regarded as time consuming for academic staff and appropriate resources must be available to supervise the chosen number and size of the groups for each module. This was consistent across all the modules investigated and was a constraint to being able to expand student numbers for their programmes.

Logistical issues concerning the availability, quality and suitability of rooms, software programmes and IT equipment as hindrances to effective delivery were discussed with two Programme Directors.

No evidence was presented by any of the interviewees regarding any formal development of their skills for group work. Each instructor relied on discussions with other colleagues, often within the same programme or discipline, to obtain

suggestions for improvements or in overcoming issues. There was no sharing of best practice across disciplines.

Three of the common disadvantages of group working were experienced by all the Programme Directors: team selection, free riding and group assessment.

4.3 Themes

This section is concerned with conveying the findings from student interviews and which facets of group working affected them. They are presented thematically and include details on students' previous experiences, methods of group work adopted by instructors, how students are allocated to groups, the task assigned to their group, the impact of group dynamics, any training they received, students interpretations of the degree of facilitation groups received, the form of assessment and its grading structure, the utilisation of reflection and the influence on their learning. It concludes with a general view of their whole experience and details of any aspects the participants felt could be improved upon for future cohorts.

4.3.1 Prior experience and attitudes

According to experiential theory (Kolb and Fry, 1974) and good teaching practice (Guerriero, 2015), the impact of previous group work experience provides new reference points for learning and experience. It was therefore important for this research to understand learners' previous practices in support of determinants about group work expectations at Cranfield University and whether or not the information on this practice at the University was a determining factor in decisions about attending one of the programmes.

4.3.1.1 Prior experiences

With the exception of two students, all the interviewees had experienced group work in some form, either as an undergraduate or at work: see Figure 3 below for the breakdown of this.

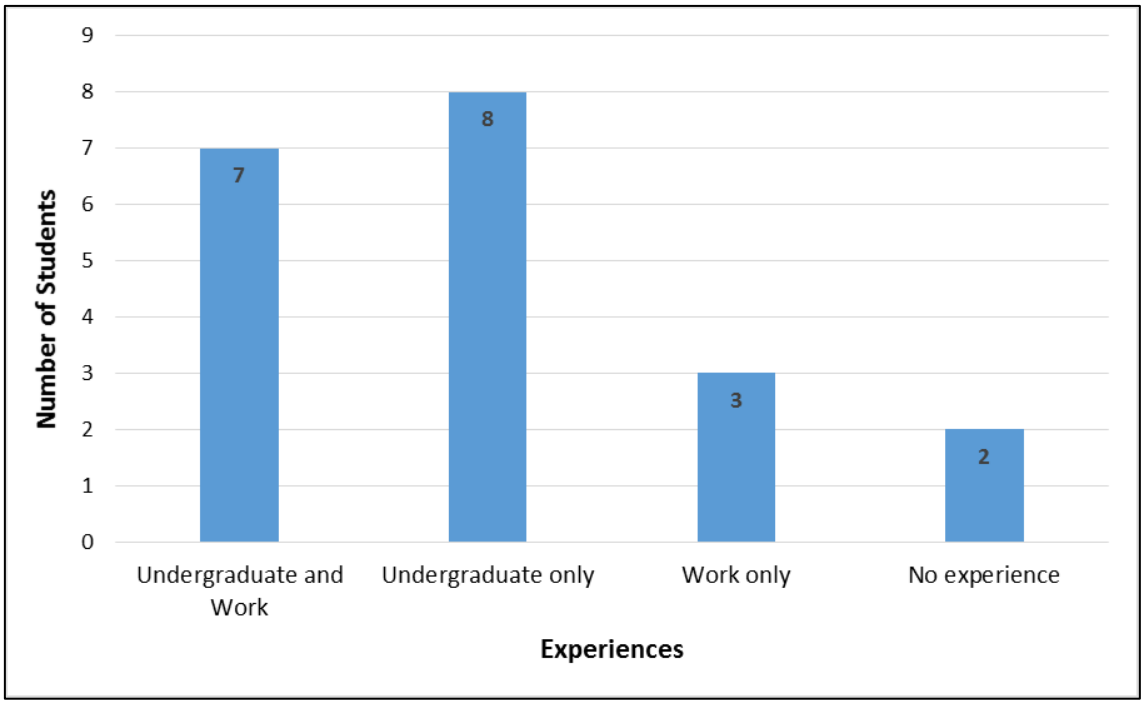
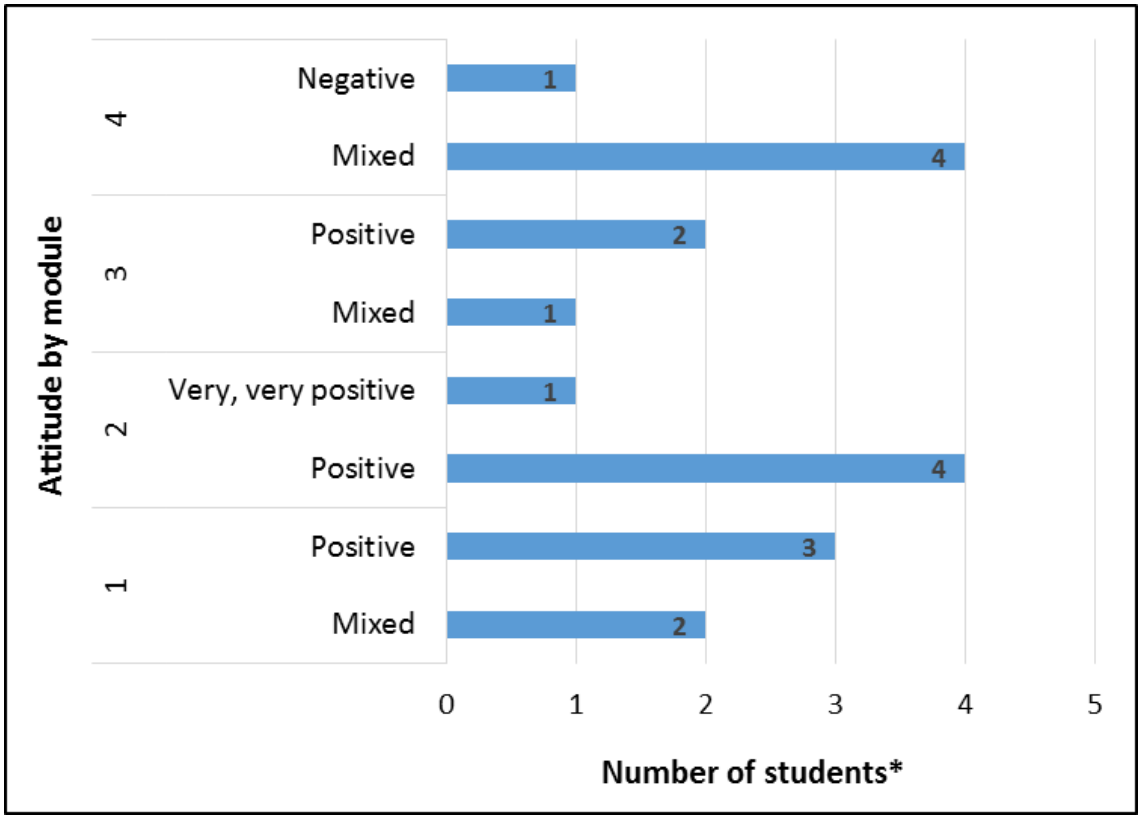


Figure 3: Prior experiences of students

Group working had been utilised as a pedagogical tool in undergraduate studies for three quarters of the students and ten of the interviewees had experienced some level of group work as part of their employment, although this ranged from ten or more years to just a few months as an internship. Amongst those interviewed, a quarter had not experienced group work in an academic environment where it was used as a teaching tool.

4.3.1.2 Attitudes to future group work

Students' attitudes towards participating in further group work after their previous experience was analysed: see Figure 4 below.



**Excludes students with no experience*

Figure 4: Attitudes of students by module

Although nine of the students stated that they felt positive overall about group work this was often qualified by the requirements they felt were necessary to make it effective: proper communication, organisation, structure, coordination and opportunities for everyone in a group to contribute. The only '*very, very, positive*' statement was from an ex-military student with several years of group working experience, including some with large numbers.

Seven students offered mixed views although the positive statements from this group were related to the single facet of the impact of interpersonal relationships. According to one student, '*If you get with someone you like, it's fine.*' The negative comments covered diverse reasons. These were the lack of free choice in group selection, not getting on with people and the distribution of work. Examples of their statements are listed in Table 21 below.

Table 21: Negative comments on future group work

Category	Statements
Lack of free choice in selection	*'I was afraid in the beginning of if my team would be nice and we could collaborate.'*
Not getting on with people	*'There were times when I dreaded every single bit of it…'*
Distribution of work	*'If you've got someone who lets the side down, it becomes a universally horrible experience.'*

The one wholly negative view of group working was because that student's only experience had resulted in them having to collate six other people's work into a coherent piece.

4.3.1.3 Relevance to work

Two of the students recognised the importance of group working for their future careers though these were all from students on the business and management course. As one student said:

'I always knew in life you would be working with groups anyway.'

4.3.1.4 Information on group working

For the majority of students, the primary sources of information about group working prior to joining Cranfield were the University and programme web pages. An unanticipated finding was that four students from Module 1 had discussed the programme with the Programme Director. Although a few students were unaware of the group working requirements they did report an assumption that it would take place. Comments about the lack of information on how extensive group working was were made by two students in Module 3, the module with the highest group working assessment. This contrasted with the students from Module 2, where the comprehensive information provided, including the high percentage of the degree marks allocated to it, provoked greater interest in the programme.

In spite of the interest in group work generated by the information presented, the utilisation of group work within a programme was not the only factor in deciding to attend Cranfield University.

4.3.2 Method of group work

The literature described the different methods which could be adopted to achieve positive group working and this section offers details of students' views on the choices made by instructors regarding this, the impact it had on how a group functioned and its impact with the rest of the programme. It concludes with student feedback on the chosen approach.

4.3.2.1 Chosen method

The choice was dominated by the instructors' determination to offer their students an opportunity to experience a professional working environment similar to the ones they might face following graduation. The interviewees were asked if they felt it had met this condition. Their responses to this question were categorised and presented by module: see Figure 5 below.

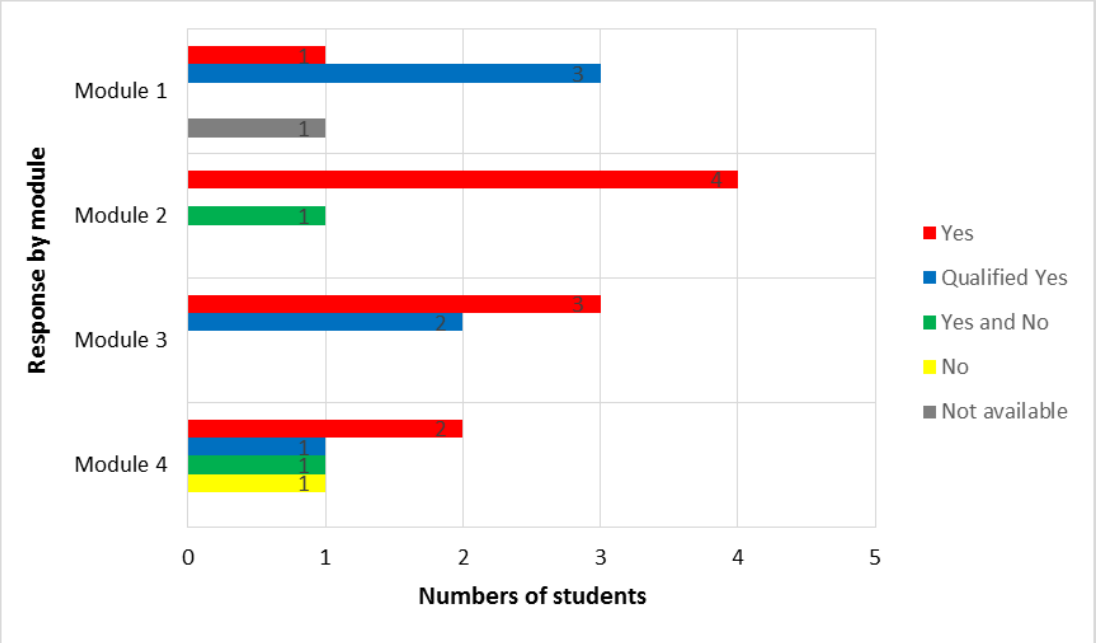


Figure 5: Relationship of approach to working roles

Half the participants reported that they felt the activity had met the requirement. Six more also agreed with some degree of qualification which was evidenced in one student's statement:

> *'I don't know if it has prepared me well enough, I don't know exactly what I'm going to find out there but yes, it's definitely a good starting point for my professional career.'*

The approach provided by Modules 2 and 3 produced a more positive overall response to the experience than the others. This could be accounted for in Module 3 which was the only approach that involved contact with a client. The other modules had not been involved in their presentations to industry at the time the research was conducted and this might have affected the students' reports of their experience.

4.3.2.2 Locus in the programme

In Modules 1 and 4 the work was undertaken with no other concurrent learning activity and the students used earlier modules to support their resolution of the problem presented. In Module 3, lectures appropriate to the task were delivered with the activity but in Module 2, due to its extended duration, other modules and assessment activities continued throughout. One student suggested it was preferable to have only the group work module to consider because they did not have to think about other modules or assessments:

> *'The fact that we don't have any other modules during this group project time, so your entire focus is on it.'*

4.3.2.3 Student feedback

Student feedback on the approach adopted by their instructors was positive. They found the opportunity to undertake larger scale work, to exchange ideas and perspectives with other learners from differing culture and backgrounds, being involved with a multidisciplinary team, the practical application of theories and having a realistic experience interesting. This was perhaps best articulated by a comment from a student:

'I wanted something more innovative, something more unique and Cranfield was a good image.'

The absence of learner comments on the delivery of the design and method adopted would appear to indicate students were satisfied that instructors had given sufficient thought and planning to the process.

4.3.3 Group allocation

This section reports views on the methods used to allocate students to groups, the various criteria which impacted on the allocation and how diversity effected students' experience.

4.3.3.1.1 Group selection and size

Group selection is concerned with the approach and criteria applied by instructors in determining groups, the concerns learners have about it, the impact of selection on relationships and impressions of Learning Teams.

4.3.3.1.1.1 Selection and size criteria

Students had little or no understanding of the selection criteria used to create their groups. In half of the student sample it was thought to be either random or an arbitrary process although Module Leaders used a series of criteria to balance the groups. Students spoke of the manner of selection as *'a line at various points in the classroom'* or *'we were just given the group list.'* A student from Module 3 construed the process thus:

'I really want to think they had a criterion, any kind of method they were following. Sometimes I struggle to see why they did it this way.'

Suggestions made by the students included a mix of ages, backgrounds, skill sets, nationalities and experiences but they were unable to work out, to their satisfaction, how selection had been achieved.

The selection method in Module 2 was the only one in which students were given an opportunity to express preferences. Not everyone obtained their first choice of project or work package but they were all engaged in the process. Their first opportunity to discuss in their group and agree with the others was deciding how

all the work packages were to be covered. Some agreed to change their work package preference to provide a learning opportunity. If the five students from Module 2 were removed from the sample for reporting purposes, because their selection process was clearly advised, then two thirds of students were perturbed about how they ended up in their particular group.

A recurrent theme of the heterogeneous groups was the opportunity to work with others from different backgrounds with differing perspectives and viewpoints. This was thought to be better for learning to cope in the real world. Examples of their comments are listed in Table 22 below. No student comments were made about either the number of groups or the number of students in each group.

Table 22: Student comments on group selection

Theme	Illustrative Comment
Viewpoints	*'liked the exchange of views and opinions'*
Interpersonal skills	*'mixing is good we learn to work with all the people, not only the people we like'*
Selection	*'obviously, once you go into the real world you don't get to choose what group you're in and it all depends on who you're being put with'*
Diversity	*'wonderful experience in the variety of people on the course'*

4.3.3.1.1.2 Relationships

Students' statements regarding the different parts of group selection showed they were concerned with how well they would get on with the others in their group: *'I was cautious to analyse the group that I would be given in.'*

Other statements elicited from the student interviews related to how they were conflicted about their own preferences for group selection and what they thought would be a better learning experience:

> *'maybe it is not the best way of getting prepared for the future, because you are working always with the same people'*

The impact on group relations as a result of mixed ability selection was broached

by one student in Module 4. Their statement concerned the identification of one student who was thought of as the weakest in each group.

> *'They also try and put someone who isn't so good in each group and it's obvious who that person is. They get put in that group and I'm not sure if that makes them feel a little bit excluded just straightaway.'*

The weakest member was a concern for Module Leaders too, with regard to how groups would interact and the possible impact on the student perceived as the least able one in a group. It was more obvious and more difficult to overcome, in small cohorts.

4.3.3.1.1.3 Learning teams

Students on Module 3 operated in Learning Teams and contrasting opinions were expressed about the impact group selection for a whole year had. Another theme was the effect group duration had on establishing relationships. Having reported difficulties during the initial period of the programme, the breaking-up of teams was not desirable and one student thought the building of relationships was a positive part of being settled in Learning Teams. Another interviewee expressed how the social and support aspects of his group had been established. A third student that alluded to the notion of changing their team thus:

> *'Once you start working with somebody, even if you don't like this person at the end you, kind of, get used to it. It's more comfortable that having to start from the beginning again.*'

They believed having got used to their current group, however difficult that had been, it would be more difficult to change and adjust to a new team. However, there were two divergent and conflicting dialogues about the changing of groups. One student said:

> '*It would have been nice that if, in our own course itself, we had the opportunity of working with other people a little bit more*'

while another expressed the concern:

> *'I really hope we stay in our group, because we weren't sure in the*

second semester if we would stay together.'

Very few comments were made regarding the application of Learning Teams to the learning process.

4.3.3.1.2 Diversity

Issues relating to diversity were not particularly prominent in the interview data. The foremost type which surfaced was in relation to the international aspect of the student body at Cranfield. Age was the only other feature reported.

4.3.3.1.2.1 Age

An analysis of age by module of the participants is presented in Figure 6 below.

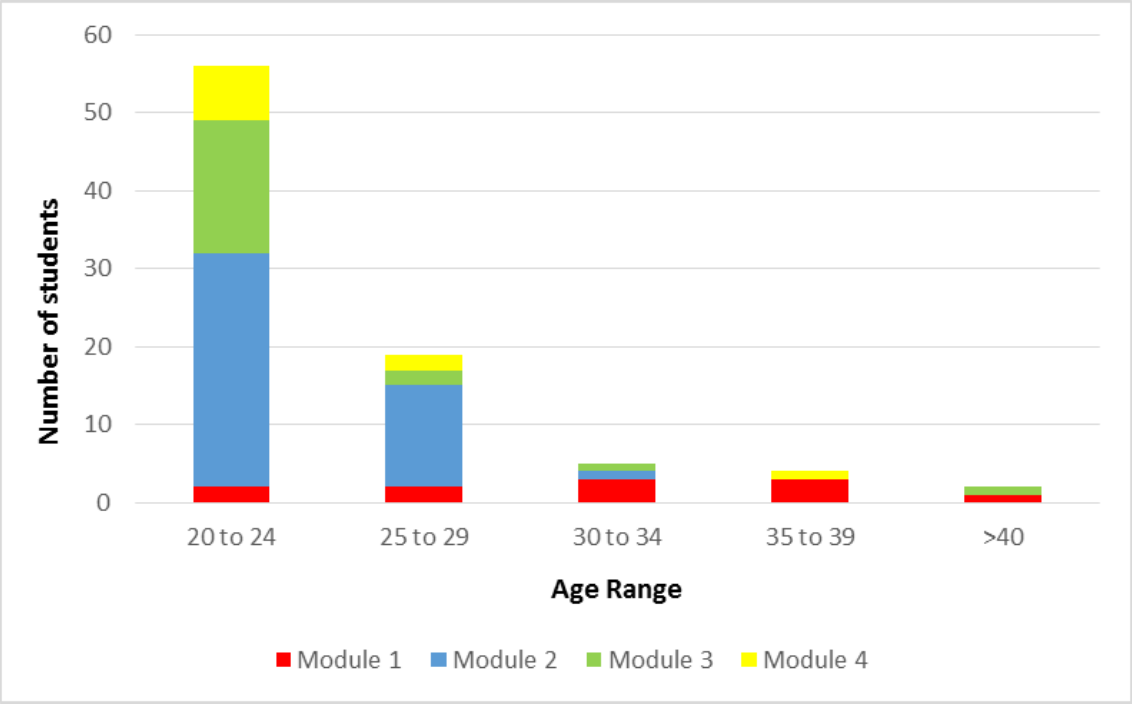


Figure 6: Ages of learner by module

While the ages cover a range of over twenty years sixty-five percent of the learners are in the youngest band of 20 to 24 years. However, there was only one interviewee who commented on an issue they felt was related to the age gap of students; the ability to be on time for meetings.

'When we say we're going to meet at a certain time, we meet at a certain time. We stick to those weekly appointments,'

This was considered a lack of professional behaviour by younger students who were inexperienced in working environments.

4.3.3.1.2.2 International groups

The analysis of student nationalities by module showed that Cranfield University was meeting its prospectus claim of providing students with an international body, made up of people from different backgrounds, each contributing to a rich learning experience: see Figure 7 below.

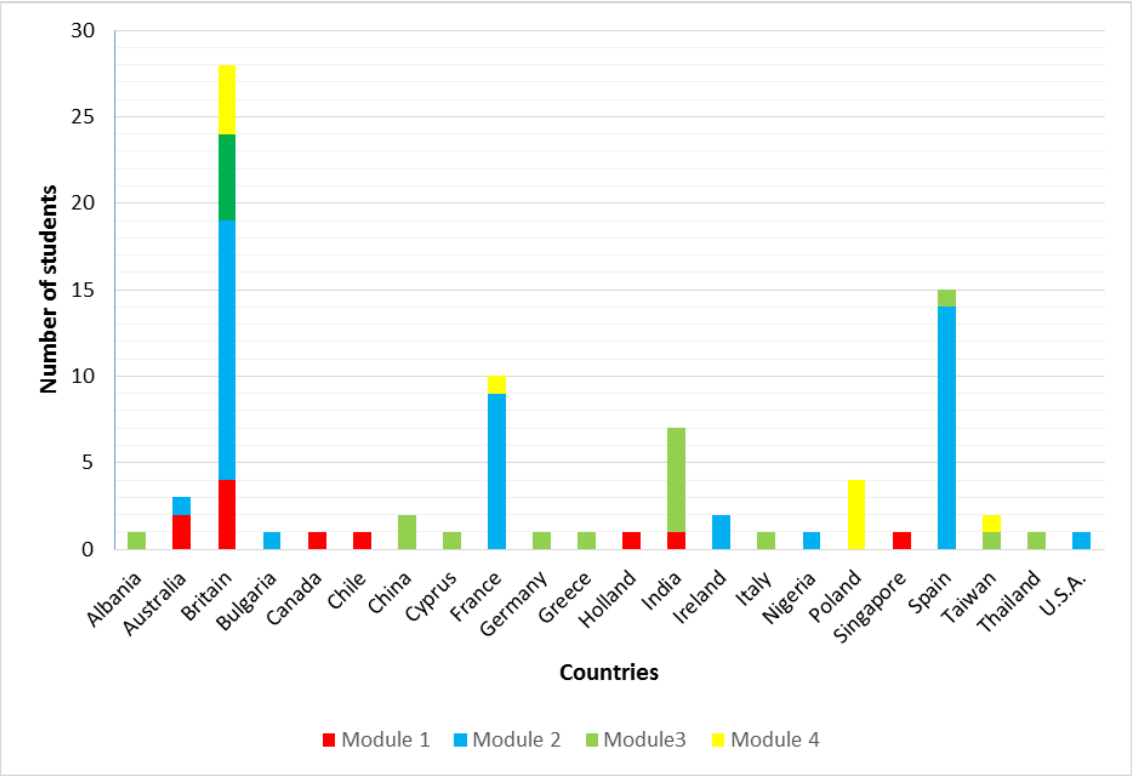


Figure 7: International makeup of students

In their reflection, most students indicated internationalism, while it was not without its problems, added to their experience of group working. Positive aspects were the different viewpoints and cultural differences to approaching the tasks presented to the groups as referenced by one student, *'learnt a lot from learning with people from different countries'.*

4.3.3.1.2.3 Language

Negative aspects were primarily concerned with the use of language, both written and verbal, although comments were only forthcoming from three of the modules in the study. A barrier existed in spoken language which was accentuated at the beginning of the course. All the students' remarks showed acceptance of the difficulty and the need for everyone to be patient with each other. It was recognised there were varied levels of skill which, as one student commented, caused some personal frustration '*because you couldn't find the right words to express what you wanted to say.'*

Two students from different modules expressed opposing views on language as a criterion for group selection. One thought that splitting students with a common language across groups were preferable so as to minimise the possible exclusion of those who could not use that language. The alternative viewpoint was that selection should include English language ability as in their experience this influenced the group's ability to complete the writing-up process effectively when only a short space of time was available. The pressures to meet the deadline often led to only a couple of the group doing the writing-up. One participant commented on the use of native English students as proofreaders.

4.3.4 Group task

As noted earlier, all the tasks designed by instructors were related to real-world problems although this was achieved through different mechanisms: a live case study, a scenario activity, a representation of a research grant proposal and an engineering design project. The students were expected to deliver business proposals, prototype software or engineering designs which met the task criteria.

4.3.4.1 Task interdependencies

Every task was structured to ensure the students would have to work together to complete it. The form of interaction in Modules 1, 2 and 4 was cooperative as students described working independently, or in sub-groups of two or three, often by discipline. In the interactions between the disciplines, and in production of the assessed work, they worked collaboratively. In Module 3, the groups' organised

working both collaboratively and cooperatively at different periods throughout the activity. Their school uses Learning Teams and students' earlier experiences of group working might have influenced their approach to the task.

4.3.4.2 Task briefing

Except for Module 2 the overall view of students was that there was a lack of instruction, direction or advice on how the group should structure itself to achieve an optimum working process to achieve the task. In Module 2, students were provided with clear directions in their task brief, see Figure 8, although this did not provide information on structuring non-work package requirements.

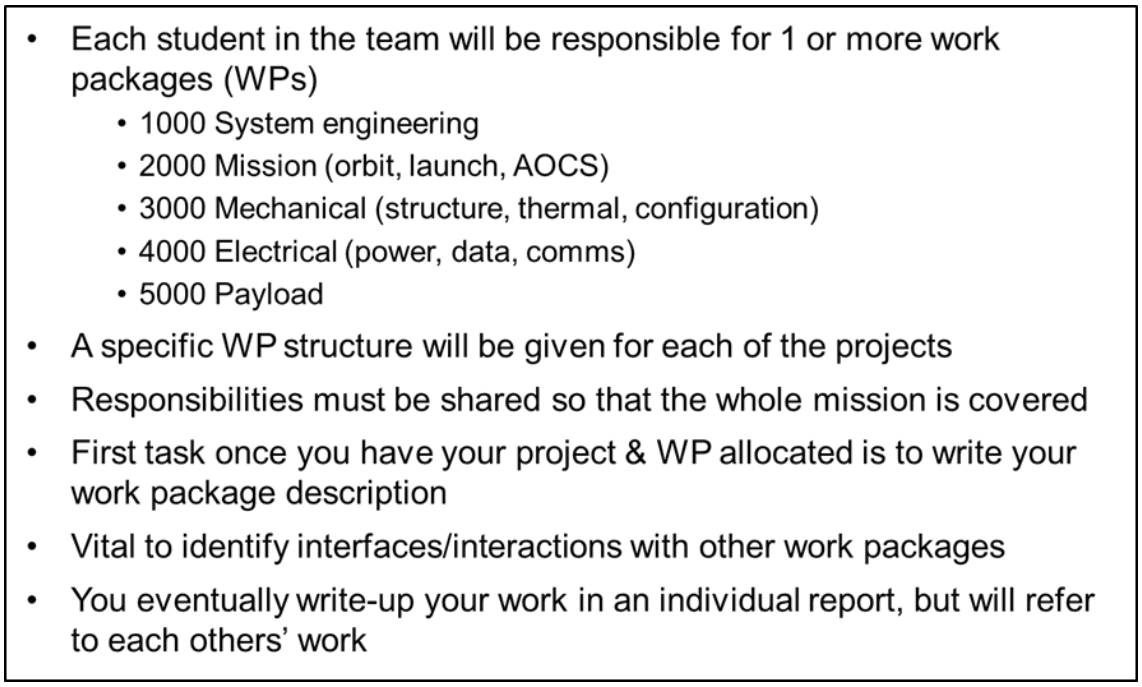


Figure 8: Presentation slide from Module 2

The Programme Director described how students were given guidance but *'have to self-organise much more'* and *'It is probably a lot more stressful for them.'* The advice did not spare the groups from organisational issues.

4.3.4.3 Client interaction

Although the tasks were often suggested by contacts with industry or the research community only the live case study in Module 3 had students interacting directly with clients. Students were impressed by this and surprised by the responsibility

of having to deliver a solution to challenges an organisation was actually facing, as evidenced in the following student comments:

> *'this organisation gave us some kind of challenge they are facing and they were expecting some kind of value from us'*

> *'We had to give recommendations to solve problems at hand now.'*

There was engagement by the students with the business client and their problem when they entered into a dialogue involving exchanges of information. Though not a part of the assessment criteria, students produced reports for the client and received feedback on their proposals. The students in both Modules 2 and 3 also completed additional tasks beyond those of the assessment criteria.

One interviewee among the participants involved in presentations to industry commented on how conscious they were of the impact their design or prototype could have because they were aware that the industry representatives were dealing with the same problems. None of the interviewees from the two other modules that included industry presentations referred to the relationship between their task and clients. In fact, where client meetings were described in Module 4 the client roles were undertaken by staff and no client contact was referenced by students during their activity: that was reserved for the Industry Day.

4.3.4.4 Level of difficulty

According to the Programme Directors, design of the tasks involved open ended questions and the tasks provided the learners with challenging experiences. In students' accounts of the tasks, comments related to the problems they faced in working out a solution. In Module 4 a student emphasised the breadth of their problem as *'a huge task'* involving an end-to-end process and in Module 1 one thought the time available for completing the task and writing-up was insufficient, *'we didn't have enough time'.* Observations on the impact of the challenges they faced as learners were apparent in comments about their emotive condition: *'it was really harsh'; 'it was intense'.*

4.3.5 Group dynamics

This section reports on the students views of the various interpersonal processes which occurred in and between groups during the period of their module or programme and how the structuring decisions made by the instructors impacted on their experience.

4.3.5.1 Group development

There was no evidence that learners had been given any instruction or had any understanding of how groups develop. However, students did describe how their individual groups struggled at the beginning of the process, '*At the beginning, it was a bit messy*' though this improved as time progressed, '*later on, I think we figured out a way to keep working together'* indicating some degree of group development.

Learners from Module 3 discussed the learning delivered by the module on Managing People and Organisations and its impact on their understanding of how individuals interacted in groups but there was no reference of any theoretical instruction in this module on this aspect of groups.

4.3.5.2 Group structure

A lack of support for how groups should structure themselves to manage their task was a consistent theme, especially regarding the sharing of work or appointing a group leader. An example, testifying to students' lack of assistance:

> *'No support from the teacher or supervisor in group work and splitting tasks and everything.'*

All students were held responsible for organising their group, how it would function and the method for completing their task. Groups were left to make their own decisions, apart from attending regular meetings with supervisors or clients. Many of the students reported that they received little advice on group structure which added to their confusion. One said:

> *'we didn't know how to organise our work, how to split tasks and we didn't have much experience in working in a group.'*

The staff took a hands-off approach once students had been allocated to groups and briefed on their task, sometimes giving direction in the early stages or only guidance in others. In this way, the emphasis for learning moved from the instructor to the student. They were held responsible for their own learning, where necessary, and to share this with other group members. Academic staff acknowledged this approach was stressful for students and especially difficult at the beginning of an activity. One student commented:

> *'We have some advice, but very, very, very little. It was basically we were all on our own.'*

Those interviewed indicated most operated by completing work relevant to their skill or designated discipline separately and bringing their contribution together at meetings. In larger groups they split into sub-groups according to relevant disciplines. This sometimes created difficulties in collating several pieces of work, with issues around dependency, but the general view was that things got better when the work was divided.

4.3.5.3 Group norms

Expectations regarding professional conduct by students were reflected upon by three interviewees. Their comments were made as a result of their prior working experience and background but with different repercussions for their experience. A negative experience was evident from this student's comment on the behaviour of others:

> *I'm a professional and I work in a professional environment. When we say we're going to meet at a certain time, we meet at a certain time. We stick to those weekly appointments'.*

A different perspective was indicated by another student who, in spite of coming from a background with clearer expectations of behaviour, did not find it detrimental to his experience:

> *'I mean, for instance, both myself and the other military guy used to arrive bang on the time to start working in the morning when you*

could arrive any time. And the other team kind of arrived half an hour later, but I wasn't annoyed at that or upset or disappointed.'

The third participant's expectations were from comparison with his undergraduate experiences. The student's remark implied a higher expectation of behaviour because the programme was at a postgraduate level and when this was not met his experience was not a positive one:

'I would have assumed, as it was a Masters, that the people would be more professional than it was under the undergraduate but yes, I thought it would end up being better than it was.'

4.3.5.4 Participant interdependence

Participant interdependence describes the process in which individuals interact with others in a group, resulting in benefits for all the participants. The design of the group work should support this exchange. However, as it is not possible to account for individual preferences and personalities, there is always an unknown element for how effective this phase can be. In analysing the interviewees' comments for this theme, the focus was on their opinions of how the groups worked together and supported each other, in the group process.

4.3.5.4.1 Reciprocity and cohesion

A feature of participant interdependence is reciprocity so it was disappointing to receive reports from two schools about groups failing to support others. One student in Module 2 clearly articulated not only the lack of reciprocity but also the effect the assessment approach had on not sustaining mutuality:

'I tried to help one of them because his part was really, really demanding, so I tried to help him. But the other people don't really care about him. It's like, "Okay, yes. We want a really good project. But I am going to be weighed 95 per cent for my part. So, if you are bad, sorry, ask the professors."'

Another comment from a Module 4 student similarly showed a lack of reciprocity for a student who acknowledged they were probably less skilled, or had lower

academic abilities, and had looked for support. The result impacted the student's psychological wellbeing and was a damaging experience.

> *'They said, "there's going to be some support" but there was nothing like that. Each was for himself. They were actually trying to show how good they were. I was, day one, trailing back and falling back, and I couldn't produce the quality of work that they could produce. So, I started feeling my sense of self-value and self-worth and confidence just went downhill.'*

Despite these views, eleven of the twenty interviewees gave encouraging comments regarding some portions of reciprocity. Students' comments revealed the harmony and help,

> *'We learnt how to harmonise our work and help each other in case somebody needed help'*

the sharing of ideas;

> *'They were different and it really made our minds richer because there were things that we would have never thought and with this group project we've had the opportunity to have them. So it was really good.'*

and the building of relationships;

> *'From the first day I started, all of us started creating relationships between all of us. Ask the other one if something was not clear.'*

The development of relationships within groups progressed in many cases into friendships. However, these were narrated as only being in relation to part of their group *'nine of them are my friends.'* The foregoing reports denote a fragmented level of cohesion within the groups.

4.3.5.4.2 Working collectively

Participants were consistent in their accounts of how the groups worked together, deciding that the best way forward was to split up the work for them to act

independently and cooperate at other times to discuss and collate the work. This was the approach taken regardless of any other criteria. One interviewee reported their group met together, *'we worked separately, we just worked in the same room'* and this was viewed as being good. Another positive report on working this way was from a student who suggested benefits from the approach,

> *'The autonomy of the subgroups enabled us to just keep going without waiting for the mistakes from the other group. Or things which held them up didn't hold us up.'*

A few comments were made regarding the initial period of the group's formation. Participants expressed a sense of feeling lost, *'find yourself in newly established groups'* or *'when the group wasn't working very well'* because the group did not know what to do in the beginning.

4.3.5.5 Communication

Communication in this theme is about how the students relayed information about the task they were undertaking or in organising their group. This matter was not included as a specific area of questioning in the student interviews but has been identified in the analysis of the data collected.

In the instances discovered there was an equal split of positive and negative experiences. In the comments one student's experience of communication became a positive one although the background was for the negative issue of non-participation. This situation was improved through ensuring communication with the rest of the group to explain the circumstances of the non-participation.

Another learner expressed the importance of communication within a group thus:

> *'so we maybe didn't all do exactly the same piece of work, but we were communicating, consulting, talking, so we have an overview of how things are supposed to be working.'*

Negative views highlighted the difficulty of organising group meetings without communicating with each other *'It was really hard for me to pull everybody together.'*

The use of the social media platform WhatsApp, intended to help a group in their communication, showed contradictory evidence where a lack of control over postings resulted in 200 messages a day with a perceived risk of missing important information;

> *maybe you don't read important information that you should consider for your discipline. I think that that was a very big problem.*

4.3.5.6 Free riding

The issue of free riding, where a learner enjoyed benefits accruing from collective effort but contributed little or nothing to that effort, was reported by many of the interviewees. Regardless of the reason for a student to free ride, it impacted others in the group and was reported in the interviews by one learner as:

> *'That's not so fair, because as I said, some individuals were working more on the project and some not so much.'*

Reasons put forward by the interviewees for this were a lack of passion about being on the programme, not having necessary skills or particular circumstances. The overall view of those who experienced this phenomenon was that there was little to be done about it and in order to obtain a good grade the others in the group did take on the additional work.

The intervention by staff, or support for students, to reduce free riding was not mentioned by any of the interviewees. Its reference by one student was as '*a necessary evil, if you will'*, signposting an expectation of this behaviour and its use as a tool for greater good.

4.3.5.7 Conflict

All the participants disclosed difficulties within their own or other groups that had come to their attention. These were all related to the development of cohesion within the group, which in some cases led to conflict. Personality clashes, issues around leadership and free riding individuals were common sources of conflict. One student reported these as being of a serious nature *'things were really bad*'

involving intervention by the Programme Director while other students indicated more maturity by acknowledging difficulties,

> *'it's hard to separate the professional part with the personal part and I didn't get on well with some of the team members'*

or adopting a positive stance,

> *'I've learned to deal with my group, to survive with them and I think that's all.'*

The selection of a group leader was a contentious area. Students from all the groups expressed views about the limited guidance they received and the varying impact this had on the organisation of their group. These were evidenced by statements from students about there being *'no leader',* natural selection of a leader, *'X more organised, he was the leader of the team'* and recognition of an improved way of doing things, *'better with a project manager'.*

Students were not happy about social loafers. All the interviewees confirmed this behaviour was present in their group but none reported any actions taken, either by themselves or staff. As one student explained, they were a necessary evil:

> *'three of us pulled his weight quite a bit, but in the end, it just means that our knowledge was expanded, whereas his was not'.*

4.3.6 Group training

The lack of training on participation in group work was a common observation among all the interviewees. Four separate accounts, one for each module, were obtained from the participants as their individual experiences were dissimilar.

4.3.6.1 Module 1

Those in Module 1 received no training. The reason was related to the age of the students which for this group was a mean of 32 years old. A student's statement '*there's an assumption made, quite rightly, an assumption made that people will have been involved with group work in the past'* attested to this.

The student background for this course was strongly biased towards military personnel who were believed by the Programme Director and Module Leader to have been exposed to the principles and practice of group working in their career. Consequently, it was believed that the cohort did not require training. This attitude was confirmed by one of the students' comments about group working in the military, *'it's absolutely fundamental to daily life'.*

4.3.6.2 Module 2

Four of the students from Module 2 described their briefing as including both organisational and technical elements, being advised about how communication was important and being guided by instructors on how to organise their work group, although the impression of the researcher was that this was directed to the organisation of work packages.

Poor group functioning was touched upon by an ex-military learner with years of group working training and experience who sublimated his skills to adapt to the functioning of the rest of the group. Better provision of the necessary skills for the majority might have mitigated the need for this behaviour.

4.3.6.3 Module 3

Students on the business and management programme in Module 3 indicated the benefit Learning Teams received from the various team building exercises and the social activities of Orientation Week. They mentioned that more of these would be beneficial during the initial stages of the programme. In their accounts of their Learning Teams interactions there was no evidence of constructive support in this area. The Managing People and Organisations module presented in the first term had the strongest impact. Several students' remarks illustrate this:

> *'that was what put a lot of things into perspective'*
>
> *'It was at that stage that I personally just relaxed'*
>
> *'we had done a module MPO, Managing People and Organisations, and that was really helpful in understanding how groups function.'*

4.3.6.4 Module 4

While participants from Module 4 found their school Induction Week was good for getting to know people, it involved no elements of group work. Commenting on preparation for the school group project period, one student said *'there was something about group work for the entire school, but it wasn't included for our course.'* Negative comments about the lack of project management training, how to split up the work, organising time and planning tasks were common.

4.3.6.5 Summary

Generally, the lack of training meant students were unable to engage in a discourse on this experience since it ranged from non-existent to poor at best. Where it occurred, regardless of its intention, the impact had been negligible as suggested by this comment from a student:

> *'I don't remember exactly, but I think they gave us some advice on how to work together'.*

4.3.7 Group facilitation

This section describes student experiences of facilitation in their group working by academic staff or a Student Representative, either of a technical or personal nature. Facilitation can be presented to a group or to an individual, often when interpersonal issues arise within a group.

4.3.7.1 Group support

When participants were asked about their group meetings, the majority commented on facilitation of a technical nature. All the learners in three of the modules were satisfied with the frequency of their contact and the support they received. However, in Module 4 the opinions were inconsistent. One interviewee reported frequency was *'as much as we needed really'* and two students described situations when they cancelled meetings, either because they did not have any questions or the supervisors were unable to answer them. In that situation their experience was marked by a lack of facilitation because the supervisor was not familiar with the tools used by the group. They felt doubly

aggrieved since they had been advised at the start of the project that they had freedom of choice regarding tools. To get help, one student said:

> '*We were mostly relying on our friends from software engineering who had more experience or stuff like that*.'

Students' perceptions about staff not supporting resolution of issues appeared to create some anxieties. In one instance, a student suggested the failure to obtain help, shown below, was due to this perception of staff not being supportive:

> *'I really wanted to, because I found it so hard for me. I thought, "This is going to be a complete failure." I was really afraid I was just going to fail with this task because I just could not manage it and tackle this. But we didn't get the feeling that they're here for us so much.'*

Alternatively, another perspective considered by one student saw such lack of support as an element of the learning experience:

> *'The goal was to work independently in finding our feet, so they kind of stayed, a bit, away. I guess if there was a major issue, they would have intervened.'*

4.3.7.2 Interpersonal support

All the students identified a member of staff, in some cases more than one, who they were willing to approach for support in resolving interpersonal issues. These were their group's supervisor, who was not always a course lecturer or Module Leader, Student Academic Support, a Module Leader or the Programme Director. The students in Module 3 who were in Learning Teams did not include their team tutor. The sole point made about a team tutor was that, after seven months on the course, only one meeting had taken place.

Problems of an interpersonal nature were predominantly dealt with by the Module Leaders and on occasion a Student Representative. One of the four interviewees who was engaged in this role described their involvement with two students wishing to change groups. Their ability to provide anonymity while resolving

issues with staff was a positive argument for the use of Student Representatives but it was difficult for one student whose conflict was with the Representative.

While the Student Representatives in Modules 3 and 4 reported being involved in facilitation with students and staff on issues between individuals and student course requests, none of those students mentioned them among those they would look to for support.

4.3.8 Assessment

In their interviews, some students from each of the modules commented on the method of assessment used in their module. These comments were either about the fairness of group marking or the impact free riding had on the other members of their group and the unfairness of that.

This study found a wide range of group and individual assessments, with some level of self and peer assessment: see Table 23 below.

Table 23: Assessments by module

Element	Marks			
	Module 1	Module 2	Module 3	Module 4
Group Presentation	25	5	50	8
Individual Presentation				10
Group Report	75			24
Group Prototype				48
Individual Report		90		
Individual Reflective Essay			50	4
Peer Assessment		5		
Individual Contribution				6
Total	100	100	100	100

4.3.8.1 Fairness of group assessment

Students' experiences of the methods used varied from those who considered it reasonably fair, some who expressed mixed opinions and some for whom it was not a fair process. Those with opinions on the positive side supported their views with more detailed explanations. The practical issues were referred to by one student, *'supervisors would not be able to assess individually'* while another suggested the recognition of individual contributions was important, *'Maybe there could be a way to do the group project but to count the contribution of others.*'

When this question was presented to the five participants from Module 2, four expressed strong opinions on the grading structure. In one case the interviewee thought the 90 per cent mark for the individual report ensured everyone would work whereas in group reports *'it was very easy for someone just not to work.'* The other three students held divergent views about the use of such a large percentage as an individual mark for a group activity. One commented:

> *'It would be more interesting maybe to, like, some percentage of the mark, like 25 per cent that could be shared, like the overall project. So that would lead us to try to all the aspects to be good, so maybe it is a purpose to help each other',*

This endorsed the use of group marking as a means to guarantee contributions from everyone because they would all be dependent upon each other. Students referred to their discussions about producing a fair grading system and the difficulties were acknowledged by one student as he indicated '*it is a question that is difficulty.'*

4.3.8.2 Self, peer and reflective assessment

A peer review process was an element of assessment only in Module 2 and none of the interviewees from that made any comments regarding the impact it had or their views about having to assess their peers. The allocation of marks for this process only accounted for five marks of the total.

Both Modules 3 and 4 made use of a reflective essay. In Module 4 this was based upon a self-reflection exercise to demonstrate an ability to reflect upon personal

skills and performance in order to support personal development and the group's performance. The allocation of marks was similar to Module 2, only four marks.

The reflective essay in Module 3 was to critically assess the proposed solution generated by the Learning Team. The mark allocated was 50 per cent of the total but this was an individual mark and not impacted by the group dynamic.

Other than reflection as a part of the assessment process the interviewees made no reference to instruction, discussion or practice of this skill.

4.3.8.3 Plagiarism

The issue of plagiarism was raised in one interview. The student was in a group in which the members were required to indicate the sections undertaken by each of them. They inferred this meant individual marks would be allocated and became concerned during the editing process, performed by two members of the group, about whether changes to sections not written by them would constitute plagiarism. Although this was really an issue associated with the briefing for the group work assessment, and students had the information available to confirm the assessment process, the interviewees' point regarding plagiarism was valid when students were continually advised to ensure they did not become involved in the practice.

4.3.9 Learner experiences

This section reports the experiences of all the participants with regard to how they felt the information they obtained before registering for their programme matched the reality of their course, which areas they considered worked well, which did not work as well and a summary of their overall view of the group working experience. Student views on how experiences for future groups could be improved complete the theme.

4.3.9.1 Information

Learner expectations were derived from the information they had obtained about the group work portion of their programme from University publications, both the prospectus and the website, and interviews with staff. When asked to indicate

whether their experience met their expectations, three said it had surpassed them. Twelve of the participants agreed that their experience and expectations matched and five thought their experience did not meet their expectations. These five students were split between Modules 2 and 3 and, with one exception, had all been aware of the group work element in the programme.

Different explanations for the discrepancies were apparent when their comments were analysed: see Table 24 below.

Table 24: Categories of divergence with expectation

Category	Comment
Workplace	*'In my line of work, it doesn't represent how things are.'*
Scope	*'Much, much bigger and challenging.'*
Experience	*'With my experience, I had a different set of expectations. I very quickly adjusted on day one, if that makes sense.'*
Expectation	*'My expectation were that in this group project the group was going to have more weight. And what I have seen here is a negative part in comparison with what I did in my old university.'*

4.3.9.2 Learning

Since the principle aim of students is to learn, the participants were asked to consider how their experience of group working either had, or had not, improved their learning.

The total number of responses to the question of learning improvements as an individual rather than in a group yielded a very strong result in favour of the group approach. One participant expressed a mixed view and two students, both from Module 4, felt their learning would have been greater if the same content were delivered and assessed in an individual format.

In obtaining students' views on how their learning had developed no qualification criteria were applied to learners' understanding of the term but their comments referred to both the interpersonal skills associated with working in groups and the

technical aspects of the activity. They reported evenly across the group specific learning points: see Table 25 below.

Table 25: Learning comments

Theme	Sub-theme	Sub-theme Definition	Illustrative comment
Interpersonal Skills and competences associated with an ability to interact with and understand other people	Leadership	The skill of organising, directing and motivating a group and associated resources to achieve a goal.	*'How to deal with intergroup relations, increased my leadership skills as well.'*
	Listening	Accurately receive and interpret messages in the communication process	*'I've learnt a bit more patience in working with people, to listen more.'*
	Team working	The ability to operate smoothly and efficiently within a group.	*'I've learned a lot, not only about teams but about myself.'*
Technical Knowledge and capability to perform specialised tasks in a specific field	Application	An understanding of the operations available for a product and its outcomes	*'Gaining more knowledge for the application side of it.'*
	Technical skills	The abilities and knowledge needed to perform specific tasks.	*'We learned a lot of technical things.'*
	Subject knowledge	Having mastery of a branch of knowledge	*'In terms of learning about the subject …probably quite a lot really'*

In reviewing learner feedback in relation to the interviewee's demographics there was little variation by module, gender, nationality or first language. A significant feature was age where the number of comments relating to improvements in the interpersonal skills appeared in the 21-24 age range.

4.3.9.3 Overall views

Students were also asked to consider the aspects which they considered worked well and which did not work well. While the responses to this line of questioning resulted in information on previously reported themes it offered an opportunity to identify the factor which was most important to the learner. Identification of their

overall view of the group working experience was similarly considered an important point and responses to all these universal questions are conveyed below.

4.3.9.3.1 Positive features

Analysis of the features the interviewees felt worked well showed three elements in which thirteen separate students indicated diversity, personal relationships and being in an effective group were the areas that worked best for them. Diversity had the highest number of students' preferences for what worked well. The students' preferences are listed in Table 26 below.

Table 26: Positive features

Theme	Definition	Mentioned	Illustrative Comment
Group work	People coming together to share knowledge for personal development or to learn from each other through discussion.	1	*'It's being able to actually think through and with other people.'*
An effective group	A group which works well together.	4	*'I was really happy with my group towards the end of it, so I had not many complaints.'*
Problem solving	The process of finding solutions to difficult or issues.	2	*'So, I think, the problem-solving part was very good.'*
Diversity	A range of people from different backgrounds, culture, countries and language.	5	*'Wonderful experience in the variety of people on the course.'*
The experience	The overall impression of the group activity.	1	*'It was a good experience for me.'*
Personal relationships	Close connection between people.	4	*'have made some really good friends'*
Confidence	A person's belief in their own abilities.	1	*'was shy and quiet, wouldn't contribute in class but now speaks up and is prepared to voice her opinion'*
The task	The piece of work to be undertaken.	2	*'I liked, actually, the general project. The project itself, what we did in it and what we developed.'*
Large group involvement	Participation in a group of over twelve people.	1	*'The best aspect was learning how to work in such a big group.'*
Group co-ordination	The organisation of the different elements of a body of people to enable effective working.	1	*'I think that's the most positive thing, to learn coordination, how to cope with problems, because there have been a lot.'*

Theme	Definition	Mentioned	Illustrative Comment
Relevance to real life	Drawn on situations or events which exist outside of an academic environment.	1	*'it was a really good opportunity to imitate a real engineering project as if in a working field'*
Having responsibility	Being accountable.	1	*'We needed to solve the problems on our own, because sometimes there was no time to ask or there was no one to ask.'*

4.3.9.3.2 Negative features

A greater number of features appeared in the responses to the question, *'What did not work well*?' although one, the weak member of a group, far exceeded the others. The identification of one member of a group as being weaker than the rest encompassed single and multiple aspects such as their lack of motivation, poorer academic ability, free riding and language skills: see Table 27 below. There was no discernible pattern from any of the *'Worked / did not work'* questions in relation to module, gender, or nationality.

Table 27: What students felt did not work well

Theme	Definition	Mentioned	Illustrative Comment
Dominating personalities	One individual controls the group processes and activity.	2	*'some individuals wanted to dominate'*
Determining group structure	Forming the way in which a group organises its self.	3	*'there was no discussion about how you should structure your working as a group?*
Poor participation	A group member who does not engage in the activity.	9	*'Some others were not so interested in the work, say they have not contributed so much.'*

Theme	Definition	Mentioned	Illustrative Comment
Depending on others	Relying on others to complete their element of an activity on time.	2	*'When you're waiting for other people to finish their work so you can do your work, it's quite a lot of delays and stuff.'*
Level of group experience	The amount of training and practice of working in a group.	2	*'I was saying we spend four hours just going around and around in circles whereas I'm used to meetings where they'll last half an hour and you say, "Right, what's the first point?" Everyone talks about it for five minutes. "Right, we're doing this".'*
Level of support	The amount of help and advice received.	3	*'in terms of support in group work and splitting tasks and everything, the teacher or supervisor was more like, "You need to find a way".'*
Interpersonal conflict	Disagreements between people.	2	*'Had an issue with another member of the team.'*
Student motivations	The stimuli of learners.	2	*'There's a lack of motivation there which was for my particular learning team a problem.'*

Theme	Definition	Mentioned	Illustrative Comment
Lack of agreement	A failure to reach a consensus.	1	*'But, also, there have been three of us in the group, three very strong managers, so everybody with a different vision, so it was at the beginning sparking a lot when we had to figure out a strategy.'*
Feedback	Information on performance for use as a basis of improvement.	1	*'For example, we had no feedback about our work and I'm still waiting for my feedback.'*
Group cohesion	The interpersonal bonds which link members of a group to one another and to the group as a whole.	1	*'There's a certain level of frustration of dealing with other individuals, even those that are somewhat smart.'*
Resources	Material, equipment or other assets which were necessary to support achievement of the group activity	2	*'just for resources, we had to traverse two different computer rooms to basically do the project, and it was just an absolute palaver'*
Time	The period available for learners to undertake the group activity and submit their assignment.	1	*'Yes. I mean, we all had the same deadline, and it was quite a rush, to be honest, to do it all in a week.'*
Distribution of work	The way in which work is allocated to the members of a group.	3	*'I would say just the fact that all the time it just kind of ended up being one person doing a lot of the work.'*

Theme	Definition	Mentioned	Illustrative Comment
Selection of the group	The method adopted to allocate students to groups.	1	*'Experience, but they also try and put someone who isn't so good in each group, and it's obvious who that person is. They get put in that group and I'm not sure if that makes them feel a little bit excluded just straightaway.'*
Communication	Imparting or exchange of information within a group.	1	*'Well, I think the worst thing was communication'*

4.3.9.3.3 Whole experience

When asked to give an overall view of their experience of group work, learners were very much in favour with seventeen of twenty responding positively and only one negatively. Key descriptive words taken from their comments, encompassing the range of their experiences, are listed in Table 28 below.

Table 28: Student remarks on overall experience

Module	Key Words
1	enjoyed, entertaining, favourite, fun, good activity, interesting, well structured, worthwhile
2	enjoyed, good experience, good opportunity, improve, sharing thoughts
3	prepared, frustrating, intense, proud, really good
4	difficult, demanding, energy consuming, frustration, interesting, lot of work, stress

These expressions of their experiences would be reflected in any response to open questions proposed as part of a student experience survey.

4.3.9.4 Suggestions for future practice

A natural conclusion to the interviews with the learners was to identify which aspects of the group work could be improved to provide a better experience for future students. An analysis of these themes is listed in Table 29 below.

Table 29: Aspects for improvement

Theme	Definition	Mentioned	Illustrative Comment
Duration and timing of the activity	The point in the programme at which the activity takes place and the period the activity lasts for.	2	*'but the module could have happened earlier and give us more time to work out some of the issues'*
Not doing group work	Delivery of the module using non-group activities.	1	*'not doing group work, because everyone did less well than they would expect'*
Free riding	An individual makes less effort to achieve a task in a group than they would individually.	2	*'a way of making sure that everyone contributes'*
Feedback	Report on a person's performance which is used as a basis for improvement.	2	*'we only have the feedback from December, but it was very, very, very short, just maybe one line about two months of work'*
Task briefing	Instructions advised to students on the group activity they are to commence.	6	*'they could if I think in the outline brief it was emphasised that the aims are to encourage the group working or the teamwork aspects'*
Assessment	The method and structure of allocating grades to learners.	3	*'may be there could be a way to do the group project but to count the contribution of its members'*

Theme	Definition	Mentioned	Illustrative Comment
Facilitation	Support of students by an instructor in guiding them through the activity.	4	*'I think we were supposed to have a bit more support. Like, a bit more supervising maybe'*
How groups work	Processes associated with the effective working of groups, e.g. communication, structure, organisation.	7	*'I think it would be good to organise workshops about it, because there are some techniques to working in a group, to split tasks, to plan everything and so I think we missed that a lot.'*

The aspect for improvement with the greatest number of mentions was 'How groups work', the processes associated with effective working of groups. The significance of this issue for students increased when the breakdown by module for the students who reported the feature was reviewed. None of the learners from Module 1, who have more group work experience, were included.

In areas relating to the task briefing six of the students referred to aspects which would have supported their experience without detracting from their learning, e.g. examples of previous work, a detailed marking scheme and provision of auxiliary materials. None of the learners from Module 3 supported this improvement.

Three of the four learners who would have preferred more support from supervisors or mentors, either internal or external to the programme, were from Module 4.

Significant points from talking about this subject with one participant elicited their desire for group work not to be undertaken at all *'because everyone did less well than they would expect'*. Another student's experience was so negative that the only improvement would have been for her not to have been involved in group work at all, although this was for reasons beyond the scope of this research.

5 DISCUSSION

This chapter discusses the findings in more detail, interpreting and describing their significance in relation to the problem under investigation and the academic literature. In addition, the consequences for practice are discussed, as are the limitations of the study, which lead to recommendations for further research. Conclusions of the study are summarised in Chapter 6.

5.1 Discussion of the findings

The aim of the research was to identify which aspects of group work influence learner experiences. The realisation of this was through the adoption of a qualitative research methodology. Semi-structured interviews provided in-depth assessments of the current process and outcomes.

The major findings of the study indicated that students have an overall positive view of their experience at the end of their group working activity. However, five central features dominated the findings: the approach to group work; the diversity of the groups; group dynamics; assessment and training. The approaches for group work adopted were found in three of the modules not to be directly related to any of the major methods discussed in the literature. The remaining module adopted a Case Study approach. However, learners described them as strong positive learning experiences. Similarly, the diversity of the student population was reported as a significant benefit though other aspects of group dynamics were not as positively viewed by students.

A review of the training, preparation and support students obtained prior to or during their group activities showed that students felt ill-prepared for the processes involved in group working. Their experience of this feature highlighted it as the most important theme for improvement. Although the findings on assessment showed a range of schemes intended to be fair and beneficial this was a key concern for students and impacted on the way groups operated.

These major findings are discussed in more detail in the following sections, showing how they relate to other studies or their implication for future practice.

5.1.1 Structuring and method of group work

The study found across all the modules that the primary driver for the structuring and method of group work was the setting of the activity in an environment in which students would be employed following their graduation.

The literature review suggested that the learning design, a responsibility of the instructor, was the initial point of consideration. Deliberation by the instructor on the elements which should be considered at this stage were student attributes, learning theory, learning outcomes and instructors' experience and training and, given these characteristics, the most appropriate method for the group work. This reduced the risk of the learning outcomes not being achieved and any impact of poorly structured learning on students' experiences. However the study found differences from the literature in two notable respects.

First, the research found that the structure of the group work differed from that suggested in the literature. The empirical study showed that decisions relating to the design, type and structure of the task were applied after first determining a real-world activity. This process is illustrated in Figure 9 and was in contrast to the decision process identified from the literature, see Figure 1.

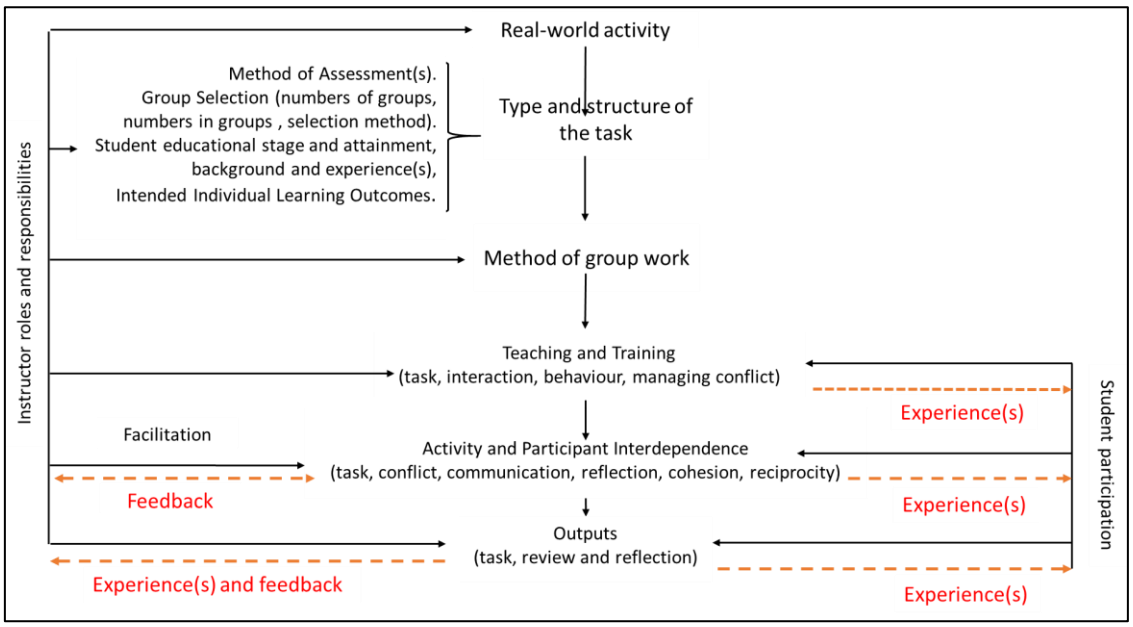


Figure 9: Structuring of variables in group work

The evidence from the empirical study showed that the staging of the group work in a real-world scenario as preeminent with the type and structure of the group task being subservient to this decision. Decisions regarding student attributes and learning outcomes, were decided in conjunction with the type and structure of the task and before a decision on the method of group work.

The study has been able to demonstrate that students' perceptions of their learning achievement was very positive and related to both technical and interpersonal skills. Equally, learners did not report any criticisms about the instructors' organisation of their learning, their experiences were viewed as being positive overall and they found placing of the group work in a real-world environment to be a strong positive experience. These views were not specific to any module or learner characteristic.

This might suggest that a positive learner experience can be achieved without following the process suggested in the literature. However, students did report negative aspects in the study which, from the evidence presented, suggests a failure to account sufficiently for some of the elements in the design process at the appropriate juncture.

Students reported difficulties in many of the aspects associated with group dynamics which highlighted their lack of previous training and experience. While this failure impacted on group dynamics, it could be argued that by not accounting for student attributes before a determination of a real world approach, students might find themselves in a situation for which they were insufficiently experienced.

Learning outcomes were similarly determined after the real-world approach was determined. The structuring of the outcomes in this way means they are influenced by the earlier decisions rather than considering the criteria for the students learning and structuring the other criteria to meet these requirements.

Application of theories of learning in the structuring of group work was not evidenced directly in the interviews with academic staff. Although the decision to approach the work from a real-world perspective indicated a consideration of one of the key learning theories for adults, andragogy, there was no consistent

application of Knowles, Holton III and Swanson's (2015) assumptions for adult learners in evidence, e.g. the learning content focused on issues related to their working life but a deep understanding of learner attributes was absent. As the students were categorised as adults more evidence of the learning being structured towards the categorisation of the students would have been expected.

The literature proposes that any design of group work has to account for the level of experience and training an instructor has received. However, while the evidence from the study suggested that instructors were experienced at group work, their level of training was limited. The evidence from the empirical study was not able to support or contradict the lack of training as a factor in learner experiences.

The combination of these findings from the empirical study provides some support for the structuring of group work to reflect the view presented in the literature. Future research may wish to focus in more detail on the structuring of group work elements. These tentative results suggest these should be a focus on student attributes and learner outcomes at the beginning of the structuring process and a greater consideration of learning theories in the design of group work.

Secondly, the choice of method for the group working was not aligned solely to a specific model in three of the modules. The methods utilised adopted elements of many of the methods presented in the literature, e.g. Cooperative, Collaborative, Problem Based Learning. However, the adaptation of methods in the study was not found to detract from overall learner experiences. This was consistent with the literature review findings on adaptation of methods, although not supported by the literature on specific approaches where adaptation would be contrary to the principles of the method (Kayes, Kayes and Kolb, 2005; Johnson and Johnson, 2009). Research from the literature review suggested that changes are made to methods by instructors in order to achieve a better professional outcome for students. The key principle is to ensure a good fit for students. Results from these studies indicated positive effects (Dunaway, 2005; Zhang, Hansen and Andersen, 2016) as indicated in this research. It can thus be

inferred that the adaptation of a method, e.g. Project Based Learning utilised in engineering design, does not detract from learners' experiences. The impact of the extent of adaptation might have been a factor but this was not determined.

It was suggested in the literature that adoption of a collaborative way of working was more appropriate for learners in higher education. These students should have the levels of motivation, authority, respect and responsibility as well as the intellectual curiosity for collaboration to work effectively. Panitz (1999b) subscribed to the concept of collaborative learning as being of a higher order when the underlying premise was based on consensus building and mastery of the craft of interdependence.

The findings from the empirical study on the effectiveness of the method in supporting collaborative working were mixed. The work package[5] methodology adopted in all the activities resulted in allocation of work to individuals followed by periods of a collaborative nature to discuss and collate results for inclusion in the assessed work. This was the norm but did vary as the level of independent learning undertaken by students in any activity varied.

It was the working independently which created difficulties as the members of each group were reliant on each other to share their knowledge and this was not always evident, e.g. evidence of free riders. Practical considerations similarly impinged on opportunities to learn collaboratively or created issues where group dependencies were linked to a group members' ability to complete a task.

A factor which conceivably contributed to the combination of independent and collaborative working was the reported lack of advice and support on how to structure groups.

The level of knowledge generation within each group was difficult to assess from the interviews taken for this research and might be worth further investigation. However, the current approach was broadly effective and satisfied many of the criteria expounded as necessary for collaborative working within the literature.

[5] Work by technical discipline

5.1.2 Group allocation

The results of this study indicate that students' experience of diversity in their groups was a positive aspect of their group working. Diversity combined not just the international dimension of language and culture but also gender, a range of ages, disciplines and skills. This multiplicity led to different viewpoints about the way in which students approached tasks which broadened students' outlook and understanding. There was no evidence from the research that any specific factor explained the level of positive experience in this area.

Selection for all the modules was under the control of the module leaders who applied criteria to optimise the mix in each group. The intention was to provide the students with the benefits of working in heterogeneous groups. The composition of the population, whether it be nationality, language, skill, age, discipline or gender, supported the options available for selection.

From a student perspective there was evidence from the research that their knowledge and understanding of the selection process and its basis was a source of anxiety. These anxieties were not reported from those in Module 2, where the selection process was visible. It could be inferred that making the process more visible would mitigate these anxieties and improve the students' experience. Any ulterior motives regarding the formation of groups by instructors could be allayed by doing selection in the presence of the students.

The findings show that, while conflict existed within the groups it was not referred to as a consequence of diversity in relation to the international mix, more a clash of personalities. The level of affirmative experiences was unexpected given some previous studies' accounts of how diversity, most frequently in relation to international groups, can exacerbate the issues known to exist in non-international group work (e.g.Moore and Hampton, 2014). Equally there was little or no evidence of the factors reported in the literature which ameliorate the difficulties, e.g. preparation or opportunities for reflection (Elliott and Reynolds, 2012) and any such benefits of these can therefore be discounted.

No difficulties were found associated with gender, contrary to expectations, as a previous study, concerning international groups, found that a higher percentage of women experienced greater problems in groups than males (Gabriel and Griffiths, 2008). However, this could only be interpreted from the two modules with a more even gender split because one module contained only men and no women were interviewed from the module with the highest male to female ratio.

Age did not appear to be a factor that impacted greatly learners' experience. Although the impact of students with more experience was referenced it was not related to age. While the mean age of the participants in each module was in the range 24-32 years, each cohort had a number of more mature students offering influences from their greater work experience and involvement in group working. Though age was not consistently presented in the literature as an aspect of learner experience it was a factor in some. These studies were where age was a negative aspect in relation to status and hierarchy in groups (Yeadon-Lee and Worsdale, 2012) or othering[6] of learners in different age groups (Moore and Hampton, 2014).

The range of nationalities in the investigation led to few situations where multiple students from the same country were allocated to the same groups. In relating their experiences students did not show nationality as being an adverse factor in their experience. This was significantly different from the situation in the reviewed literature where the spread of nationalities reported either had a higher concentration of some nationalities (Melles, 2004; Elliott and Reynolds, 2012) or greater numbers of students as the sole representative of their country (Gabriel and Griffiths, 2008; Moore, 2011), with both showing negative experiences for students. This study did not investigate whether students' prior knowledge of the international dimension of the student intake was a factor in their acceptance of international working in groups. Thus, it cannot be inferred that this was a factor in their positive experience.

[6] A process of polarisation amongst participants (Elliott and Reynolds, 2012)

In relating the students' experiences of multiple languages, the findings show that over two thirds of the international students found occasions when difficulties existed but overcame them through patience. As the groups were balanced by the other criteria mentioned the opportunities for small numbers, of whatever category, to develop cliques or sub-groups were reduced. Not balancing groups was considered to lead to issues around cohesion and collaboration (.Michaelsen, 2002).This tactic is consistent with other research on group selection. It may be considered that the range of criteria leaders use to balance groups ensures such a range of diversity that no one criterion becomes a source of conflict. By making groups as mixed as possible some of the associated issues are mitigated.

Alternatively, the variety of skills and disciplines used as criteria might have provided learners with opportunities to show their skills in their group and offered a context in which to discuss the task from different perspectives. The emphasis put on the real-world experience would suggest a group's ability to meet the task objectives meant these were the more dominant criteria in selection with the others used to balance groups and thus it was from this aspect that students possibly benefitted most and therefore improved their experience.

5.1.3 Group dynamics

The study found learner experiences were negatively impacted by difficulties with interpersonal conflict, free riders, structuring their groups and the support of instructors in resolving issues.

Students from the study reported interpersonal conflict due to free riders or a lower ability student in each group. The presence of these students resulted in additional workload for some as they made up for the failure of others to complete their share of the work. These issues were among those reported in the literature as to why group work was difficult but provision of training or support in confronting behaviour considered unacceptable was key to developing students (McGraw and Tidwell, 2001; Rafferty, 2013). Students themselves have presented advice on managing interpersonal conflicts effectively (Tombaugh and

Mayfield, 2014) and opportunities to discuss how to approach and deal with this were positively reviewed in the literature (Drake, Goldsmith and Strachan, 2006)..

An important concern was the students' clear knowledge that their group included an individual who either did not have the necessary skills to cooperate at the same level as the rest or were free riders. Students in this study and others (e.g. Underwood, 2003; Nordberg, 2008) accepted this phenomenon but it was considered to be unfair by the majority. This suggested conflicting values and attitudes to students because there were no reports of this being addressed.

In reviewing earlier studies a fundamental requirement for staff was to be vigilant in reinforcing a culture of group responsibility through identification of free rider participants. This was due to students described as being reluctant to report unhelpful peers (Underwood, 2003). Nonetheless the current study found a lack of intervention when learners, identified as not participating, were reported by students. This was perceived by students as them being left on their own to resolve the issue. A poorly performing member of staff would not be tolerated so what message was being given to students if those in authority failed to take action.

Similarly a consistent theme from students in the study was a lack of support by instructors in many of the other areas of group dynamics. The structuring of groups being reported as the one being most regularly reported. Despite the literatures emphasis on improvements to group dynamics being related to relevant instruction and training none was provided to students in this study.

5.1.4 Training

The findings from this study with respect to training on the process aspects of working in groups showed an overall deficiency in provision for learners and instructors. These results do not correspond with those presented in the literature where learner experiences were improved by their own training and a perceived a lack of training in their instructors on group work was not acceptable (Greenan, Humphreys and McIlveen, 1997; Brown and McIlroy, 2011).

The staff in this research relied upon their own experience or advice from their peers when designing and delivering group work. There was little to no sharing of best practice between disciplines, schools or the wider university and where this had occurred the level of uptake was low.

When comparing the training academic staff obtained in the research with the literature, the variation was in delivery of the interpersonal and facilitation skills that learners had subscribed to as being beneficial. Students, even in postgraduate studies, still looked to those in authority to resolve unacceptable group working behaviour (Underwood, 2003).

As poor experiences in these aspects of the group work dominated the findings a link between the lack of instructor training and learner experiences might be inferred. The discrepancy could be accounted for by instructors' views of student training not being an effective use of time or interventions reducing learning opportunities for students in resolving issues. However, it was not possible to discern if the basis of the discrepancy was a lack of training in the necessary skills or their assessment of the educational role of intervention.

The issues of intervention and support by instructors were viewed from two very different perspectives by the parties involved. Research interviews with staff pointed to their understanding and the benefits for students of working in groups and offered reports of positive student feedback on their experience. However, several examples from student participants contradicted this positive view.

Learners were predominantly satisfied with the level and availability of support of a technical nature. However, common comments on the lack of support from instructors, especially on group processes, and of instructors' demeanour did not reflect a positive supportive culture. The intention from an instructor's perspective was to engender students' learning and development by leaving groups to try and resolve their own issues. Without an understanding of what was expected of them this point was lost on some students and led to difficulties with some negative experiences.

In the three modules where training was available for students it was either not taken up; it was not adequate for supporting learners or its position in the programme was not ideal. These factors undoubtedly influenced students' expressions of a better understanding for how groups work as an item for improvement. In the only instance with some level of instruction delivered, the impact on students' ability to apply it to their group experience was positive, although it did not support them sufficiently. Taken together these experiences indicated a lack of consideration about delivering training as a tool to improve group working and student learning.

In considering why this occurred it is important to note that each programme had its own variations. For example in Module 1 training was not considered appropriate due to the characteristics of the majority of the student cohort. Although an alternative view that might be relevant is that training ought to have been delivered to all the learners for the environment in which they were working.

Delivery of skills after the relevant group activity was seen as being too little, too late. The duration of the training and students' lack of experience applying it to their activity were cited as reasons for this situation and whilst the training would support the learners in future group working it did not support students' present experiences.

Module 3 offered a contrast to the other groups because the students were allocated to Learning Teams for a year and remained in those teams for all their group activities. The team building exercises in their orientation week were received positively but were not comparable with group process training. They were also supported, to some degree, in understanding how people work together through the academic module Managing People and Organisations. This had a positive impact on students as it supported the concept of training in group processes. It seemed inconsistent that a module on people and organisations was not included in other disciplines which were also run by people who work in organisations.

The use of Learning Teams was structured to provide support to students in their learning and personal development as outlined in the students' handbook. This

was not reported with any enthusiasm or interest by the participants in this study. The failure to take up the opportunity to develop group skills in such an environment suggested that as a tool for the personal development of learners it was not meeting its aims.

An unanticipated finding was the segregation of students in Module 4 from the training provided by the School in the first week of the group programme. The reason for this was that it was considered an unproductive use of time. This view was reinforced by the perception of positive student feedback to staff. There was however no clarification as to whether the feedback referred to was directly related to the delivery of training or the module as a whole.

School training covered some of the aspects which learners felt were missing in their group activities, e.g. project management and team working. Students were additionally able to access this through the University's virtual learning environment. Details on the utilisation of these resources by learners' were not available to the researcher at the time of the interviews and was therefore not explored.

However, the failure to take up these opportunities suggested that the poor group functioning disclosed by learners might be connected to their lack of training. The research showed there was a range of skill sets among the sample and whilst it could be accepted that postgraduate students should already have the necessary skills, either due to their maturity, experience or both, requests from students for improvements in developing the necessary skills provided evidence that being a postgraduate student did not necessarily imply either knowledge or skill.

Prior studies have not always shown a causal relationship between training and positive experiences of group working due to the many variables which affect group working (Gibbs, 2017). Some studies though on postgraduate programmes into the teaching of group skills, group dynamics and team formation have presented outcomes of improved student motivation, personal development, informed reflection and self-analysis (e.g. Greenan, Humphreys and McIlveen, 1997; Drake, Goldsmith and Strachan, 2006). Johnson and Johnson (2009) strongly promoted the teaching and application of skills for individuals who were

to work together. A modicum of these were necessary if they were to cope with the stresses and strains of working together productively. The study indicated the overall level of training delivered as being insufficient and improvements in this area would benefit students.

The study also found, contrary to the literature, that a series of key skills for professional and personal development of students were not promoted. It could be inferred from this deficiency that a culture of interpersonal development was not valued. If students perceived that this was not regarded seriously by academic staff it would not encourage appropriate behaviour. Several reasons behind this situation have been presented in the literature e.g. it is not the role of academics to teach skills (Prichard, Stratford and Hardy, 2004), staff are not suitably trained to assume this type of role (Greenan, Humphreys and McIlveen, 1997). This situation does not however exhibit to students the importance of their development as professionals.

It might be argued that implementation of training was not time and cost effective but in the competitive market of postgraduate education it could be thought unwise to have ignored opportunities to deliver a premier learning experience. There were strong benefits of improved training. For example, when delivered effectively, student interaction improved which benefited their learning from both academic and personal perspectives (Prichard, Stratford and Hardy, 2004).

5.1.5 Assessment and reflection

In this research the analysis of assessment focussed on the summative element undertaken at the end of a module because it was this aspect which primarily concerned the participating students. The impact of formative assessments was only discussed with regard to the relationship with the learners' summative assessments.

The promoted principles for assessment of group work were to design the assessment in such a way that interactions were supported thus ensuring contributions were generated from everyone; to see better students benefit from their greater contribution; to include both self and peer assessment (Gibbs, 2017).

In comparing these principles to the schemes of assessment in the study there was very little consistency.

The modes of assessment investigated appeared to meet the designing principle of supporting interactions and contributions from everyone (Gibbs, 2017). Activities which required individuals to act together to produce work for assessment predominated in terms of quantity and mark value. The one exception was Module 2 where an individual report accounted for 90 per cent of the grade. It might be argued that inclusion of a group section within the report was sufficient to motivate students to work together or the nature of their task, a space design project, which necessitated all the component disciplines to co-operate to achieve the task. Conflicting evidence was found with some students focussing on their individual assessment to the detriment of others who were working for the collective good. This gave rise to discouraging views by learners of their fellow students and the assessment process.

Contrary to expectations the structuring of the schemes of assessment did not deliver opportunities for better students to benefit from their greater contribution as evidenced in several of the modules. Students in Module 1 were required to identify the elements of their work in the group report but it did not offer an obvious contribution in terms of the assessment, other than possibly to ensure all students participated to some degree. The quality or quantity of a learner's contribution was not discernible. Module 3 offered no mechanism in the group work for identifying which students contributed most. Module 4 included contributions to group work assessed by instructors but the marks allocated to these were relatively low. These were unlikely to have proved to be a sufficient incentive for learners inclined towards free riding to have increased their level of contribution. Given the amount of literature and advice from professional bodies on group assessment (e.g.Gibbs, 2017; Jackel *et al*., 2017) this was unexpected.

A related point is why there was a group assessment when group selection resulted in one student being unable or unwilling to make their fair contribution. It was likely this acted as a demotivating factor for learners and additionally might have forced the less able learner into the role of a free rider.

Instances of self and peer assessment were included in three of the assessment schemes but these did not provide constructive experiences. In examining this a consideration was the identification of a lack of opportunities to understand and practice reflection. Additionally, where formative assessments were planned they were not always carried out. Inclusion of self and peer assessment was supported in the principles from the literature (Exley and Dennick, 2004; Johnson and Johnson, 2009), by the advice of the Higher Education Academy and the University's Senate guide to assessment in taught courses (Cranfield University, 2016). However, teaching and facilitating of these types of assessments and reflective skills were not maintained, contrary to Bolton's view (2010).

Similarly, there was no evidence in this research to suggest learners were prepared and provided with guidance in the area of peer assessment. It was suggested by Gibbs (2017) that overcoming some of the key issues of peer assessment, e.g. whether it could be trusted, required students to be familiar with, and have ownership of, the criteria used. This improved the reliability of the results. Several studies have indicated the success of group work is associated with the level of skills learners possess in being able to manage the whole group process. These, include a familiarity with the process of assessment, and as such learners require help in interacting across complex boundaries (Gibbs, 2017).

While students accepted the difficulties associated with delivering a fair system and some believed their assessment was fair, others experiences reinforced the view of unfairness predominantly in relation to the levels of work undertaken by some learners in the groups. There was no assessment mechanism which could not be undermined. Nonetheless, where an appropriate teaching and learning culture existed, where students had an understanding of the use of group work and of the assessment methods, where they behaved appropriately and possessed suitable skills, then a fair mechanism could be implemented (Gibbs, 2017).

6 CONCLUSION

This chapter summarises the aims and findings of the study and considers the degree to which the research question has been answered. It also summarises the limitations of the investigation, implications for future research and finally the implications for practice.

6.1 Addressing the research question

The present study was designed to determine what aspects of group work influence learner experience. It was expected to access students' perceptions, insights, thoughts and feelings on the aspects of group working which influenced the quality of their experience.

The primary data collection method was one-to-one interviews with academic and administrative staff and learners. Analysis of these revealed a succession of themes which impacted on learners' experiences, their general views and overall experience. Key findings from the analysis identified four main points in relation to the research question.

A constructive approach to delivery of a good experience was to make the activity as realistic to a working environment as possible. The impact of this was significantly higher when the approach included direct contact with clients. Students' technical skills and experience were enhanced by the adoption of this as the primary driver for the approach. This however reversed the sequence of criteria reflected in more traditional pedagogical approaches.

Diversity incorporating nationality, age, gender, skill and discipline provided students with a strong positive experience. The differentiating factor compared to other studies was the level and range of diversity. This was sufficiently high to reduce the negative effects described in other studies. The spread of skill and discipline reduced sub-group development and necessitated cooperation in the achievement of tasks, although this might have been a unique situation due to a particular spread of factors presented by the enrolled students.

A failure identified in the study was the lack of training for students in relation to group processes and the skill of reflection for personal development. The lack of training in relation to group processes had the largest negative effect on learner experience as difficulties in how to work in a group were felt.

Learner experiences were not negatively influenced by the schemes of assessment though this was probably impacted by learners' acceptance of them as being inherently unfair. The schemes did not totally follow the advice from professional bodies or the literature in that there was little or no opportunity for better students to obtain better grades.

The learner experience of reflection was nominal and as reflection is a key aspect for professional engagement the deficiency did not develop learners to their fullest potential. Arguments might be put forward about the feasibility, necessity or role of higher education in delivering these skills but without them learners will continue to find their experience is compromised by the problems they can create.

6.2 Limitations of the research

With regard to the literature, it should be noted that earlier learner experiences of group work in an undergraduate environment were not included in the reviews. This was because the research was intended to investigate postgraduate experiences. This constraint might have limited the examination of relevant research.

The relative inexperience of the researcher in conducting interviews should also be noted. Opportunities presented in the interviews to put questions to the interviewees to explore points in more depth might not have been discerned and thus limited the results.

Timing was possibly another limiting factor. The period during which the interviews were conducted was towards the end of the teaching periods which meant many of the interviewees were leaving campus within a short period and were not available for follow-up interviews.

Access to informants was through a purposive sampling strategy and the introduction of researcher bias was a potential limitation due to the adoption of this approach. This was acknowledged at the beginning of the process and a structured approach maintained throughout to minimise any impact. Additionally, the interviewees who offered their opinions might not have been representative of the population. The sample sizes from each module were consistent but represented varying proportions of their populations which could have introduced a degree of bias.

Further, it should be noted that these findings were predicated on a single institution with a small sample and therefore might not be generalisable. This was considered to be valid on the basis that it was representative of those institutions delivering postgraduate taught programmes and offered an opportunity to conduct research into the phenomenon. The findings did concur broadly with practitioner views, although further study in other organisations was recommended to provide greater confidence.

A further possible difficulty was that since this was a sponsored degree, there might also have been a potential conflict of interest between the role of the researcher and the associated organisational sponsorship and the possibility that findings might challenge existing organisational views. In practice, this was not seen. In fact, during the study, there was interest and support from the organisation for the ultimate research findings.

6.3 Implications for learning design

In considering how the structuring of group work has been presented in this study it broadly informs and guides the decision-making process for instructional experiences which make the acquisition of knowledge and skill effective, and appealing. There are however two important changes which need to be deliberated.

A key policy change concerns the aim of the group work itself. Is it to represent, as nearly as possible, the working environment in which students are likely to find themselves in employment or as an experience in which they are able to learn

the technical and interpersonal skills of group work? It might be argued that it is possible to do both although the research indicates this is problematic due to constraints of time and resources. The real-world design approach currently in operation results in many undesirable course features leading to poor experiences for some learners. If the aim is to offer an experience in which learning interpersonal skills is a factor then the inclusion of suitable objectives along with such features as how instruction on this will be delivered and the objectives assessed is needed in the design.

The research is grounded on the premise of the learners being adults and the learning design structure is based on the types of characteristics these learners present, e.g. they have experiences upon which they can draw and apply to new learning, internally motivated, self-directed etc. This study indicates that although postgraduate students, are considered as adult learners they do not all meet all of these criteria either by their educational definitions or in the characteristics relevant to adults for learning.

A greater number of students are entering postgraduate courses directly from honours programmes without accumulating a reservoir of experience that is a resource for learning. Moreover not all schools or higher education establishments utilise group working with the concomitant result that some postgraduate students arrive at Cranfield University with no training or experience of this method of learning.

The change to becoming a self-directed human being and the motivations for learning are similarly predicated on a level of maturity which the research has indicated is not always presented by the learners. These findings have implications for learning design where it is essential to reduce the detrimental features which impact student learning and experiences. A reasonable approach would be to improve the collation of data on learner attributes before commencing the group work design and to instigate a programme of training which prepares and then supports learners through the process.

6.4 Implications for practice

The findings of this study highlighted some important areas for development in the practice of group working in postgraduate taught programmes. It was therefore recommended that consideration be given to the following areas for improvement.

It is important to understand students' previous experiences. Much of the literature showed the significance of knowing learners' previous experiences and level of skills associated with working in groups. The research showed current practice did not appear to undertake an in-depth examination of this which created problems impacting on learner experiences. An assumption by instructors regarding learners' experiences and abilities resulted in pre-instructional decisions which were beyond some of their capabilities or for which the learners had not been sufficiently prepared.

It was apparent from this study that training for both students and staff on areas directly related to the processes involved in working in groups and facilitating groups' interactions as a means of improving the learner experience would be beneficial. Students clearly indicated it was in this area of their experience that they wished to have had more understanding and support from instructors. The balancing of facilitation to support learners' achievement while promoting learner self-discovery was leaning too far towards isolating the instructor from the group with a concomitant impact on learners' self-assurance. Assisting staff with understanding facilitation and how it could be used to improve students' skills and learning would appear to be essential. Johnson and Johnson (2009) were emphatic in views of teacher training, emphasising conceptual understanding of the nature of cooperative learning and the basic elements that make it work.

There was also compelling evidence for the implementation and training for both parties on self and peer assessment. This aspect of assessing students learning was not delivered consistently across the Schools despite evidence to connect this activity with students' learning. Undertaking assessment of peers and assessing one's own development is a key skill in a working environment but one which was currently underrepresented at Cranfield. Allied to this type of

assessment was reflection and if reflection is to be effective it needs confident, experienced teaching and facilitating to affect genuinely practitioners' lives and those around them (Bolton, 2010). Peer assessment was a common approach for overcoming the issue of allocating fair marks to individuals in groups but as a method its effect should be significant enough to leverage appropriate group learning behaviour. An implication for this study of poor experiences with less able learners and free riders suggested this practice was not meeting its desired outcomes and grade boundaries for the different elements of assessment should be deliberated upon.

The nature and level of feedback from learners was largely overlooked. While the organisation has developed a process of feedback for modules, its application was haphazard with unconfirmed feedback directly to instructors being the most frequent. This failed to capture data of sufficient quantity or depth for organisational development in this area. If Cranfield wished to advance learners' experiences it should create a process which identifies those aspects of group working that either do or do not bridge the divide between expectation and delivery.

6.5 Implications for future research

As an exploratory study into learner experiences this study offered opportunities to gain insights into a variety of learners' experiences for later investigation. It was therefore recommended that consideration be given to further research in the following areas.

The period and timing of this study meant learners' opinions were collated at the end of their group working experience. Unsubstantiated feedback from staff indicated affirmative views of learners' programme experience when in their working environment. Since this feedback is insufficiently detailed, further understanding might be gained from conducting a similar study six months or a year after course completion. This could offer different interpretations as to which aspects impacted their experience during the activity and how their employment experiences related to their programme activity.

Further studies need to be carried out in the area of learners' expectations regarding group work. Expectations were set in part by their previous experiences. Students instinctively compared each new experience with previous ones and judged accordingly. Where no experience existed, expectations could also be shaped by information, communications or a personal situation. In order to ensure that a learner's experience met their expectations, monitoring and probing of their prior experience would be necessary and investigating this might generate opportunities with which to understand the discrepancies that existed between expectation and experience.

Another possible area for future research offered was to investigate the differences in experiences as a result of different approaches to training prior to group work. More work needs to be done to understand the impact of training learners for group work and the influences different aspects of training have on experiences. Further enquiries might explore the appropriateness of project management, conflict resolution or group communication skills for learners or the effect instructor training in facilitation could have.

The research identified that the levels and types of group activity included in programmes were varied. It would be interesting to assess what, if any, effects curriculum, programme structure or encouragement of a learning environment conducive to responsible collaborative learning have impacted on the behaviours and experiences of learners.

The study showed surprising positive experiences from the level and range of diversity learners experienced. An investigation into future cohorts or cohorts from other institutions with differing student characteristics should provide data to determine whether the positive experiences in this study are comparable. Further research along these lines would validate features for group working which might be significant.

This study and the literature revealed the impact of a less able student on participant interdependence with an assumption of their acceptance of a free rider role. This might not be the case and further investigation into this aspect of mixed

ability selection is invited to determine the emotional and academic impact on the individual and other members of a group.

6.6 Summary

This investigation has revealed a variety of themes which impacted on learners' experience of group work. Four main points provided significant insight: approach, diversity, assessment and training. While the research focussed on a small sample, and its findings were not considered generalisable, the results suggest several aspects for future research.

The areas of learners' expectations of group work, their post-employment feedback and above average levels of diversity all merit further study. Developments in training for staff and learners and a greater understanding of learner characteristics were suggested to improve practice. Implications for future design of group work centred on the assessment and inclusion of student training as an educational requirement but at a possible diminution of other design features given some of the other restrictive criteria of group work.

7 PERSONAL REFLECTION

One element of the Cranfield M.Sc. is the emphasis on personal reflection and development. This section draws on a series of reflective notes written throughout the period of the research to show what and how the author has learned about the process of undertaking research and the impact this venture has had on her.

7.1 My reflections

My time as a student at Cranfield did not get off to the smoothest of starts because for the first two months I was still working my notice period with my employer. In addition, due to a previously booked holiday, I missed the introductory week of lectures for the Doctoral Research programme that I was enrolled upon. This was not a major problem but I believe that when beginning any new endeavour, being involved from the start reduces the inevitable stress.

I had been informed at the interview about my inclusion with the Ph.D. students and it was intended they would effectively be my cohort for the year of my studies. In considering how this has worked I can only report mixed results. The programme was designed around the requirements of doctoral students whose academic needs and time frames were considerably different from mine. This meant some lectures were not relevant to me and so did not need my attendance. The timing of some lectures that would have been helpful did not match my stage of study. My experience of those I did attend was positive and I learned how many aspects there are to undertaking research and the variety within each. The higher academic content of some, particularly philosophical approaches to research, challenged my intellectual capacity. It was occasionally necessary to discuss with my supervisor whether some of the aspects were a requirement for a Masters degree. It was a good introduction into what is expected of doctoral students.

I always felt part of being a student is not just completing the requirements of a course but taking advantage of the broader academic material and resources available. Having completed my undergraduate degree part-time while I was managing work, family commitments and studying, I thought the opportunity to study full-time would offer me more opportunities to engage in what Cranfield

University has to offer students. This has not been as successful as I had hoped, primarily because I was not based on campus and the workload meant I often felt unable to attend events which were not directly relevant to my research. Nevertheless, I availed myself of a range of courses, lectures and webinars to support my studies and broaden my knowledge.

The process I was required to follow was not particularly difficult: the hard part was the input required. I applied my time-management skills at each stage to meet the required deadlines, a strength of mine. I always felt pressure to achieve these deadlines and wondered if I exceeded the weekly hours expected of a postgraduate student. It has certainly taken over my life. Even when I was not reading, writing or researching, some idea was whirling around inside my head: it was almost impossible to switch off. I was comforted to hear a doctoral student say the same thing at a training session. I do wonder, now that I am coming to the end of my time at Cranfield, how I shall cope with the loss of the impetus my studying has given me. I no longer need employment, nor to consider my career, but I contemplate how I shall cope without something to occupy me.

In reflecting, I have considered one of my questions for the interviewees in my research. What has been the best and worst part of the course? Two really bad points were the change to the research question at my third review meeting and the lack of students willing to be interviewed. The change to the research question was the only occasion when I was reduced to tears. Up to that point I had been working towards research associated with learner outcomes but the panel was not satisfied that my research question had sufficient clarity and questioned my sponsor about what they expected. A revised question was proposed and agreed after much discussion. At the time, I did not think seriously enough about the impact it would have on me but once the meeting was over and I started to realise what the change involved, I became very depressed about the situation. However, like many things that do not work out the way you would like, the only way to progress was to address the problem and attempt to resolve it. This was where the resilience training I attended came in. This training was really a refresher for me: forty years of working and married life has developed quite a lot

of resilience, perhaps even grit. My supervisor was more than understanding throughout the course and I valued her supportive phone calls and our early morning meetings to get me through the initial panic I experienced.

I knew things do not always go to plan and just because the design for my research included interviewing twenty students did not mean it would happen. I spent a very anxious week or two wondering whether all my work would come to nothing if I could not obtain sufficient data. I had done everything I could to engage with the students, explained my requirements, kept their time commitments to a minimum, been flexible with interview appointments and followed up any indication of interest. I really did not know what else to do. The added pressure of time moving on with nothing happening did not help either. I turned to my supervisor and discussed various options, none of which were ideal, and just as it looked as though I should have to make a difficult decision it all came good. I met the interview target and my relief in knowing I had the data I needed was indescribable. It was all down to me from then because I was in control of the situation, a much happier place for me.

Identifying the best part was difficult. During my earlier studies, when asked if I was enjoying it I often replied that enjoy was not the right word. Looking back now, I did enjoy the course. I must have because I resigned from my job and took up studying full-time. I shall feel enjoyment again when I have graduated. I have learned so much about so many different things associated with my research that it is impossible to select one moment and say it was the best. It is a coalescence of everything which has brought me to this point and I take confidence in what I have done and achieved.

It would be unrealistic of me not to have expected that my age would have an impact on the way I organised my study, the thoughts and impressions of some aspects of student life and others' perceptions of me. Probably the most common perception was that I worked at Cranfield, either in some administrative capacity or as a lecturer. Someone once thought I was a professor but I suspect the phrase was meant more in relation to being a teacher. After I had established that I was a student the assumption was I that I was studying for a Ph.D. Conversation

developed further when I explained my research was at Masters level which put me outside the norm for Cranfield. Research equated to doctoral study and a Masters degree was only associated with a taught programme. It always made for a good ice breaker and most people were keen to understand how I was finding studying after working for so long.

It has not just been my age which made me unique. As the only Masters by Research student in SoM I quickly realised that the systems infrastructure was not set up to cope with me. The only way I could be processed was as a doctoral student. Every interaction with the support services, or event I wanted to attend, required explanations. Being unique became obstructive at times and definitely meant people I came into contact with remembered me, which might have been a good thing or not.

Undoubtedly the isolation I felt was possibly more severe being the only student in my category. The loneliness was in not being able to discuss how things were going with others at the same stage. Almost everyone I met was helpful and supportive but they were either not students or were doing doctoral research. Not being based on campus did not help with making social contact with other students. The suggestion that I move into the Doctoral Office in SoM when on campus did not resolve the isolation, although I did talk to a couple of the other students. I shall probably leave Cranfield without any student friendships, which is disappointing. The majority of the time I was on my own but I could at least put the radio on and listen to music. I have always considered myself to be resourceful but this past year has added to that.

I no longer listen to, read or watch anything in quite the same way. My time as a researcher has enhanced my appreciation of the role and the impact that the work undertaken by those involved with it can have. If my research is able to offer some level of improved provision in how learners are able to experience group working, I shall be content to have made a contribution.

'Every now and then a man's mind is stretched by a new idea or sensation, and never shrinks back to its former dimensions.' (Holmes, 1858)

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APPENDICES

Appendix A - Review of text template

Review of Text		
Title		
Author(s)		
Journal / Ranking		
Year		
How does this relate to my investigation		
What type of literature is it		
What doesn't it include		
What is their point of view		
How do they substantiate this		
What methodology have they used.		
What type of intellectual project:		
	Understanding	Improving
	Critiquing	Reflecting
	Evaluating	
How does the intellectual project being undertaken affect:		
	the research question	
	place in theory	
How does the authors target audience affect the reporting of the research		
What is being claimed that is relevant to answering my review question		
	theoretical knowledge, research knowledge, practice knowledge	
	what are the three or four most significant claims	
	are they for improving policy or practice	
	how clear are the claims	
	with what degree of certainty do they make their claim	
	how generalised are the claims: context universal, culture, national	
	how consistent are all the claims	
Backing for the claims		
	Are sources unspecified	
	What range of sources is used to back the claims	
	How roust is the authors research	
	Is there sufficient evidence to support claims with a high degree of certainty	
Is there a theoretical orientation or conceptual framework guiding the data collection		
Are the authors impartial, critical, positive stance		
Are claims supported by others work		
Are the claims consistent with my experience		
Summary	How convincing are the claims and why	
	How could the claims have provided stronger backing	

Appendix B - Systematic review literature

Authors	Title	Method of group working	Group selection	Group Training	Group Task	Assessment	Group Facilitation	International Group Working	Participant Interdependence	Learning Outcomes
Stepney, P., Callwood, I., Ning, F. and Downing, K.	Learning to collaborate: a study of nursing students' experience of inter-professional education at one UK university								✓	✓
McGraw, P. and Tidwell, A.	Teaching group process skills to MBA students: A short workshop			✓						
Greenan, K., Humphreys, P. and McIlveen, H.	Developing transferable personal skills: part of the graduate toolkit			✓		✓				✓
Sathe, R. S.	Using the cohort model in accounting education								✓	✓
Kayes, A. B., Kayes, D. C. and Kolb, D. A.	Experiential learning in teams			✓					✓	
Warhuus, J. P. T., Lene; Robinson, S., and Erna, S. M.	From I to We: collaboration in entrepreneurship education and learning?			✓						
Rafferty, P. D.	Group work in the MBA classroom improving pedagogical practice and maximizing positive outcomes with part-time MBA students		✓				✓			
Rafferty, P. D.	The evaluation of MBA group work: a case study of graduate student experiences and perceptions of positive group work outcomes					✓			✓	✓
Morgan, B., Rodrigues, A. and Rosenberg, G.	Cooperative learning, Jigsaw strategies, and reflections of graduate and undergraduate education students	✓								✓
Long, D. D. and Shobe, M. A.	Lessons learned from preparing social workers for grant writing via connected learning				✓					✓
Hanshaw, L. G.	Qualitative aspects of group-only testing									✓
Panitz, T.	The motivational benefits of cooperative cearning									✓
Snyder, L. G.	The use of pre-group instruction to improve student collaboration			✓	✓				✓	
Melles, G.	Understanding the role of language/culture in group work through qualitative interviewing							✓		
Murray-Harvey, R., Powshafie, T. and Reyes, W. S.	What teacher education students learn about collaboration from problem-based learning								✓	✓
Zhang, Z., Hansen, Cl. T. and Andersen, M.I.A. E.	Teaching power electronics with a design-oriented and project-based learning method at the Technical University of Denmark	✓			✓				✓	✓
Moore, P. and Hampton, G.	It's a bit of a generalisation, but ...': participant perspectives on intercultural group assessment in higher education						✓	✓		
Aburra, C., Villardon-Gallego, L. and Calvete, E.	Design and validation of the Cooperative Learning Application Scale				✓				✓	
Elliott, C. J. and Reynolds, M.	Participative pedagogies, group work and the international classroom: an account of students' and tutors' experiences		✓	✓		✓	✓	✓		
O'Connor, P. and Sharma, K.	Redesign of a large lecture course into a small group learning course	✓	✓						✓	✓
Myllymäki, S.	Cooperative learning in lectures of an advanced electrical engineering course	✓								✓
Brown, C. A. and McIlroy, K.	Group work in healthcare students' education: what do we think we are doing						✓			✓
Dunaway, G. A.	Adaption of teamlearning to an introductory graduate pharmacology course	✓	✓							✓
Hersam, M. C., Luna, M. and Light, G.	Implementation of interdisciplinary group learning and peer assessment in a nanotechnology engineering course	✓	✓	✓	✓	✓			✓	
Stevens-Long, J. and Trujillo, C.	Individual experience and paradox in the development of small groups								✓	
Drake, R., Goldsmith, G. and Strachen, R.	A good approach to teaching teamwork		✓	✓	✓		✓			

Authors	Title	Method of group working	Group selection	Group Training	Group Task	Assessment	Group Facilitation	International Group Working	Participant Interdependence	Learning Outcomes
de Hei, M. S. A., Sjoer, E., Admiraal, W. and Strijbos, J-W.	Teacher educators design and implementation of group learning activities					✓			✓	
Johnson, D. W. and Johnson, R. T.	An educational psychology success story: social interdependence theory and co-operative learning			✓		✓	✓		✓	
Rientes, B., Alcott, P. and Jindal-Snape, D.	To let students self-select or not: that is the question for teachers of culturally diverse groups		✓							
de Hei, M., Strijbos, J-W., Sjoer, E. and Admiraal, W.	Thematic review of approaches to design group learning activitites in higher education: the development of a comprehensive framework	✓	✓							
Janssen , J., Kirschner, F., Erkens, G., Kirschner, G. A. and	Making the black box of collaborative learning transparent: combining process-oriented and cognitive load approaches								✓	
Tombaugh J.R. and Mayfield C O	Teams on teams: using advice from peer to create a more effective student team experience			✓			✓		✓	
Verreault, D.	Design and delivery of a required corporate valuation course in an MBA program	✓								✓
Skilton, P. F., Forsyth, D. and White, O. J.	Interdependence and integration learning in student project teams: do team project assignments achieve what we want them to?								✓	
Jewels, T. and Ford, M.	The development of a taxonomy of desired personal qualities for IT project team members and its use in an educational setting		✓						✓	
Santos, C.M., Passos A. M. and Uitdewilligen, S.	When shared cognition leads to closed minds: temporal mental models, team learning adaptation and performance			✓						
Ceschi, A., Dorofeeva, K. and Starton, R.	Studying teamwork and team climate by using a business simulation. How communication and innovation can improve group learning and decision-		✓							
Lightner S., Bober. M. J. and Willi, C.	Team-based activities to promote engaged learning		✓		✓					
Underwood, J. D. M.	Student attitudes towards socially acceptable and unacceptable group working practices					✓	✓			
Bentley, Y. and Warwick, S.	Students experience and perceptions of group assignments					✓				
Bovill, C.	Enhanced student engagement through collaborative evaluation of a research module						✓			
Chalmers, L. and Keown, P.	Communitites of Practice and professional development								✓	
Yeadon-Lee, A. and Worsdale, G	An analysis of the use of action learning in an MBA programme		✓				✓			
Li, D., Clarke, D. and Remedios, L.	Chinese students' perception of out-of-class groupwork in Australia							✓		
Gabriel, Y. and Griffiths, D. S.	International learning groups: synergies and dysfunctions							✓	✓	
Nordberg, D.	Group projects: More learning? Less fair? A conundrum in assessing postgraduate business education					✓				
Baldwin, T. T., Bedell, M. D. and Johnson, J. L.	The social fabric of a team based MBA program:network effects on student satisfaction and performance								✓	

Appendix C - Exploratory themes and interview questions

Themes	Interview Questions
Approaches	Are there any particular circumstances, in terms of group work, which are unique to their school rather than any of the other schools? Within the Masters programmes are there any differences in the way approaches to group work are undertaken?
Group Size	Typically how many students in each group?
Group Task	To what extent are the group work modules designed? What factors determine the design of modules involving group work?
Group Composition	How is the composition of groups determined? Do you use any personality profile or learning style tests to assess students' suitability or preferences for group work?
Training	Do instructors receive training on group work? How do Module Leaders deal with conflict? Are students prepared for group work, i.e. any training or activities they undertake to support them in working as a group? Is advice given to students about how to deal with conflict in groups?
Group Duration	How long does the module last?
Assessment	How is assessment undertaken? Do you use any tools to assess students' personal reflections or development?
Best practice	Does the school share best practice on group working within the school or with other schools?

Appendix D - Interview protocols

D.1 Programme Director interview protocol

Category	Question	Source
Introductory	Why has group work been chosen as a part of the teaching practice for this course?	Emergent
Specific	What benefits do you see from the use of this teaching practice?	Literature, e.g. Morgan, Rodriguez and Rosenberg, 2008.
Probing	How do you see this benefit evidenced?	Literature, e.g. Panitz, 1999.
Specific	What are the disadvantages?	Literature, e.g. Zhang, Hansen and Andersen, 2016.
Probing	How is this evidenced?	Researcher
Specific	How does this fit with pedagogical theory?	Literature, e.g. Kayes, Kayes and Kolb, 2005.
Introductory	How do you determine the level of group work on the course?	Emergent
Specific	What criteria do you use?	Researcher
Specific	What constraints impact the level of group work?	Literature, e.g. de Hei, Strijbos, Sjoer and Admiraal, 2016.
Probing	What are you able to do about these?	Researcher
Specific	What are the advantages of this choice?	Researcher
Specific	What are the challenges of this choice?	Researcher
Probing	How do you overcome these? Are these specific to this course?	Researcher
Introductory	How effective do you think the group work has been at delivering its intended learning outcomes?	Literature, e.g. O'Connor and Ferreri, 2013.
Specific	Which aspects have worked well?	Literature, e.g. Gabriel and Griffiths, 2008.

Category	Question	Source
Probing	Can you give me some examples?	Researcher
Specific	Which aspects have not worked well?	Literature, e.g. Gabriel and Griffiths, 2008.
Probing	Can you give me some examples?	Researcher
Specific	How do you think this could be improved?	Researcher
Specific	How could training in design and delivery of group work for module leaders improve the effectiveness of the learning outcomes?	Literature, e.g. McGraw and Tidwell, 2001.
Specific	Is best practice of group working shared across the course, within the school and / or across schools?	Emergent
Specific	What training have you received in integrating group work as a pedagogical practice into course design?	Literature, e.g. Brown and McIlroy, 2011.
Introductory	How frequently is the use of group work the course reviewed?	Emergent
Specific	What feedback to do you receive, as a course director, about the course structure and the utilisation of group work within it?	Researcher
Specific	What changes to the course have been initiated to improve the student experience?	Researcher
Introductory	How do you think approaches to group work could be improved?	Literature, e.g. Greenan, Humphreys and McIlveen, 1997.
Specific	Course, School, University	Researcher
Probing	What initiatives have you introduced or seen introduced by others to improve group working?	Researcher

D.2 Module Leader interview protocol

Category	Question	Source
Introductory	Could you give me information on how group work is currently undertaken?	Emergent
Specific	How many students on the module?	Literature, e.g. Zhang, Hansen and Andersen, 2016.
Specific	How long does the module last?	Literature, e.g. Zhang, Hansen and Andersen, 2016.
Specific	How are they divided into groups?	Literature, e.g. Zhang, Hansen and Andersen, 2016.
Probing	Has this changed?	Literature, e.g. Rienties, Alcott and Jindal-Snape, 2013.
Specific	How big is each group?	Literature, e.g. Hanshaw, 2012.
Probing	How many staff?	Literature, e.g. McGraw and Tidwell, 2001.
Specific	How do you determine the task?	Literature, e.g. Zhang, Hansen and Andersen, 2016.
Probing	Group, Individual or both	Literature, e.g. Zhang, Hansen and Andersen, 2016.
Specific	How are groups facilitated?	Literature, e.g. Drake, Goldsmith and Strachan, 2006.
Specific	How is the module assessed?	Literature, e.g. Hersam, Luna and Light, 2004.
Introductory	Why has group work been chosen as the teaching practice for this module?	Emergent
Specific	What benefits do you see from the use of this teaching practice?	Literature, e.g. Morgan, Rodriguez and Rosenberg, 2008.
Probing	How do you see this benefit evidenced?	Literature, e.g. Panitz, 1999.
Specific	What are the challenges?	Literature, e.g. Chalmers and Keown, 2006.
Probing	How is this evidenced?	Researcher
Specific	Have you based your approach on any particular andragogic theory?	Literature, e.g. Kayes, Kayes and Kolb, 2005.

Category	Question	Source
Introductory	How do you determine the structure of the group work?	Literature, e.g. de Hei, Strijbos, Sjoer and Admiraal, 2016.
Specific	What criteria do you use?	Researcher
Probing	What about…?	Researcher
Specific	What constraints impact the choice of approach?	Literature, e.g. de Hei, Strijbos, Sjoer and Admiraal, 2016.
Probing	What are you able to do about those?	Researcher
Specific	What are the advantages of that structure?	Literature, e.g. Panitz, 1999.
Specific	What are the challenges of that structure?	Literature, e.g. Johnson and Johnson, 2009.
Probing	How do you overcome these? Are these specific to this module and / or course?	Researcher
Introductory	To what extent are students prepared for undertaking group work in this module?	Literature, e.g. Snyder, 2010.
Specific	How do you think this could be improved?	Literature, e.g. McGraw and Tidwell, 2001.
Probing	Can you give me some examples?	Researcher
Introductory	How do students respond to the practice?	Literature, e.g. McGraw and Tidwell, 2001.
Specific	What sort of feedback do you get?	Literature, e.g. Myllymaki, 2012.
Probing	Where can I get details of this?	Researcher
Introductory	How effective do you think the group work has been at delivering its intended learning outcomes?	Literature, e.g. O'Connor and Ferreri, 2013.
Specific	Which aspects have worked well?	Literature, e.g. Gabriel and Griffiths, 2008.
Probing	Can you give me some examples?	Researcher
Specific	Which aspects have not worked well?	Literature, e.g. Gabriel and Griffiths, 2008

Category	Question	Source
Probing	Can you give me some examples?	Researcher
Specific	How do you think this could be improved?	Researcher
Probing	How frequently is the module reviewed? What changes to the module have you initiated to improve the student experience?	Emergent Researcher
Specific	Have there been any unintended learning outcomes?	Researcher
Probing	Can you give me an example?	Researcher
Specific	How could training in design and delivery of group work for module leaders improve the effectiveness of the learning outcomes?	Literature, e.g. McGraw and Tidwell, 2001.
Probing	What training have you received in designing and delivering group work as a teaching practice?	Literature, e.g. de Hei, Sjoer, Admiraal and Strijbos, 2016.
Probing	Is best practice of group working shared within your school and / or across schools?	Researcher
Introductory	How do you think approaches to group work should change?	Literature, e.g. Greenan, Humphreys and McIlveen, 1997.
Specific	Course, School, University?	Researcher
Probing	How long have you been running this module? Have you instigated any changes to the module? What initiatives have you introduced or seen introduced by others to improve group working?	Researcher

Category	Question	Source
Introductory	Is there anything else you could tell me about your experience which we haven't talked about?	Researcher

D.3 Student interview protocol

Category	Question	Source
Introductory	Could you tell me about any previous experiences you have had of working in groups?	Literature, e.g. Murray-Harvey, Pourshafie and Reyes, 2013.
Specific	Was it a positive or negative experience?	Literature, e.g. Murray-Harvey, Pourshafie and Reyes, 2013.
Probing	What happened? Can you give me an example?	Researcher
Specific	Describe anything unusual about your previous experience(s)?	Researcher
Specific	How did it make you feel about doing group work in the future?	Literature, e.g. Tombaugh and Mayfield, 2014.
Introductory	Thinking back to when you were considering applying for this course what information were you given about the use of group work in your course?	Researcher
Specific	How did you find out about group work on the course?	Researcher
Probing	How do you think the communication of this could have been improved?	Researcher
Specific	Did it make any difference to your decision about coming to Cranfield?	Researcher

Category	Question	Source
Specific	Given what you have told me about the level of communication of the group work what were your expectations going into the course?	Researcher
Introductory	Tell me about the group work you have been involved with on this module?	Researcher
Specific	What aspects of the group work worked well?	Literature, e.g. Gabriel and Griffiths, 2008.
Probing	Could you give me an example? Were these the same for other students?	Researcher
Specific	What aspects didn't work so well?	Literature, e.g. Gabriel and Griffiths, 2008.
Probing	Could you give me an example? Do you think these were the same for other students?	Researcher
Specific	In what ways were you engaged in the process?	Literature, e.g. Panitz, 1999.
Probing	Can you give me an example?	Researcher
Specific	What were the benefits for you in studying this way?	Literature, e.g. Panitz, 1999.
Specific	Tell me anything which you found challenging?	Literature, e.g. Chalmers and Keown, 2006.
Specific	How did you get on?	Researcher
Probing	Do you think the University could have helped more?	Researcher

Category	Question	Source
Introductory	Thinking about what you have just told me how has your experience of group work matched your expectations?	Literature, e.g. Myllymaki, 2012.
Specific	In what ways did it differ?	Literature, e.g. Myllymaki, 2012
Probing	Can you give me an example?	Researcher
Specific	How prepared were you for working in groups?	Literature, e.g. McGraw and Tidwell, 2001.
Probing	Can you give me an example?	Researcher
Specific	How do you think could this be improved?	Literature, e.g.
Introductory	How effective do you think the group work has been at developing your learning?	Literature, e.g. Stepney, Callwood, Ning and Downing, 2011.
Specific	Do you think you would have learnt more or less if the module was delivered to individual students?	Researcher
Specific	What was the strongest outcome for you?	Researcher
Specific	What could have been done to address the weaknesses?	Researcher
Specific	How well do you feel your experience has prepared you for the use of groups in the working environment?	Literature, e.g. Long and Shobe, 2010.
Introductory	Tell me about anything else about your experience which we haven't already discussed?	Researcher

Appendix E - Research request to Programme Directors and Module Leaders

Dear Dr. [redacted] and Dr. [redacted],

I am an MSc by research student based in SOM undertaking some research on behalf of Lynette Ryals and her team in Education Services, supervised by Emma Parry. For my degree I am researching the learner experience of group working across Cranfield University and need to find several modules that utilise group work and which meet the sample criteria.

The study will involve an initial interview with the course director and a module leader and, after delivery of the module, interviews with five students who are prepared to talk about their experience of this teaching practice. I should also like to have access to the module specification and some basic demographic data, e.g. the number of students, whether they are full or part-time.

I have been able to identify from the SITS records for the 2015/16 academic year that you are respectively the course director for the MSc in [redacted] and the module leader for [redacted], which involves group working, and I should like to use it for my research.

Please let me know if this is possible. I shall be happy to discuss my research with you if you need to know anything more.

Regards, Judith

Judith Chivers
Researcher
School Of Management
E: J.Chivers@cranfield.ac.uk

Appendix F - Invitation to students

Dear Fellow Student,

I am a student in the School of Management undertaking an M.Sc. by Research and seek your support for my research into student experiences of group work.

One element of the research design is to undertake interviews with students who have had experience of group work and [redacted] has kindly offered his support for me using the [redacted] module you recently completed under his leadership. I hope to interview four or five students about their experiences. Each interview will take forty-five minutes to an hour and will involve questions about the module to elicit your views on what went well and not so well. I am particularly interested in the group work aspects.

The interviews will be tape recorded, transcribed and used for analysis. Please be assured your answers will remain totally anonymous. Ethical approval for this research has been obtained from the Cranfield University Research Ethics System.

If you are willing to participate, please contact me via e-mail, j.chivers@cranfield.ac.uk, to arrange a convenient date and time for your interview.

I shall be delighted to supply the drinks and cookies!

Regards, Judith

Judith Chivers
Researcher
School Of Management
E: J.Chivers@cranfield.ac.uk

Appendix G - Student interview guide

Student Interview Guide

My name is Judith Chivers and I am a student here at Cranfield undertaking my MSc by Research in the School of Management. The focus of my research is an exploratory study on what is the learner experience of group work at Cranfield.

This research aims to assess what students' perceptions are of their experiences of group work with the aim being to use this research as evidence for my M.Sc. by Research and to evaluate and improve this as a teaching practice across the University and determine best practice. The research is interested in obtaining your honest opinions about your experiences and whether you believe there are improvements which could be made.

This session is being audio taped and will be transcribed and analysed, with the results only used for academic research and for no other purposes. The results of the research may be published in scientific journals, and an anonymised version of the data may be published in support of these results. All information provided will be treated with the strictest confidence and a participant number will be provided to you to ensure that all raw data remains anonymous.

Participation is voluntary and you are free to withdraw at any stage simply by informing me, contact details have been provided.

Ethical approval for this research has been obtained from CURES.

In this interview I shall be asking about your experiences and for your opinions on your experiences of the …. module. There are no wrong answers: I am looking for different points of view and want to know what your honest opinion is.

It should last between forty five minutes and an hour.

Appendix H - Initial coding template

Category	Description
Prior experience and attitudes	What experience, if any, students had of group working prior to starting at Cranfield University and any associated attitudes as a result of that experience
Approaches to group work	The method utilised in delivery of group work
Group selection	The method used to divide students into groups
Group training	Details of any form of training or support students were given on working together in groups, i.e. icebreakers, social activities, group dynamics, conflict resolution, communication
Group task	Details of the assignment given to groups
Participant interdependence	Any aspect regarding cohesion, communication, conflict, reciprocity, free riding etc., which learners experienced
Assessment	Details of the method(s) of assessment used in group work
Learning outcomes	What students believe they have learnt from working in this way
Learner experience	Details, positive and negative, of the learners experience of group working
Improvements	Intended changes which would improve the functioning and outcomes of group work
Group facilitation	Reports of any instances in which a group required support

Appendix I - Final coding structure

I.1 – Coding structure for learner interviews

Name	Description
1. Antecedents to group work	Students' views on their experiences of group work prior to starting at Cranfield
Notification of group work at Cranfield	Details of how, or if, students were made aware of group work and the level of it in the course
Previous experiences of group working	What experience, if any, students have had of group working prior to starting at Cranfield
Positive or negative views of previous group work	Students' views on whether their previous experience was positive or negative
2. Approach to group work	Determinants of the method adopted and / or design of the group work
How the group functions	Details on how the group sets about completing the work, i.e. cooperatively or collaboratively
Student group meetings	Information on how the group organises its meetings and their frequency
Timing of group work in the programme	The timing of the module in the programme and any reasons for it
3. Assessment	Information on the way the assignment is assessed, including students' views of how it is structured
Assignment	Details of the assignment(s) given to the students on which they are assessed
4. Future Practice	What could be done to improve the practice of group working in the future
Improvements	Actions to specific aspects which students or instructors believe could be improved
5. General views	Overall views of the group work experience
Challenging	Which aspects students found challenging

Name		Description
	Expectation v reality	Comments on how students have found the realities of the group work as opposed to what they were expecting
	What has not worked well	Information on what students feel has not worked well
	What worked well	Information on what students feel worked well
6. Group facilitation		The ways in which the group were assisted and supported in working together
	Comments on other groups	Student comments on how other groups are working and how they feel about it
	Communication of information during group work	Information on how communication about the group work is undertaken once the assignment has started
	Group meetings with lecturers	Details on meetings the group has with instructors, clients, lecturers or facilitators during group work
	Problem resolution	How students have resolved problems they or their group have experienced
	Student mentors or tutors	Comments on frequency of meetings, purpose and content of meeting with student mentors or tutors
7. Group selection		The process by which learners are allocated to groups
	Number of student groups	The number of groups the student cohort were divided into
	Number of students in a group	Details of the number of students in each group
	Diversity	The range of diverse characteristics available as criteria for selection and how they are utilised
	Relevant resources	Availability of the necessary resources to complete the assignment

Name		Description
	Selection of students to groups	The method and / or approach of the lecturer to allocation of students to groups
8. Group task		Details of the assignment(s) given to the students on which they are assessed
	Challenging	Which aspects students found challenging
	How the group functions	Details on how the group sets about completing the work, i.e. cooperatively or collaboratively
	Length of the group working	Details on how long the group working is undertaken for
	Resources	Availability of the necessary resources to complete the assignment
	Student group meetings	Information on how the group organises its meetings
9. Group Training		What, if any, training on how to work in groups students were given
	Instructions on group work	Comments on the instructions, suggestions or lack thereof, provided by lecturers on how to structure their working in groups
10. International groups		Issues related to groups involving learners from a variety of countries
	Language skills	Comments on the impact of diverse language skills in the groups
11. Learning		What students believe they have learned from working in this way
	Benefits of group work	Students perceived benefits of working in groups
	Individual or group work	Does the student believe they would have learned more if they had worked individually or in a group
	Interpersonal Skills	Group members' ability and skills in being able to get along with others

Name	Description
Preparation for work	Do the students feel the group working has prepared them for working in groups in the 'real world'

I.2 - Coding structure for instructor interviews

Name	Description
1. Approach to group work	
Student feedback	Information from students on aspects of group working on their programme and / or module
Programme Level	Details regarding the selection and use of group work at a programme level
Group work at programme level	Comments about the use of group work within the programme
History of group work	Details of previous approaches to group working
Period as Programme Director	The length of time the current programme director has been in post
Programme design	Factors which influence the way in which group work is incorporated into a programme's design
Programme reviews	The frequency at which programmes are reviewed
Students background to the programme	Previous experiences which may impact a students' involvement in group work
Timing of group work in a programme	The identification of reasons why group work is undertaken at a particular point in the programme
2. Assessment	Information on the way the assignment is assessed, including rationale of the approach.
3. Future Practice	Planned changes to group working in the future
Improvements	Intended changes believed to improve the functioning and outcome of group work
4. General Views	Comments of a non-specific nature about group working

Name	Description
Challenging	Aspects which directors and / or module leaders find challenging in delivering group working
Benefits of group working	Value of utilising group work
Advantages of group working	Comments on perceived advantages of using group work at programme or module level
Student benefits of group work	The perceived benefits of the existing design of group working for students
Disadvantages of group working	Drawbacks to undertaking group working
Problems	The frequency and type of problems instructors experience in utilising group work
Restrictions	Details of any aspects which restrict the use of group work
5. Group facilitation	The ways in which the groups were assisted and supported in working together
Lecturer meetings	The frequency, duration and format of meetings between instructors and student groups
Student mentor or tutor	Comments on frequency of meetings, purpose and content of meeting with students
Student Representative	Information on the function of student representatives in the programme and specifically in relation to group work
6. Learning	Comments in relation to the learning outcomes of group work
7. Participant Interdependence	Details of various interactions which occur as a result of learners' requirement to achieve a task
Expectations of students	Expectations of the way(s) students should be working in groups
Group owning task	Comments on how or if students accept ownership of the task and achievement of the outcomes.
8. Group Selection	The process by which learners are allocated to groups

Name		Description
	Group allocation	The method used to divide students into groups and its rationale
	Number of groups	The minimum or maximum number of groups in each module
	Size of groups	The minimum or maximum number of students in each group
9. Group task		Details of the assignment(s) given to the students on which they are assessed
	Length of the group working activity	Duration of the group work activity
10. Group training		What, if any, training on how to work in groups
	Instructor training	Details of instructor training in undertaking group work
	Sharing of good practice	Ways in which aspects of group working practice are shared with other colleagues, faculty, schools and the wider university
	Student Training	Details on any form of training or support students are given on working together in groups, i.e. icebreakers, social activities, group dynamics, conflict resolution, communication
	Instructions to students on approaches to group work	Information students are given on any approaches they should incorporate into the way they run their groups