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Group cohesion and collaborative information behaviour: An exploration of student experiences of university group work

Parisa Khatamian Far
Edith Cowan University

Group Cohesion and Collaborative Information Behaviour: An Exploration of Student Experiences of University Group Work

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Parisa Khatamian Far

Principal Supervisor: Assoc Prof Justin Brown

School of Science
Edith Cowan University Western Australia
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ABSTRACT

Modern organisations heavily rely on using interdisciplinary teams to accomplish intellectually demanding tasks. The advent of the World Wide Web, the advancements in communication technological tools and easy access to high volumes of information through the Web provide expanded capacity for individuals to work together and fulfil their shared goal but true collaboration is far from straightforward. Teamwork skills are identified as a desirable and distinguishing attribute of the graduates whom employers seek to employ. Accordingly, higher education institutions lay particular emphasis on developing students' collaborative skills by designing and incorporating group projects into courses. The findings of relevant research demonstrate that employers are still not satisfied with the newly-hired graduates' performance and students also reflect negative attitudes towards university group work. In this regard, scholars attempt to gain a through and deep understanding of individuals' collaborative information behaviour when working in group settings and identify the factors that can impact on this process.

This research, guided by the primary question of 'How does group cohesion shape students' collaborative information behaviour over the duration of group tasks?' sought to explore the development of cohesion in student groups which has been widely recognised as an influential element in motivating group members to work collectively. Through a series of supporting research questions addressing the role that task cohesion, social cohesion and perceived cohesion play in students' collaborative information behaviour, the work also aimed to find out how different dimensions of cohesion can have an impact on the way students make sense of the group task components, search for information and use information to accomplish group projects. This study took a qualitative approach and used Straussian grounded theory methodology to collect and analyse the data. Data collection was conducted by taking an in-depth interview approach through 10 semi-structured focus group sessions with student participants recruited from an Australian university who were undertaking project units as part of their degrees across any number of discipline areas over two successive semesters. Data was analysed using open, axial and selective coding following the Strauss and Corbin approach. Constant comparison of similarities and differences in the data enabled the researcher to elaborate on the identified concepts in terms of their properties and dimensions.

This study resulted in rich description of how different dimensions of group cohesion emerged and developed in student groups over the duration of completing the group task and its association with students' collaborative and individual information behaviour practices. Results suggest that task cohesion exerted more meaningful impact on group process and outcomes in comparison with other aspects of cohesion. It was found that students' collaborative information behaviour activities are shaped by their perceptions of group task cohesion developed through adopting shared leadership style, the level of task complexity and

interdependence and group members' composition in terms of similarity in aspirations and academic capability. With regard to social cohesion, familiarity was identified as a factor which had immediate impact on students' feelings of attraction and liking towards the group which did not persist over time as it fell under the influence of group members' commitment and active involvement in group task activities. Task cohesion was then recognised as an antecedent of social cohesion in student groups and participants' interpretation of social cohesion was based on experiencing comfortable feeling with group members instead of developing collective sense of closeness and friendship. Experiencing such a feeling within the group plays a more influential role in motivating students to communicate easily and sharing their ideas In terms of perceived cohesion, the findings of this study indicated that students in this particular sample did not intend to develop a sense of belonging and attachment to the group. They were of the mindset that once they complete their group task, the group would be disbanded so there is no potential benefit of developing such a feeling in university group context.

This study highlighted the role of task design and its features on students' collaboration as well as their choice of communication method throughout the group's lifespan. At the early stages of the group project, the level of collaboration for identification of needed information to create a shared focus and define the project's problem statement was heavily dependent upon the nature of the assessment task and its perceived complexity. Individual information searching was also identified as a common characteristic among all the research participants in this study but the structure of the assessment task determined the level of collaboration among members in regard to sharing information and evaluating the retrieved information in terms of relevancy and credibility. The evaluation and use of information sources to fulfil group task requirements was seen to be a collaborative activity in similar research studies but the findings from this study showed that groups assigned a highly structured task did not feel a need to have regular communication because their sub-tasks were not so much related to each other. This finding suggests that the outcomes of collaboration are not what most academics expect them to be as too little emphasis placed on the role of the task and more on the scale of the work to be delivered.

The key finding of this research is that the group 'task' drives the behaviours of students, as individuals and as a group member, and that assigning students a project to do as a group that is too large to be done individually will not drive genuine collaboration. This research suggests an addition to the Input, Mediator, Output, Input (IMOI) model that includes a Task Calibration step by academic staff, to define the primary outcome of any given assessment task as either 'collaboration' or 'product', rather than the hope that collaboration takes place in order to deliver a big product. This shows that true collaboration would not take place by assigning students a large-scale group project; instead the tasks should be designed and structured in a way to drive and reward collaboration.

DECLARATION

I certify that the thesis does not, to the best of my knowledge and belief:

i.   incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher degree;

ii.   contain any material previously published or written by another person except where due reference is made in the text; or

iii.   contain any defamatory material.

Signed:

Date: 19/10/2020

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DEDICATION

To

My Mother & My Father

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1. INTRODUCTION

Collaborative information behaviour is a field of research that involves events where a group of individuals with a common goal, work together to make sense of their shared information need, search for information, assess the retrieved information and use information to accomplish a group task. This area of research has attracted the scholars' attention to explore its different facets and stages, triggers and influential factors. The research presented here aims to provide a comprehensive and detailed understanding of this phenomenon in educational settings and group learning environments where the importance of developing teamwork and collaborative skills have always been emphasised.

This chapter provides background to the research study. It outlines the research problem, its justification, the main research question and supporting research questions that were explored. Significance of the study and its contributions to library and information science as well as education research field are also outlined. The chapter concludes by outlining the overall organisation of the dissertation.

1-1. Background to the Study

Today's modern world has been characterised by an increasingly complex and constantly evolving information landscape due to developments in technology. The emergence of the Internet, the World Wide Web (WWW) and information communication technologies has eased the people's access to a large volume of information. The online information overload causes difficulties and confusion over information evaluation and retrieving credible information. This demonstrates the inherent complexity of information seeking behaviour which requires a certain amount of knowledge and a range of skills. Information seeking behaviour has been defined as a purposeful information seeking which is a result of an information need for satisfying a specific goal (Wilson, 2000). Researchers have examined and explored various facets of information seeking behaviour over the last decades which led to the development and establishment of several different models and conceptual frameworks to describe and depict the concepts representing this phenomenon (Fisher, Erdelez, & McKechnie, 2005). These models and frameworks are the result of distinct approaches taken by scholars but an individualistic perspective

is their common characteristic. The present era not only does provide people with vast amount of information but also creates the opportunity for individuals with a shared goal to collaborate and work together to accomplish a group project, no matter where in the world they are. This shows that information has become easily available to people and they also can easily collaborate with one another to solve a shared problem. In this regard, Wilson (1999) posed a noteworthy question as "to what extent are the different models complete, or complete representations of the reality they seek to model?" (p. 267) which underlines that collaborative and social aspect of information seeking behaviour passed unnoticed to that point in time. Information seeking behaviour is far more complex within the group context in comparison to individual settings. People who decide to work together have different sets of skills and level of knowledge; they have different personalities and mindsets which all have an impact on their collaboration and the information seeking process. Thus, researchers have concentrated their attention on exploring the collaborative facet of information seeking behaviour and challenging its individualistic characteristic by examining people`s behaviour when they need to collaborate and work together to make sense of their information need, search for and use information to complete a group task.

In this regard, studies examining the way people seek, retrieve, assess, and use information in a group work setting to perform a particular task and accomplish a shared goal are described as *collaborative information behaviour* studies. Scholars have conducted several research studies in different domains to develop a better understanding of the process and the possible factors that can impact on the way a group of people seek and use information collaboratively including military (e.g., Sonnenwald & Pierce, 2000), engineering (e.g., Bruce et al., 2003; Du Preez, 2017), health (e.g., Reddy & Dourish, 2002; Reddy & Spence, 2008) and education (e.g., Hyldegård, 2006; Ndumbaro, 2016; Saleh, 2012). The findings from these studies have led to the development of some models and frameworks such as Reddy and Jansen's (2008) model of collaborative information behaviour, Shah's (2008) model for collaborative information seeking (CIS), Karunakaran, Reddy and Spence's (2013) model of collaborative information behaviour as well as Yue and He's (2009) model of understanding collaborative information behaviour in e-discovery which are still in their infant stage and should be widely applied and examined in subsequent empricial research before being identified as well-

established models (Kim, 2013). A number of workshops have also been held with different purposes such as discussing current conceptions of collaborative information seeking, collaborative search evaluation, issues in designing collaborative search systems, and evaluation of collaborative information retrieval and seeking (Azzopardi, Pickens, Sakai, Soulier, & Tamine, 2016; Azzopardi, Pickens, Shah, Soulier, & Tamine, 2018; Shah, Capra, & Hansen, 2015; Shah, Hansen, & Capra, 2012). Collaborative information behaviour has been an active area of research over the last decades as many scholars have recognised that in dynamic work contexts, individuals must work together to identify, collect, exchange and synthesise information to reach goals that are difficult to achieve individually (Morris, 2008; Reddy & Dourish, 2002; Sonnenwald & Pierce, 2000; Twidale, Nichols, & Paice, 1997). Nonetheless, there are still many challenges to be addressed including a lack of theories to understand the collaborative information seeking process (Kim, 2013; Tao & Tombros, 2013a), proper research designs and evaluation frameworks (Hertzum & Hansen, 2019; Shah, Capra, et al., 2015) which highlight the need to carry out more research studies.

Group work is a common practice in higher education and is defined as the process in which a group of individuals with a shared goal divide the responsibility of accomplishing a course-related group project. Over the past decades, researchers have performed several studies with the aim of investigating students' experiences of completing group tasks to explore their behaviours and attitudes towards this pedagogical tool as well as identifying the challenges they might face over the lifespan of fulfilling group tasks (e.g., Bacon, Stewart, & Stewart-Belle, 1998; Barfield, 2003; Cen, Ruta, Powell, Hirsch, & Ng, 2016; Chang & Brickman, 2018; Connolly, 2009; Gottschall, 2006; Hardy, 2011; Le, Janssen, & Wubbels, 2018; Miceli, 2019; Rafferty, 2011; Sturgeon, 2004; Volkov & Volkov, 2015; Wong, 2018). Scholars have also expressed interest in exploring how students collaborate in terms of gaining a shared understanding of the group task components, searching for information, evaluating the retrieved information and using information to accomplish the assigned group project (e.g., Hyldegård, 2006; Lee, 2013; Leeder & Shah, 2016a; Ndumbaro, 2016; Saleh, 2012; Shah & Leeder, 2016; Toze, 2014; Wu, Liang, & Yu, 2018). Little is known about the impact of contextual group factors on this process and how they can shape students' collaborative information behaviour.

Interactions among group members constitute group processes which in turn form a social context to stimulate or hinder collaborative behaviour. In this respect, group cohesion is recognised as one of the fundamental features and qualities of successful and effective groups and has been researched extensively comparing to other group process attributes with thousands of research studies conducted. This contention has also been supported by a number of meta-analyses studies that have revealed a strong link between cohesion and performance (Beal, Cohen, Burke, & McLendon, 2003; Chiocchio & Essiembre, 2009; Evans & Dion, 1991; Gully, Devine, & Whitney, 1995; Mullen & Copper, 1994). In particular, when group performance is defined as behaviour, the relationship between group cohesion and performance is stronger compared to group performance as an outcome (Beal et al., 2003). Furthermore, cohesion plays a major role in motivating group members to make special effort to perform a group task efficiently and willingness to participate actively in group activities and work collectively (Mathieu, Kukenberger, D'innocenzo, & Reilly, 2015).

Given that group work is a common course requirement and students usually are not willing participants in group work, the current research aims to understand what factors predict the development of group cohesion in student groups and how it can shape students` information behaviour in this context and drive them to engage in collaborative information behaviour activities.

1-2. Statement of the Problem

In modern organisations, employees usually need to work with one another to complete tasks and they seldom work on projects individually. Work-related information in organisations exists across various systems, artifacts and people which is not easily available to everyone, so individuals should be able to collaboratively seek, retrieve, and use information to carry out the assigned tasks effectively (Reddy & Dourish, 2002; Reddy & Jansen, 2008). Accordingly, employers highly value university graduates who have strong teamwork and interpersonal skills and are increasingly seeking to hire those who have a demonstrated ability to work effectively with others within a team environment (Azevedo, Apfelthaler, & D., 2012; Chen, Donahue, & Klimoski, 2004; Hart, 2013; Landrum & Harrold, 2003). According to the most recent survey report conducted by the Australian Association of Graduate Employers in 2019, while 60% of employers rate candidates' academic performance as 'very important'

or 'quite important', teamwork skills are regarded as indispensable by 97% of employers. This finding demonstrates that academic achievement is not the only determining factor for landing a professional job after graduation particularly in the current, competitive employment market (Carr, 2020).

It is a growing expectation that graduates from universities will be equipped with the required skills to work collaboratively with others. Higher education institutions lay particular emphasis on developing students' teamwork abilities by incorporating group work projects into their courses and Australian universities also commonly cite teamwork skills as one of the important learning outcomes of courses and a necessary graduate attribute. Findings of research reports indicate that employers are still dissatisfied with the newly-hired graduates' performance, claiming that they lack adequate skills to work effectively with others, and that to this day there exists an expectation gap between the graduates exiting university courses and the perceptions of their future employers (Banerji, 2007; Harder, Jackson, & Lane, 2014; Willcoxon, Cotter, & Joy, 2011; Willey & Gardner, 2009). As part of course requirements, students are compelled to work together on a given task and they usually fulfil group projects through cooperative activities by dividing the task among each other. These occasions might lead to collaboration if group members mutually and actively involved in the process and jointly solve the problems while responsibilities have been shared. In collaborative environments, collective cognitive effort is required from all or part of a group's members to critically evaluate one another's sub-tasks whereas in cooperative situations each member simply completes their tasks without proactive involvement with other members. Collaborative skills cannot be developed spontaneously, and several factors can play a part in influencing students' collaborative information behaviour activities in the context of university group work. In this regard, group cohesion which is generally defined as "the resultant of all the forces acting on the members to remain in the group" (Festinger, Schachter, & Back, 1950, p. 274) driven by the social or task features of the team (Casey-Campbell & Martens, 2009) is recognised as a crucial variable of team effectiveness. It can affect groups` performance in terms of uniting group members and developing a shared context encouraging them to collaborate and interact with one another more effectively (Dion, 2000; Kashy & Kenny, 2000).

Based on the above, this research aimed to develop a conceptual understanding of how group cohesion emerges and develops in student groups and in what ways students` collaborative information

behaviour can be shaped under the influence of this key team process. The results would enhance our knowledge regarding the role of group cohesion on fulfilling group tasks in educational settings and how universities can better address collaborative learning outcomes of their graduates to better serve the needs of multi-team, multi-location, collaboration centric industry expectations.

1-3. Statement of the Research Question

This study sought to explore the development of cohesion in student groups and how it might impact on students' collaborative information behaviour over the lifespan of completing a group project. Individual information behaviour in group contexts differs from independent individual information behaviour due to the contextual impact which group dynamics and interactions can have on individual behaviours (Arrow, McGrath, & Berdahl, 2000). The rationale behind this contention is that contextual factors provide group members with values and unspoken assumptions of how they are expected to perform (Birmingham & West, 1995). Group cohesion has been extensively examined both theoretically and empirically and it is regarded as a key and influential attribute of successful group performance (Casey-Campbell & Martens, 2009). Group cohesion is perceived as a process developing group`s tendency towards remaining united, forming a whole and functioning in a reasonable way to achieve a shared goal (Kozlowski & Ilgen, 2006). Forsyth (2006) asserted that without at least some degree of cohesion, groups would fall apart as each member may stop taking part in group activities and leave the group. He also noted that cohesive groups share some common characteristics including a sense of pleasure and fulfilment, an accommodating and welcoming environment, reciprocate compliments for achievements, less concerned about the group performance and greater member retention. Prior research shows that group cohesion is critical to the performance and positive outcomes of many collaborative efforts but there is no research on the relationship of group cohesion to the way individuals search, collect, assess, and use information in group contexts particularly student groups which are considered as newly-formed ones. Thus, the primary research question was defined as:

How does group cohesion shape students` collaborative information behaviour over the duration of group tasks?

The primary research question of this thesis was addressed through the exploration of four supporting questions defining the specifics of the overall question.

1-3-1. Supporting Research Questions

According to the literature, a general consensus has been arrived at that group cohesion consists of two distinct elements including task cohesion and social (interpersonal) cohesion (Dion, 2000). Task cohesion indicates group members` sense of commitment and affinity towards their common goal or group task which has a pivotal role in increasing members` effort to perform the task efficiently. Social cohesion refers to the emotional bond formed among group members that can lead to feeling attraction towards the group as a collection of individuals and as distinct from the task itself. Cohesion helps group members to communicate effectively and put deliberate effort to carry out the task (Kozlowski & Ilgen, 2006). The findings of research studies have demonstrated that distinguishing between these two dimensions of group cohesion would enhance the prediction of members' engagement in performing the group task. The findings of some research indicated that the potential impact of task cohesion on facilitating group performance is stronger than social cohesion (Aubé, Rousseau, Brunelle, & Marques, 2018; Carless & De Paola, 2000; Croy & Eva, 2018; Dellinger, 2019; Mullen & Copper, 1994; Zaccaro, 1991), while other studies revealed that groups put in an excellent performance when members demonstrate both task and social cohesion (Dion, 2000; Picazo, Gamero, Zornoza, & Piero, 2015).

To this end, understanding the distinct impact of these two aspects of cohesion on student groups' performance and how their interplay would influence the way they gather and exchange information collaboratively can demonstrate which dimension is more or less meaningful in university group work settings. On this basis, the two following supporting questions were formulated:

1-3-1-1. What role does task cohesion play in students` collaborative information behaviour?

1-3-1-2. What role does social cohesion play in students` collaborative information behaviour?

Another two-dimensional model of cohesion is recognised as *perceived cohesion* which is proposed by Bollen and Hoyle (1990) as "an individual's sense of belonging to a particular group and his or her feelings of morale associated with membership in the group" (p. 482). The belongingness dimension is grounded in people's judgment of their relationship to a group and their sense of identification including cognitive and affective elements. The cognitive element is rooted in the experiences that individuals have gained from taking part in group activities and engaging with other group members and affective element is based on feelings about those experiences. Morale dimension primarily reflects members' emotional reactions combining both positive and negative ones derived from being a member of the group (Dion, 2000). In this respect, as students usually have negative attitudes towards group assignments in academic settings, understanding the development and the impact of this dimension of cohesion on their performance is important. While some scholars are of the view that belongingness and morale are essentially two components of social cohesion suggesting that it may be an incomplete representation of the cohesion construct (e.g., Casey-Campbell & Martens, 2009; Grossman, 2014), Salas, Grossman, Hughes, and Coultas (2015) did raise concerns that the cohesion literature disproportionately focuses on task cohesion and social cohesion over morale and sense of belonging. This encouraged the researcher to explore how perceived cohesion can emerge in student groups that are recognised as short-term, goal-oriented groups and in what ways this dimension of cohesion can have an impact on students' collaborative information behaviour practices. Thus, the following supporting question was formulated:

1-3-1-3. What role does perceived cohesion play in students` collaborative information behaviour?

Communication is an essential element and a defining characteristic of working effectively in group settings as it transmits values, norms, standards, needs, as well as conveying the ways to satisfy individual and group goals. According to media richness theory put forward by Daft and Lengel (1984), the richer and more personal communication media provide an opportunity for transmitting more social cues such as gestures and body language which is highly beneficial to exchanging information effectively among a group of people, in particular in events where the task is ambiguous. Leaner and

less rich communication media cause lack of immediate access to information and restricted awareness which can influence negatively on group performance because awareness plays a fundamental role in collaborative information behaviour as group members should be aware of others` progress in the task. Accordingly, the social presence feature of the communication channels should the particularly suitable for the level of interpersonal engagement that is needed for fulfilling a group project. In this regard, communication technologies can play a key role in facilitating group work activities, specifically social media technologies which are user-centred and employing them is becoming increasingly common and widespread comparing to face-to-face meetings. Thus, the final supporting research question aimed to explore the extent to which communication channels chosen by students are appropriately rich to provide them with adequate degree of awareness and how they can have an impact on the way students seek, find and use information collaboratively over the duration of conducting their group tasks.

1-3-1-4. What role does communication technologies play on students` collaborative information behaviour?

1-4. Significance of the Study

Collaborative information behaviour has been investigated from different aspects and five elements including space, time, control, communication, and awareness have been recognised as important factors that can have an impact on this behaviour in group-based settings (Shah, 2014a). It seems that the influence of group work processes on the way people collaborate to find, retrieve, and use information has been overlooked and there is a general lack of research examining the impact of group contextual factors on collaborative information behaviour practices. Exploring the impact of cohesion as one of the influential group processes on students` performance in groups may contribute to a new understanding and perception of how it can shape students` information processes in group work settings. This understanding may advance theories of collaborative information behaviour in terms of determining whether socially cohesive groups or groups that are united based on a shared commitment to achieving the groups' objectives collaborate more successfully. In general, findings of this study contribute to collaborative information behaviour area of research by highlighting the role of

group attributes on individual information behaviour in group contexts. The research findings also advance the cohesion literature by exploring the factors that can predict cohesion development in student groups by adopting qualitative approach and carrying out the study in a naturalistic setting.

According to the literature, students` attitude towards group projects is not satisfactory for several reasons such as social loafing and non-contributing group members, therefore the findings of this study provide practical support for collaborative activities in learning environments and better insights for reorienting group assignments to be more efficient and effective. Specifically, given that employers are dissatisfied with the level of graduates` teamwork skills, the findings can be beneficial for educational institutions to revise their teaching approaches to develop and enhance academic collaborative environments.

1-5. Dissertation Structure

The introduction to the thesis has presented the background and rational for conducting this research study, the main research question and supporting research questions as well as the significance of the study. Chapter 2, Literature Review, will provide a comprehensive review of the literature on collaborative information behaviour; group cohesion and group work in higher education covering both the theoretical and empirical research. Chapter 3, Research Methodology, will outline the methodology and its associated research design employed for conducting this study and addressing the research questions of this thesis as well as a full description of carrying out the pilot study and its outcomes which led to a significant change of approach. A detailed and comprehensive discussion of emerged categories and their properties/dimensions (open coding) will be presented in Chapter 4, Findings, in three distinct sections including developing group cohesion in student groups, students' individual and collaborative information behaviour activities and communication in student groups which established a solid foundation for the next stage of data analysis. Exploring the relationships among the emerged concepts (axial coding) was conducted in Chapter 5 which enabled the researcher to discuss the results in the context of supporting research questions. Chapter 6 summarises the discussion in the context of the primary research question and the core category was identified that integrates other themes

(selective coding). An integrative model of collaborative information behaviour and group cohesion is presented in Chapter 6 as this thesis's contribution to the field of collaborative information behaviour.

2. LITERATURE REVIEW

2-1. Overview

This chapter provides an in-depth and extensive exploration and analysis of the literature and prevailing theories pertaining to information behaviour as a concept and how the individualistic perspective has been shifted to collaborative one in this field. This will be followed by an exploration of the concept of collaboration and collaborative information behaviour to provide a better understanding of this emerging area within the information science domain. This review also explores the previous studies of collaborative information behaviour not only in student groups but also the ones conducted in other domains to identify the gaps and to critically situate this study within the emerging research in collaborative information behaviour. Group work in higher education is also addressed including its benefits and challenges as well as the causal factors impacting students' interactions while working in groups to complete their assigned projects. In the end, the concept of group cohesion and how this group construct as a key and influential group process can lead to team effectiveness is discussed.

2-2. Information Behaviour

Information behaviour defines how people make sense of the gap between their existing knowledge and an unfamiliar situation (information need), look for information, evaluate, process and use the retrieved or found information to satisfy that information need. A very basic definition of information behaviour as "how people need, seek, give and use information in different contexts" (Pettigrew, Fidel, & Bruce, 2001, p. 44) is useful to define the components of information behaviour. This simple definition masks the complexity of this phenomenon. Ingwersen and Jarvelin (2005) included the generation and management of information in their definition of information behaviour and defined it as "generation, acquisition, management, use and communication of information, and information seeking" (p. 259) but Wilson (2000) provided a more comprehensive and detailed definition of this concept: "the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking and information use" (p. 49).

Wilson (2000) also differentiated between "information behaviour, information seeking behaviour, information searching behaviour, and information use behaviour" (pp. 49-50). His description of information seeking behaviour is a purposeful seeking information activity which is a result of an information need for satisfying a specific goal. Information searching behaviour looks more specifically at information retrieval task including how the searcher interacts with information system retrieving required information which involves cognitive actions such as assessing whether the retrieved data is relevant or not. He noted that information use behaviour includes acts leading to incorporating found information into the individual`s existing knowledge so as to fill the gap and meet the information need.

It is worthwhile noting that Savolainen (2007) introduced the 'information practice' concept as a critical alternative to 'information behaviour' stating that these concepts both define the ways that individuals "deal with information" in information seeking area of research (Savolainen, 2007, p. 109). There is an ongoing debate over behaviour/practice, in particular, after Reijo Savolainen published his book titled '*Everyday Information Practices: A Social Phenomenological Perspective'* in 2008. The interesting and informative debate was conducted between Tom Wilson and Reijo Savolainen which is published as a contribution to the *Information Reseach Journal* in 2009. Savolainen stated that providing clear and precise definitions of the concepts of behaviour, action, activity and practice is challenging owing to their generic nature, while Wilson noted that these concepts are not generic. Wilson argued that human behaviour consists of different types of activities including cognitive, social and physical which in turn are composed of different sets of actions. Accordingly, actions and activities are considered as elements of behaviour and practice a mode of behaviour. Wilson did not consider these two terms as distinct and complementary aspects of human behaviour with equal theoretical status and believed that using 'practice' as an analytical tool needs to be defined rigorously for the purpose of any given investigation. With regard to the current research study, its aim is aligned with Wilson's theoretical stance, so 'information behaviour' is the preferred term for defining the interactions between human beings and information.

Information behaviour research started with studies concentrating on how particular groups of people used specific information resources as well as how they search information systems to retrieve

the desired information. Accordingly, context is a key variable in information behaviour area of research as its focus is on both the setting and the individual's situation and the locally-related outcomes of those studies made useful and practical contributions to the field by providing rich explorations of this phenomenon in different settings (Fisher & Julien, 2009). Over the years the researchers` focus has been shifted to investigate more complicated and a variety of interactions between individuals, organisations and information. For instance, the focus that defines information behaviour from an individual user`s perspective has shifted to include groups, organisations and communities and attention has been devoted widely to the contexts in which interactions between individuals and information take place (Ford, 2015).

From early 1990's, cognitive perspectives towards information behaviour has been shifted to social perspectives and exploring collaboration in this field from different aspects drew the scholars' attention (Kim, 2013). The cognitive viewpoint in information behaviour field has an emphasis on how individuals seek and retrieve information in isolation leading to cognitive and emotional experiences and processes, instead the social perspective has highlighted the social and collaborative dimension of information behaviour demonstrating the importance of social and situated context (Pettigrew et al., 2001). Hence, researchers have concentrated on social research approach and started carrying out studies on information behaviour implying collaboration.

In order to critically explore collaborative information behaviour, the concept of collaboration needs to be comprehensively conceptualised to provide a better understanding.

2-3. What is Collaboration?

Individuals in various contexts usually work together with different purposes, but we should not consider these activities that involve a group of people to always be considered actual 'collaboration'. Collaboration has its own specific criteria and essential ingredients which scholars from different fields define according to the tenants of their specific domains of enquiry. Barbara Gray, recognised as a noted collaboration scholar, defined this concept as "a process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible" (Gray, 1989, p. 5). Chrislip and Larson (1994) provided more

specific elements of collaboration in their definition, stating that collaboration is "a mutually beneficial relationship between two or more parties working towards common goals by sharing responsibility, authority, and accountability for achieving results" (p. 5). Terveen (1995) similarly described collaboration as a process within which individuals work together to accomplish their common goal. In this regard, participants should actively take part in articulating the common goal and arrive at a consensus, share the responsibilities and delegate the specific tasks and most importantly authority should be balanced. Schrage (1995) also stated that collaboration is a process which two or more persons with different sets of skills interacting and communicating with one another to create and reach a shared understanding that they cannot achieve it on their own. These definitions showed that there are many different perspectives when we look at collaboration, but all of them focus on the output of collaboration as a shared meaning or a shared understanding.

Shah (2008) is of the opinion that people usually use the term collaboration interchangeably with other terms typically associated with individuals working together such as coordination and cooperation. He noted that the meaning of this concept should be thoroughly interpreted before analysing any collaborative situations. He investigated the predominant elements of collaboration without putting it into a specific context such as information seeking and believed that for true collaboration to take place certain requirements should be met regardless of the domain, task or context. In this regard, he developed a model of collaboration named the C5 Model (Figure 2-1) based on Denning and Yahokovsky (2008) and Taylor-Powell, Rossing, and Geran (1998) works that contributes to a general understanding of the requirements for effective collaboration. This model includes five elements: communication, contribution, coordination, cooperation and collaboration.
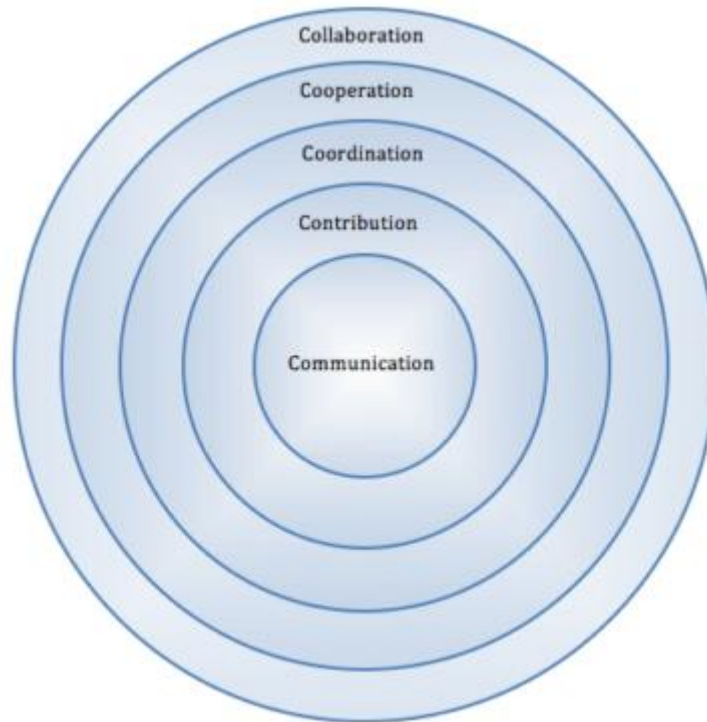
Figure 2-1. Shah's (2008) C5 Model of Collaboration

Communication is at the core of this model and is considered as a series of actions for exchanging and sharing information which is recognised as one of the most significant elements of collaboration process. Another important component of true collaboration is *contribution* which means individuals assist one another with accomplishing the shared goal they pursue in terms of giving ideas and making suggestions. *Coordination* helps to organise people in a harmonious way providing them with an opportunity to work better towards their common goal. *Cooperation* is defined as a relationship in which different individuals who have similar goals involve in fulfilling a collective task by establishing and following a set of guidelines to achieve a shared goal. In the end, *collaboration* is a process involving different people with different expertise who may see the problem from different angels and they are able to come up with a solution which is more than the sum of individuals' contributions (Shah, 2008).

In addition to the features of Shah`s model, the usefulness and effectiveness of a collaborative process depends on other components as well. London (1995) believed that the size of a group is an important element and that true collaboration will develop in small groups rather than larger groups. He also highlighted the role of power as unbalanced authority among group members which can result in

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ruining the collaborative situations. Morris and Horvitz (2007) raised the issue of task explaining that collaboration for simple tasks is meaningless, while complicated and exploratory ones cannot be performed without collaboration. Fidel, Pejtersen, Cleal, and Bruce (2004) also argued that collaboration is considered as an extra cognitive burden; therefore, its benefits should be tangible and worth the investment required in terms of time, activity and at times, compromise.

Collaboration is an enticing idea theoretically but in practice it does not take place spontaneously. Several research studies in different domains have been conducted with the purpose of exploring and investigating collaborative information behaviour from different aspects including the motives and triggers, process and stages as well as benefits and outcomes of collaboration. The following sections will outline the concept of collaborative information behaviour and its components including formulating information need collaboratively, collaboration in information seeking and collaborative information evaluation.

2-4. The Concept of Collaborative Information Behaviour

Apart from conducting research studies examining individual information behaviour, researchers have also focused on how individuals can collaboratively identify and make sense of the information need, search for information and use information to carry out group tasks. In this regard, several studies have been carried out by scholars in different contexts which resulted in offering distinctive definitions (Foster, 2006). Accordingly, various terminologies have been interchangeably used in studies of collaborative information behaviour such as collaborative information seeking (Hertzum, 2008; Shah, 2010b), collaborative information retrieval (Fidel et al., 2000), collaborative information seeking and retrieval (Foster, 2006), collaborative information synthesis (Blake & Pratt, 2006), collaborative information searching (Morris & Horvitz, 2007), collaborative web searching (Large, Beheshti, & Rahman, 2002), collaborative sensemaking (Paul & Reddy, 2010), and collaborative information behaviour (Karunakaran et al., 2013; Reddy & Jansen, 2008; Talja & Hansen, 2006). All of these terms have emerged from studies that focused on specific activities and different contexts.

Karunakaran et al. (2013) argued that although the definitions seem different, they are inherently interrelated, and researchers should make an effort to synthesise and integrate these concepts and

develop a unified framework. They also noted that due to the lack of such a framework, these concepts have been used interchangeably. For instance, in a study that focused on collaborative search in design teams, Poltrock et al. (2003) defined collaborative information retrieval as "the activities that a group or team of people undertakes to identify and resolve a shared information need" (P. 243). This definition describes collaborative search and retrieval but the authors perceived it as broad and general concept encompassing a variety of information-related activities such as identifying and making sense of information needs, formulating terms to search information systems and incorporating the retrieved information to solve a shared problem through collaboration. Moreover, collaborative information retrieval has been conceptualised by Hansen and Järvelin (2005) as:

An information access activity related to a specific problem solving activity that, implicitly or explicitly, involves human beings interacting with other human(s) directly and/or through texts as information sources in a work task related to information seeking and retrieval process either in a specific workplace setting or in a more open community or environment (p. 1102).

In general, collaborative information seeking and retrieval has been defined as "the study of the systems and practices that enable individuals to collaborate during the seeking, searching, and retrieval of information" (Foster, 2006, p. 330). Shah (2014a) also defined collaborative information seeking as "an information seeking process taking place in a collaborative project (possibly a complex task) among a small group of participants (potentially with different set of skills and/or roles), which is intentional, interactive, and mutually beneficial" (p. 219). It is worthwhile noting that information seeking in this definition is not limited to searching for and retrieving information, but it also includes browsing, sharing, evaluating and synthesising information.

Talja and Hansen (2006) provided the following definition for collaborative information behaviour:

An activity where two or more actors communicate to identify information for accomplishing a task or solving a problem…[it] includes processes of problem identification, analysis of information need, query formulation, retrieval interactions, evaluation, presentation of results, and applying results to resolve an information problem (p. 114).

This definition includes both human cognitive aspects (problem definition, identification and analysis of information needs, and applying information to solve the problem) and technical aspects (using an information retrieval system, querying, and filtering results collaboratively).

Hyldegård (2006) also defined collaborative information behaviour as "the physical activities and cognitive and emotional experiences of individuals acting as group members, engaged in a collaborative problem-solving process involving information (seeking) behaviour" (p. 277) which its focus is on how individuals work within the group context, not assessing the group itself. Moreover, Saleh (2012) offered a working definition of collaborative information behaviour based on Wilson's (2000) definition of information behaviour as his research was focused on human aspects of information behaviour: "collaborative information behaviour is the totality of human behaviour, when two or more people work together, in relation to sources and channels of information, including both active and passive information seeking and information use" (p. 20). It seems that a unified definition covering all the aspects of this concept has not been yet developed which resulted in no agreement on broader picture of this research area and its activities as well as their interrelations. In this regard, Karunakaran et al. (2013) suggest that current research in this field can be classified into two main streams: (1) *a technical stream* and (2) *a social stream*. Technical stream includes searching, retrieving, making queries and filtering collaboratively. On the other hand, social stream includes defining the problem and making sense of it collaboratively, seeking information collaboratively encompassing several activities such as searching, retrieving, evaluating and using information collaboratively. Furthermore, they believed that past theory and research in this area should be synthesised and as a pioneer in this field, they proposed using "'*collaborative information behaviour'* as an umbrella term" (Karunakaran et al., 2013, p. 2438). They defined collaborative information behaviour as:

The totality of behaviour exhibited when people work together to (a) understand and formulate the information need through the help of shared representations; (b) seek the needed information through a cyclical process of searching, retrieving, and sharing; and (c) put the found information to use (p. 2438).

The purpose of this research was to explore and gain a rich understanding of how different dimensions of group cohesion can emerge and develop in student groups and in what ways they can shape students' collaborative information behaviour. Therefore, the present study concentrates on the social stream of collaborative information behaviour and the above definition aligns with the conceptualisation of this concept in this research. Accordingly, research studies that have purely discussed or examined the use of collaborative information seeking technologies are not referred to in this research. It is also important to note that usually the information-related practices that were investigated in collaborative information seeking research works are similar to those of collaborative information behaviour including identifying, seeking, retrieving, sharing and using information (Shah, 2014a). Therefore, such research studies are thoroughly reviewed in the current research study. Nonetheless, the researcher believes that the definition provided by Karunakaran et al. (2013) covers all aspects of this phenomenon, so she concurs with this statement that collaborative information behaviour should be used as an umbrella term for this area of research.

The following sub-sections outline a comprehensive description of the three main facets of collaborative information behaviour according to the definition provided.

2-4-1. Identification and Conceptualisation of Information Needs in Groups

Information need is one of the prominent concepts in information behaviour area of research and scholars conceptualise it from different perspectives owing to different viewpoint towards the factors that contribute to and result in information needs (e.g., Belkin, Oddy, & Brooks, 1982; Case, 2002; Dervin, 1983; Taylor, 1962; Wilson, 1981). Accordingly, this concept is often used inconsistently across disciplines from being simply described as "the information that is needed, the situation that requires information or just the recognition that a person's current cognitive state is somehow insufficient" (Ruthven, 2019, p. 87). Wilson (1981) for example, provided a holistic view on this concept maintaining that three basic interrelated needs, namely physiological, cognitive and affective give rise to information needs which lead to the individual's engagement in information seeking behaviour. On the contrary, Belkin et al. (1982) underlined the importance of cognition in their explanation of this concept describing it as 'the anomalous state of knowledge' which was defined as

the situation when "… an information need arises from a recognised anomaly in the user's state of knowledge concerning some topic or situation…" (p. 62). This cognitive approach towards information need implies that the recognition of a knowledge gap to satisfy a goal emerges inside the people's head which serves as the motivation for information seeking. Taylor's (1962) seminal taxonomy of information needs provides more clarification on conceptualisation of this concept. According to his model, information need has four levels: "*visceral needs*, *conscious needs*, *formalised needs*, and *compromised needs*"(Cited in Shiga, Joho, Blanco, Trippas, & Sanderson, 2017, p. 716). Visceral needs are defined as an unclear feeling of dissatisfaction which cannot be expressed in linguistic terms. Conscious needs are defined as an imprecise and vague expressing of the needs which may evolve and develop into formalised needs, which are considered as a clear and easy to understand phrasing of the need. The final level composed of formulated queries that are submitted to search engines or information systems. This model devotes attention to the fact that information need is a root factor to an information seeking process conceptualising it as a continuous process along the continuum.

Complexity of the information need, in fact, is identified as a trigger for collaborative information behaviour activities based on Reddy and Spence's (2008) research findings. Rieh, Robert, and You (2013) also argued that there might be situations in which members of a group do not initially realise the necessity of working collaboratively. They then initiate seeking for information individually and later in the process they recognise the need for diverse expertise and knowledge to be able to resolve the problem. Accordingly, the process of identification and reaching a shared understanding of the group information need is more complicated in the context of collaborative information behaviour (Saleh, 2012; Shiga et al., 2017; Toze, 2014; Wilson, 2010). Each member of a group generates their own conception of the assigned task which may be either similar or different from others depending on their common background, knowledge and expertise. In a group setting, all the members need to be aware of the problem and conceive it similarly to be able to have meaningful interactions to fulfil the assigned task. Shared conceptualisation of the task provides a foundation for identifying the subsequent problem-solving activities. According to Hertzum (2017), information needs are realised, expressed, criticised and evolved by group members and the interrelatedness of these activities would lead to other collaborative information seeking practices to address the information need. When group members have

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different understanding of the task and its requirements, they are not able to make a joint decision about the potential relevance of problem-solving information. This, in turn, would make it more difficult for the group to manage the scope of the group task and coordinate information gathering which have an adverse impact on the group to function properly. Group members should communicate their perceptions of the identified problem and freely discuss their ideas and opinions to identify discrepancies across group members, resolve differences in their understanding and reach a unified conceptualisation of the group task. Furthermore, the information needs associated with different sub-tasks should also be given detailed consideration. After reaching an agreement on a unified definition and conceptualisation of the group task, group members need to make sense of the sub-tasks together as well to ensure everyone gains a shared understanding of their assigned sub-task, otherwise their contributions might be irrelevant to the task.

With respect to recognition of group information needs, it sounds that the dimensions of the task structure and the degree to which it is assumed as complex or simple task will have an impact on the process (Hyldegård, 2006; Saleh, 2012; Tao & Tombros, 2017; Wu, 2018). Groups that assigned well-structured tasks may be able to assess their information needs without collecting further information. On the contrary, complex tasks would require group members to search for a wide variety of information beforehand to make the group information need clearer and easier to understand again and again to develop a shared idea and similar understanding of the work task, so the process here can be characterised as cyclic than linear. In this regard, findings of Hertzum's (2017) review of research conducted in collaborative information seeking domain revealed that identifying the collaborative information need is generally addressed by exploring characteristics of the task in majority of related research. He reported that researchers should devote more attention to identifying the collaborative aspects and dynamics of recognition of information needs in group settings.

2-4-2. Information Seeking in Group-based Settings

As a result of realising and negotiating a shared focus, the task might be separated into smaller parts which would lead individuals to conduct several information seeking activities consisting of information searching actions. Shah (2014a) emphasised that collaborative information seeking is about

"collaboration to help information seeking" (p. 216) and defined this concept as "an information seeking process that takes place in a collaborative project (possibly a complex task) among a small group of participants (potentially with set of skills and/or roles) which is intentional, interactive and mutually beneficial" (p. 219). People who conduct search tasks collaboratively usually expect the outcome to be more than the sum of individual contributions. Accordingly, having common goals, being assigned to complex tasks and lack of expertise among members of a group to perform the search task individually are identified as conditions in which collaborative information seeking could benefit the project at hand (Shah, 2010a). Although the nature of the task has been identified in the literature arguing that exploratory tasks are more useful for collaborative information seeking, Shah and his colleagues (Shah, Hendahewa, & González-Ibáñez, 2015, 2017) performed empirical research to demonstrate the level of individual and collaborative activities between exploratory and fact-finding tasks in collaborative information seeking settings. In 2015, they carried out a lab study to examine the impact of assigning groups an exploratory search task with the focus of group size on the amount of information they found, the relevancy of retrieved information, the overall performance of searching for information as well as learning. The results revealed that individuals in comparison to groups were able to retrieve vast amounts of information but the search performance of those who were working in groups including dyads or triads led to retrieving better results owning to formulating search strategies collaboratively. It was also found that triads performed even better in many of the measures which indicated the usefulness of extra people in groups to conduct a multi-faceted search task.

In a follow up study, Shah and his colleagues (2017) examined how collaboration can benefit complex fact-finding tasks. Their analysis showed that while greater efficiency and effectiveness of information search performance were achieved by putting more people into a group that was assigned an exploratory search task, the same results were not obtained when they were required to accomplish fact-finding tasks. Findings of their study revealed that individuals outperformed the dyads and triads with regard to retrieving useful and relevant information and unlike the previous study; no significant difference was found between the performance of dyads and triads. The findings from these two experiments provide useful insights into the impact of task type on collaborative information seeking indicating that collaboration is beneficial when people need to work together for fulfilling multi-faceted

and exploratory tasks and their performance can be even improved with the help of added project member. In this regard, scholars are of the idea that while collaborative information seeking likely suggests a group work, the collaborators may conduct some of the information seeking activities; in particular, information searching actions in sub-groups or individually. They further argued that in these circumstances a common behaviour is division of labour which provides group members with an opportunity to split up the task into sub-tasks and divide them up among each other depending on the structure of the task (Foley & Smeaton, 2010; Morris, 2007, 2008).

2-4-2-1. Division of Labour

Division of labour has been identified in several collaborative information seeking empirical research studies as a common strategy for people to collaborate where group members carry out the search activities individually; they then integrate their contributions into a collective product (e.g., Ndumbaro, 2016; Prekop, 2002; Reddy & Spence, 2008; Saleh, 2012; Wu et al., 2018). According to Kelly and Payne (2013), division of labour is an indispensable part of collaborative information seeking projects as it facilitates concurrent work among participants as well as preventing repetition, redundancy, and breakdowns. Findings of the research study conducted by Bruce et al. (2003) showed that the aim of division of labour in two design teams was to utilise collective expertise through managing highly interactive collaboration. They maintained that well-defined work roles helped design teams to identify the range of sub-tasks which gave team members a heightened sense of responsibility towards the whole group project. Results of their research also revealed that one design team employed "hard division of labour" (p. 151) by assembling the team based on members' expertise, while this process was more flexible and often self-defined in the other design team. In the former design team, each member had to find ways to define their role in the process and those who sat and waited to be told what to do were considered as non-collaborators. In his review of assessing the performance of collaborative information searching tools, Shah (2014b) identified reducing workload and accomplishing something more than individual contributions as two potential benefits of division of labour. This practice is also characterised by Reddy and Jansen (2008) as a process involving repeated actions of searching for information and sharing information until retrieving relevant information to

satisfy the information need. Findings of their study showed as one participant found pieces of information, they communicate and share their results within the group and after analysing the found information and determining its relevance and sufficiency in meeting the information need as a group, members carry on searching for more information until the task is completed. Collaborators need to evaluate the task characteristics before deciding to divide up the work as poor division of labour is identified as one of the major obstacles to collaborate successfully in several research studies (e.g., Hyldegård, 2006; Leeder & Shah, 2016c; O'Farrell & Bates, 2009; Tao & Tombros, 2013a). With regard to using groupware applications, Grudin (1994) highlighted that unequal division of labour and benefits could result in groupware applications failing as some members have to do additional work while these systems are expected to provide a collective benefit. Kelly and Payne (2013) reviewed the literature on division of labour in collaborative information seeking and they identified a communicative approach as a simplest form of coordinating divided labour where collaborating actors exchange information about their work. In a study investigating students' collaborative information behaviour, Saleh (2012) found that the process of dividing up a work task is changing in student groups depending on the complexity of the group project assigned to them. His research findings revealed that students decided to do a group search for a similar information need when they encountered a problem in proceeding with their task as it helped them to retrieve relevant information sources faster. Furthermore, participants in his research argued that when they look for information individually, making a decision about whether the found information is good or bad would be difficult for individuals as they usually do not possess the collective knowledge related to the whole facets of the project. Their strategy was searching for information individually according to their assigned sub-tasks along with running frequent group meetings to analyse the findings in terms of credibility and relevancy over the course of the project. Likewise, findings of Ndumbaro's (2016) research revealed that division of labour is a motive for sharing information. Results of his research demonstrated that in situations where the group task was divided into sub-tasks and group members each was assigned a sub-task to work on, they were obliged to have regular communication and share the information they found to maintain the group awareness with regard to the task progress, coordinate the varied activities performed by group members and confirm that they are heading into the right direction. It is important to note that we cannot

perceive that this process always takes place in groups, in particular in student groups where they use divide and conquer strategy to complete a group task as a combination of varied factors play a role in this process.

2-4-3. Collaborative Information Evaluation

Collaborators may search information individually due to labour division and focusing on different aspects of the project topic, so they might not need to be aware of the exact queries other group members formulate to retrieve relevant information to their sub-tasks. However, the found information needs to be evaluated in groups in terms of its usefulness, credibility and relevancy to the topic. This could add value to the group information process by validating and confirming information from one another through discussions, reviews, agreements and disagreements (Rieh et al., 2013). Rieh et al. (2013) provided the following definition of collaborative information evaluation:

> *Individuals' judgments of the value of certain information shared, negotiated, and changed feedback, suggestions, and individuals as a result of interacting with them in situations where they have common information problems to resolve* (p. 2).

This view is also supported by Ndumbaro and Mutula's (2019) research results demonstrating that the process of collaborative information evaluation entails making joint decisions with regard to what information needs to be searched and used in various phases of conducting group tasks. They further argued that during the planning phase of accomplishing a collaborative task, collaborative evaluation is primarily performed with the aim of defining and formulating a shared focus of the task and over the implementation stage, it would include verifying and confirming the retrieved information sources to ensure their credibility and relevancy for fulfilling the task. Paul (2010) also noted that in group settings where activities are assumed to be performed collaboratively, collaborators need to have a similar understanding of information related to task components, sub-task related information that is assigned to each group member, the information found and retrieved by group members and the interpretations they have made. He further argued that this process can be challenging because group members need to constantly interact with others and contextualise theses communications with regard to the information being retrieved.

Information evaluation can be performed at the individual level initially then within the group which means that group members need to assess the retrieved information themselves over the searching process then the relevancy and usefulness of the found information can be re-judged by more than one group member. Hertzum (2008) states group members' interpretations of the information they found might be different, so information needs to be continually shared to reach a common understanding and make a coherent sense of it. He emphasised that this process is often lengthy and necessitates continual efforts to be maintained over the course of conducting a collaborative task. Saleh (2012) also noted that judging the relevancy of information is a subjective activity and group members make different relevance judgments about the same information objects according to their existing knowledge and their understating of the project topic. Therefore, they should engage in a discussion about the task relevancy of information until a joint collective judgment of relevancy is shared by all. In this regard, his research findings showed that evaluation of information was mainly collaborative among student groups in his study. He found that group members were engaged in many information seeking and search activities resulting in a large amount of information being shared. Afterwards, students discussed the found information during the group meetings and everyone gave their explanation of why they thought the information was relevant to the task. This process continued until all the group members felt comfortable with the usefulness of the information which led to a joint decision about what bits of information were more relevant to the task requirements and meeting its objectives. Nonetheless, it was found that this process is heavily dependent on the nature of the task and group members' knowledge and expertise. Some of the research participants in Saleh's (2012) research explicitly stated that they were responsible for evaluating the information that was found individually by other group members because their fellow group members lack the required expertise to assess the information. In this regard, Tao and Tombros's (2013a) research findings showed that group participants were actively involved in sharing the information they assumed that might be useful for other group members via the agreed communication technology tools but they were reluctant to share their own understanding of that piece of information and why they perceive it relevant to the group task. It highlights the fact that sharing information alone cannot be sufficient for exchanging information and building a shared and similar understanding of the found information within the group.

Assessing and evaluating the relevance of retrieved information within the group can also be helpful with regard to re-formulating search queries and revising search strategies leading to optimising group search information (Yue, Han, He, & Jiang, 2014). While group members assess the obtained information found by other group members, they might recommend one another different information resources to look at or information databases to search from along with suggesting different keywords and modified search queries. Moreover, they might also start searching together during group meetings in which they have an opportunity to search and evaluate information concurrently. In this regard, prior research also showed that students usually prefer to seek help from their peers or their instructors to select databases and choose the best search strategies (Ismail, 2013; Leeder & Shah, 2016b; Ndumbaro, 2016; Thomas, Tewell, & Willson, 2017).

Another important facet of information evaluation is evaluating the credibility of information resources. Collaborative information evaluation provides group members with an opportunity to question the credibility of information sources suggested by others. In this regard, sharing the same criteria with respect to platforms for searching and retrieving information as well as evaluating the found information in terms of authority and currency can help group members to act similarly while searching individually. Several research studies have reported that students almost use Google to search for scholarly information (e.g.,Bury, 2016; Saines et al., 2019; Wu et al., 2018) and they rarely evaluate the credibility of sources (Leeder & Shah, 2016b). Furthermore, findings of some research also demonstrate that students who began their research using online resources provided by the library often encounter difficulty in searching databases and retrieving relevant information (Biddix, Chung, & Park, 2011; D'Couto & Rosenhan, 2015; Thomas et al., 2017) and they simply search specific databases in their field and are unfamiliar with other information resources that can support them (Johns, Price, & Ungaretti, 2019; Saleh, 2012). These findings indicate the prominence of developing and maintaining group awareness and frequent communication over the duration of performing individual searches. In addition, it shows that students still have difficulty with basic information literacy skills indicating that one-shot information literacy session rarely helps students to gain adequate experience in retrieving scholarly information as they cannot immediately turn the ideas into practical knowledge (Johns et al., 2019; Murphy, 2019; Webber & Wiegand, 2019).

Accordingly, Leeder and Shah (2016a) suggest that results of relevant research with regard to different characteristics of collaborators' behaviour should be taken into consideration for designers who develop collaborative search systems to enhance the functions of those systems. As students are still facing difficulty with identifying credible information, these authors recommend that instructions and specific criteria for evaluating the quality of information sources can be built into collaborative information seeking tools to assist students in enhancing their searching and evaluation expertise.

2-4-4. Awareness

Awareness is recognised as one of the crucial elements of collaborative information behaviour process. Awareness has been defined as the "understanding of the activities of others, which provides a context for your own activity" (Dourish & Bellotti, 1992, p. 107). According to Dourish and Bly (1992) "awareness involves knowing who is around, what activities are occurring, who is talking with whom" and "it may lead to informal interactions, spontaneous connections and the development of shared cultures" (p. 541). Awareness provides group members with an opportunity to evaluate and assess one another's actions and can potentially enhance the collaboration process. Indeed, for "an interactive, intentional, and mutually beneficial collaboration to be successful, it is imperative that all the participants be aware of each other's actions and contributions" (Shah, 2010a, p. 8). A well-accepted taxonomy of awareness has been proposed by Liechti and Sumi (2002) who addressed four kinds of awareness including *group awareness*, *workspace awareness*, *contextual awareness* and *peripheral awareness*. While group awareness provides information about the status and activities of collaborators to each group member, workspace awareness refers to a common space that the group members share and where they can bring and discuss their findings to create a common product. Contextual awareness helps group members to identify the common goals for their project and what content is useful for the group and peripheral awareness relates to the group members' ability to process the information which needs to be kept separate from what they are currently doing. With regard to workspace awareness, Gutwin and Greenberg (2002) provided a comprehensive conceptualization of it in groupware workspaces in comparison to face-to-face environments. Their definition of workspace awareness included three categories of *who*, *what* and *where*. The first category i.e. *who* encompasses the presence,

identity and authorship of collaborators. The second category i.e. *what* determines the actions that collaborators are involved in, their intentions of taking those actions and the artifact that they are working on. The final category i.e. *where* refers to location (where collaborators are working), gaze (where they are looking), view (what they can see) and reach (where they can reach).

According to Sonnenwald and Pierce's (2000) research findings, group members need to develop and maintain "*interwoven situational awareness*" which is defined as the shared understanding of the work context, the situation, the work process and domain specific information within the group and between groups that can be achieved by frequent communication. Endsley (1995) proposed a model of situation awareness which provides a more detailed understanding of this type awareness including three components: "(1) the perception of the elements in the environment within a volume of time and space, (2) the comprehension of their meaning, and (3) the projection of their status in the near future" (p. 36). In this regard, Saleh's (2012) research revealed that situation awareness in the context of academic settings changes dynamically over the different phases of the learning task which can lead to a variety of decisions about information seeking and searching. He emphasised that group members need to maintain a high level of shared situation awareness with regard to one another's information searching to be able to incorporate what they find into the project.

With regard to making sense of information shared during collaborative information seeking activities, Paul's (2010) research findings indicated that group members are required to maintain awareness about longitudinal endeavors named "*activity awareness*" which is recognised as a higher level of awareness comparing to social awareness and action awareness representing who the collaborators are and what they are doing respectively. He argued that activities are composed of a sequence of actions occurring over a prolonged period such as formulating and making changes in shared plans, while group members' actions are related to short-term tasks.

Although the importance of awareness has been emphasised in almost all CIB/CIS studies, the basic fact is that awareness needs to be supported by additional communication channels. Toze (2014) examined group information processes in student groups and found that while participant groups regularly updated their knowledge of what other members had done and built situational awareness, they needed flexible communication tools. Her research findings showed that groups specifically

needed tools to help them with mapping their activities to calendars; alerting one another if they encounter problems with accomplishing their sub-tasks and determining the best way and timing for sharing information between meetings. According to her research results, the most common way for student groups to manage monitoring activities and maintaining awareness between meetings was through email In this regard, they wished they could use their course site, but it did not have the required features with respect to support for monitoring group and individual activities. She concluded that a single interface that coordinated all the necessary features may be more efficient and practical for groups. Shah (2013) investigated how employing different kinds of awareness support can affect group members` coordination behaviour in collaborative information seeking situations. He examined providing three different awareness conditions on the interface of the collaborative system that users used including *baseline* (i.e., assistance with the contextual awareness, for instance providing basic information about the present task including its name and description as well as workspace awareness in which the group could be informed of the retrieved information sources for the task), *Personal peripheral awareness* (i.e., assistance with regard to the information relevant to individuals' actions such as files saved, keywords used, queries formulated as well as providing the baseline support), and *Group peripheral awareness* (i.e., providing information related to group members' actions such as documents and information sources saved, queries and keywords formulated in addition to the baseline support). Findings of his research revealed that groups with either baseline or personal awareness facilities were required to devote more time and put in more effort into facilitating coordinative activities in comparison to those who were provided with an appropriate group awareness facility. In other words, the results showed that providing adequate and proper kind and amount of awareness can help in decreasing the effort for coordinating activities. In this regard, Tao and Tombros's (2013b, 2014, 2017) research showed that collaborative information seeking systems should provide an opportunity for users to select what types of awareness information they require to complete their task collaboratively. According to their research findings, student groups that divided labour were not interested in being aware of members' query history and webpage-view history because they focused on different aspects of the task. They found out that information about task progress in terms of the

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current activities that collaborator are involved in, the actions that have been taken and the steps that need to be followed for completing the task are more important and useful to these groups.

2-5. Prior Studies Examining Collaborative Information Behaviour

Collaborative information seeking has been investigated within different domains including military units, engineering, medical and health care units as well as academic settings. The domains, tasks and unit of analysis are varied in these research studies; however, these works are included in this review due to the relevance of their key finding to the current research objectives.

2-5-1. Military

One of the earliest studies in collaborative information seeking field has been conducted by Sonnenwald and Pierce (2000) in a military context. They explored and examined how group members developed and maintained awareness of others' information practices and how this awareness had an impact on group information sharing. Their findings revealed three important themes: 1) *interwoven situational awareness*, 2) *dense social networks*, and 3) *contested collaboration*, which are potentially of interest to the study of small work groups. The researchers found that to make effective decisions, a shared understanding of the situation at three levels including individual, intragroup and intergroup is of great importance which they called it *interwoven situational awareness* which is built upon frequent communication and information exchange among participants regarding the context and the situation which led to a dense social networks pattern. The third theme named contested collaboration describing when group members challenge others` contributions based on their different past experiences and backgrounds. According to their findings, it is essential to take communication and information sharing into account to understand how groups maintain situational awareness and create shared understanding to complete their tasks. Moreover, the idea of contested collaboration highlights the fact that information use at a group level may be problematic and groups should identify mechanisms to negotiate information as it sometimes would destroy the collaborative effort. This issue is similarly identified by Hyldegård (2006) in educational context as she concluded that finding a solution for

complex and complicated problems in educational settings seems to be more difficult when it is carried out in a group context.

Another study in the military environment has been conducted by Prekop (2002) who investigated the process of collaborative information seeking in the Australian Defence Force. This study is particularly worthwhile for the current research as he focused on the '*context*' as one of the main dimensions of collaborative information seeking. Prekop (2002) described context as "the collection of events, histories, culture, knowledge and understanding, which exist together at a point in time" (p. 535). He used the concept '*collaborative information seeking context*' to represent the creation of a context which "captures what is collectively known, understood, felt and believed, as well as the history of the working group, and the groups' norms, social rules, and social structures" (p. 536). The collaborative information seeking context is dynamic and changing upon group interactions over time based on his research findings. He also highlighted how specific information activities within the group were distributed among the members. He reported that the process of assigning roles to group members was dynamic and participants' roles could be changed based on the task progress. These particular roles may not generalise beyond this study, but the findings emphasised that roles may be a key part of how group information process would take place.

2-5-2. Engineering Domain

Apparently, one of the most comprehensive works that explored collaborative information seeking has been carried out by a group of scholars from the University of Washington (Bruce et al., 2003; Fidel et al., 2004; Poltrock et al., 2003), who investigated collaborative information seeking from information retrieval perspective. The authors examined how two design teams from two different organisations (Microsoft and Boeing) make sense of the information need, formulate the queries, retrieve information, assess the found information and use it to complete their group projects. Findings of their research revealed that while these two teams worked on various group projects which led to different outcomes, they adopted similar strategies with regard to collaborative information behaviour. The results indicated that team's information needs were mainly related to design issues and members made a considerable effort to gain the required information and define the various aspects of the design work that needed to

be considered before initiating the information seeking phase. The management perspectives and opinions were also the essential information that they needed to take into account when defining the information need within the team. With respect to seeking information, team members primarily gathered information from other members, from other engineers working in the organisation or through their personal network i.e., colleagues outside the organisations. They also searched the information databases developed by their organisations when they needed specific information about existing system designs. Teams held regular meetings to share information they found, to get feedback from members and to update the team about the project progress. Ad-hoc meetings were also used as another strategy for updating one another and gathering more information from team members. The researchers concluded that team members in design teams collaborated with each other when defining the information need and seeking information, but the act of information retrieval was usually done individually.

Another study of collaborative information seeking in engineering field was carried out by Hansen and Järvelin (2005). They studied a Swedish Patent and Registration Office examining how nine patent engineers collaboratively seek and retrieve information. Through the study, they developed a basic framework of collaborative information seeking. This framework defines two types of collaboration: document-related collaboration activities that involved creating or using documents and human-related collaboration activities that attempted to use knowledge held by someone else on the team. The results revealed that participants were engaged in collaboration with regard to sharing their expertise and knowledge for evaluating the retrieved information. In addition, they also found out that workers' awareness of one another had a profound impact on performing successful collaborative information retrieval activities. Furthermore, the authors also defined distinct levels of collaborative information seeking process, including the work-task level, which involves receiving a task (initiation), preparing and planning for a task, and completing the task. The information seeking task level is where basic information about the task is collected and the task needs are then determined. The information retrieval task level is the stage in which queries are formulated (and possibly reformulated) and relevance judgments made. The framework developed by Hansen and Järvelin (2005) could be used to determine

what activities are commonly experienced in collaborative information seeking process in other domains.

2-5-3. Medical and Health Care Domain

In health setting, Reddy and colleagues (Karunakaran et al., 2013; Reddy & Dourish, 2002; Reddy, Jansen, & Spence, 2010; Reddy & Jansen, 2008; Reddy & Spence, 2008; Spence, 2013) have examined several aspects of collaborative information seeking. For instance, Reddy and Dourish (2002) focused on temporal aspects of work which had an influence on participants' collaborative information seeking activities in the context of an intensive care unit. Their results demonstrated that the relationship between the information need and finding information in groups may be complicated, and affected by time. Reddy and Spence (2008) also carried out an ethnographic field study within a multidisciplinary patient care team with the aim of identifying the team's information needs as well as situations that give rise to collaborative information seeking activities. To understand why group members collaborate while they seek information, the researchers utilised the "analytical concept of triggers as an event or situation within the environment that initiates collaborative information behaviour amongst a formal or informal group of people" (p. 16). Triggers are vital and primary situations in launching a marked shift from individual information behaviour to collaborative information behaviour. These triggers are: (1) *lack of domain expertise*, (2) *lack of immediately accessible information*, (3) c*omplexity of information needs*, and (4) *fragmented information resources*. Based upon this research, Reddy and Jansen (2008) created a model (Figure 2-2) illustrating the shifts from individual to collaborative information seeking. The model is described in terms of two axes, behaviour and context. Behaviour, on one hand, distinguishes information search from seeking. Context, on the other hand, refers to whether information behaviour practices are conducted individually or collaboratively.
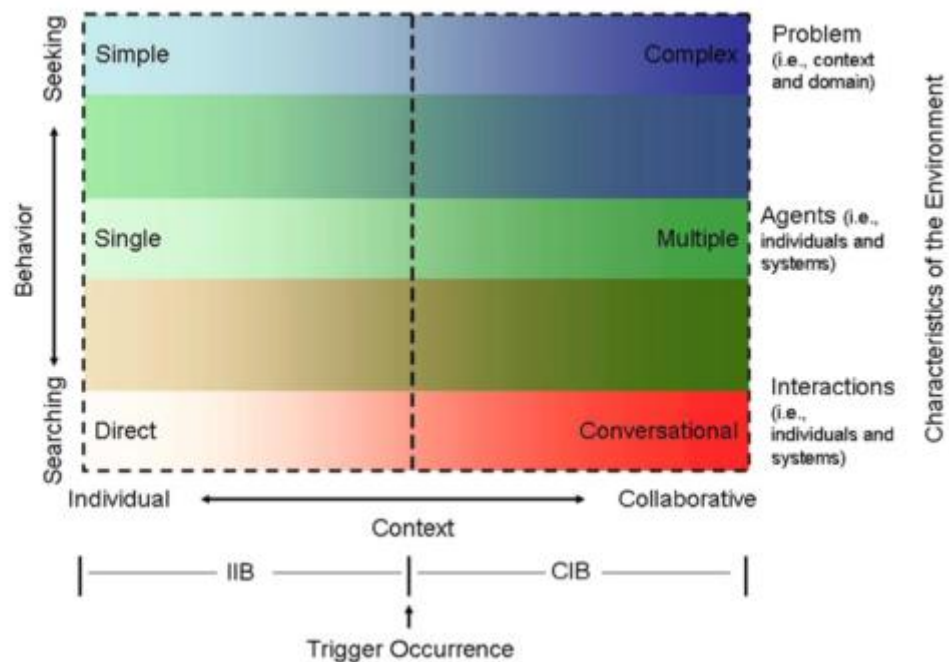
Figure 2-2. Reddy and Jansen's (2008) Individual versus Collaborative Information Behaviour Model

While the stages of the process, specifically the activities performed by actors are not quite clear, the model illustrates the possibilities to move along these dimensions based on particular characteristics of the environment such as the type of problem or task, the number of collaborators and their interactions. According to this model, individual information behaviour is characterised by simple problems, with little need for communication, and involving only basic interactions with a single person or system. By contrast, collaborative information behaviour is needed when there is a relatively complex problem and it involves interactions and communication with a number of individuals and systems.

Karunakaran et al. (2013) extended the previously discussed Reddy and Jansen's (2008) model. Their model is based on both empirical studies by authors in health domain as well as reviewing relevant literature. They suggested that collaborative information behaviour consists of three broad phases: *problem formulation*, *collaborative information seeking*, and *information use* (Figure 2-3).

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Organizational Context
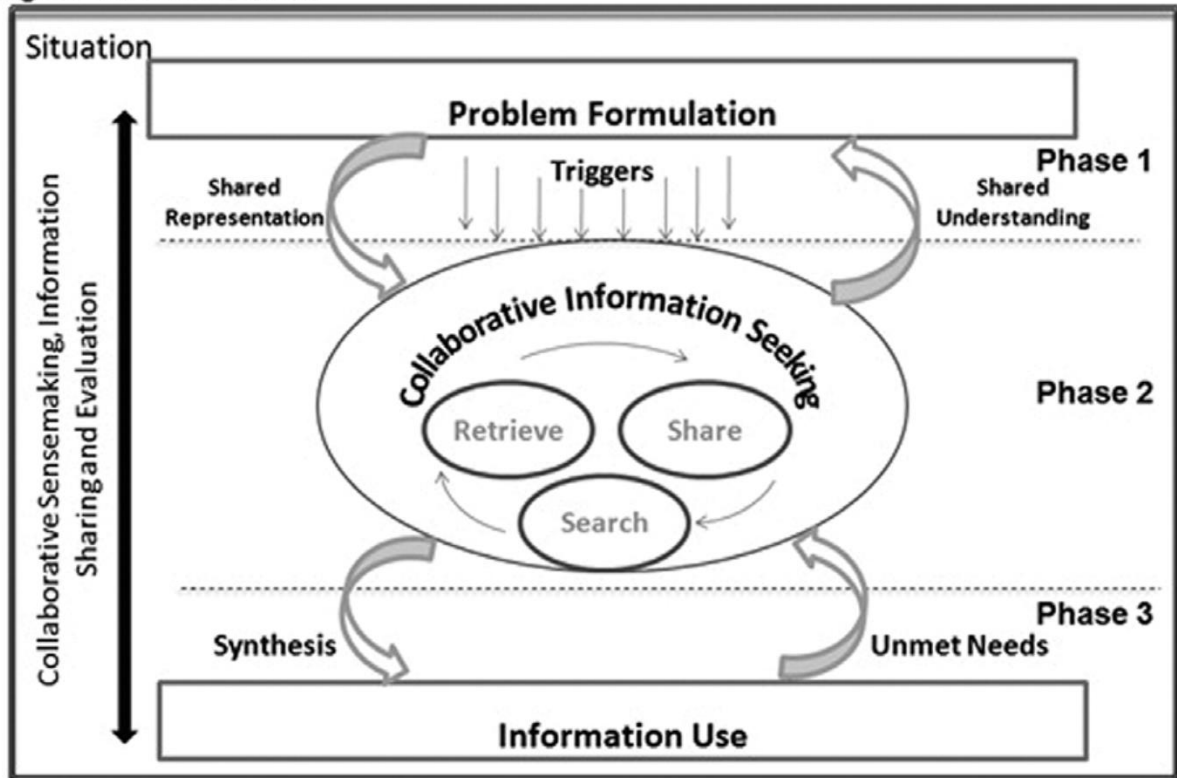
Figure 2-3. Karunakaran, Reddy and Spence's (2013) Model of Collaborative Information Behaviour in Organisations

A number of activities apply across all these phases including *information sharing and evaluation* and *collaborative sense-making*. Information sharing and evaluation take place both within and across the three main phases. Collaborative sense-making involves different individuals with varied viewpoints who arrive at a shared understanding of the group task.

Spence (2013) also carried out an ethnographic research exploring the collaborative information seeking activities of information technology teams in two hospitals with an objective of examining the impact of contextual factors on these activities. She noted that the focus of most studies in this field was on how individuals seek, retrieve and use information collaboratively, while the primary question is what contextual factors can have an influence on these activities and how. She defined context as:

Circumstances and conditions that surround and affect a phenomenon. These circumstances
and conditions may be tangible or intangible and could include location, position, people,
objects, function, purpose, meaning, or time (p. 3).

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In this study, she identified four broad categories of contextual factors that influence collaborative information seeking activities including individual, team, organisational, and technological characteristics. By category, these contextual factors include: individual characteristics (quality of information the individual can provide, reputation of the individual, availability of the individual); team characteristics (team communication, team culture, team Workspace); organisational characteristics (cross-team communication, integration of systems, issue priority, reputation of a team); and technological characteristics (simultaneous remote collaboration functionality, social functionality). In order to explain how contextual factors have an impact on CIS practices, she developed a conceptual framework of contextual factors influencing collaborative information seeking activities in organisations (Figure 2-4).

Organizational Context

TEMPORALITY

INDIVIDUAL CHARACTERISTICS	TEAM CHARACTERISTICS	ORGANIZATIONAL CHARACTERISTICS	TECHNOLOGICAL CHARACTERISTICS
• Availability • Quality of information • Reputation	• Team communication • Team Culture • Team workspace	• Cross-team communication • Integrated systems • Issue priority • Reputation of team	• Simultaneous remote collaboration • Social functionality

CROSS-CUTTING CHARACTERISTICS

Awareness   Collaborative Climate   Common Ground

CIS PRACTICES
- Creation of Ad hoc teams
- Evaluation of Information
- Adaptation of technology
- Use of Stopping Criteria

Figure 2-4. Spence's (2013) Framework of Contextual Factors Influencing CIS Activities in Organisations

The framework highlights the interconnectedness of contextual factors and how this interplay contributes to certain collaborative information seeking practices. The framework helps in understanding how contextual factors can influence CIS activities in a more general context of organisational work. The framework depicts multiple levels of the context that need to be taken into account when investigating CIS activities: time, characteristics of individuals, teams, the organisation and technology, as well as cross-cutting characteristics including awareness, collaborative climate, and common ground. These contextual factors can influence, reinforce or change those practices and conversely the CIS practices can influence, reinforce or change the contextual factors. The framework also highlights the followings about contextual factors: (1) they are not independent, but instead are interconnected, (2) they are not always equally relevant in all organisations, (3) when considering their impact on work activities, contextual factors are linked in a contingent relationship, (4) as time moves forward they may have an impact on CIS activities in different ways and to varying degrees, and (5) engaging in the CIS practices themselves may have an impact on them differently over time. The framework also emphasises the importance of temporality as a contextual factor affecting CIS practices. While other contextual factors may not always exist in all organisations, temporality does always exist and will always have an impact on CIS practices. Furthermore, the framework shows that the influence of contextual factors on collaborative information seeking shifts the focus of CIS from activities taking place in isolation at the team or group level, to a collaborative process taking place within a complex organisation at the intersection of individuals, teams, and technology use. In overall, this research extends our conceptual understanding of the role of context in collaborative information behaviour and highlights the value of studying the context as an aspect of collaborative information seeking.

2-5-4. Tourism

Researchers have also attempted to examine tourists' collaborative information seeking behaviour to gain more details about why and how tourists engage in collaborative information seeking practices (e.g., Fardous, Du, Choo, Huang, & Hansen, 2017; Mohammad Arif, Du, & Lee, 2015; Ye et al., 2019).

With respect to information needs and motivations for engagement in collaborative information behaviour Ye et al. (2019) conducted a grounded theory study to explore what circumstances would

lead young Chinese tourists to search for information collaboratively. The authors argued that previous studies on this topic have either entirely theoretical or conducted in a laboratory setting where participants performed collaborative information behaviour as if they are planning a trip, but this study investigated real tourists' collaborative information behaviour practises while planning and conducting their trips. Adopting a longitudinal perspective allowed the researchers to obtain comprehensive details of tourists' collaborative information behaviour before, during and after their travel. Preliminary analysis of pre-trip/post-interviews and kept diaries by participants revealed five dimensions of group holidaymakers' motivations to engage in collaborative information behaviour practices, including collecting rich and comprehensive information, formulating particular information needs, sharing the workload of searching for information, discussing and considering each member's points of view and priorities as well as making an effort to create a feeling of participation among all group members.

From the user side, Mohammad Arif et al. (2015) investigated tourists' collaborative information retrieval in a web search setting. Study participants including 17 males and 3 females were grouped in ten pairs to search for tourist information and data was collected through distributing pre-search and post-search surveys, analysing web search and chat logs as well as conducting interviews after completing the search tasks. Their research findings showed that participants collaborated with their peers through formulating the search terms and search strategies, splitting up the search task into sub-tasks and assigning each specific sub-task, sharing search terms with one another and using them to conduct more searchers as well as sharing links to other information resources and discussing the retrieved information together. Data analysis further indicated that expertise and prior experience played a role in collaboration as those participants who were more skilled at information searching were able to retrieve precise and helpful information easily and they were more interested in disseminating that information to their teammates. Based on the prior research carried out to explore the tourists' collaborative information search behaviour, Mohammad Arif and Du (2019) have proposed a collaborative search system in tourism domain called '*collaborative tourism information search (CoITIS)'* to support collaborative planning and online information searching for travellers' group. The system was evaluated by conducting a user study research including 18 pairs of participants and findings showed that formulating the search queries collaboratively, labour division, chatting and sharing the

found information are the most important activities that can simplify the tourists' collaborative search behaviour. It was also discovered that the proposed system outperforms the TripAdvisor in terms of ease of use, collaborative support and usefulness.

Using social media throughout the group travel for the purpose of trip planning and seeking information collaboratively was also explored by researchers. Fardous et al. (2017) surveyed 63 Australian participants and found out that almost all the participants used Facebook for collaborating on trip planning activities. The findings also showed that while about 70% of participants used social media at the beginning to gather information for their planning processes, 41% used it to confirm the decisions they made and almost 40% of participants changed their minds due to their interactions with social media and the new information they came across. Fardous, Du, and Hansen (2019) also conducted an exploratory research study using employing group interviews for data collection to discover the situations that tourists utilise social media for collaborative information seeking. Analysing the interview data revealed that all the participant groups experienced the re-planning phase, so they used social media for seeking and collecting various opinions and more information which helped them make informed decisions. Sharing travel information was identified as another factor which led participants into using social media. In this regard, participants used social media to share their travel information and activities that had been planned with their family members and friends with the aim of seeking more useful suggestions during the trip. Furthermore, receiving regular updates on local news and specific events at the destination as well as keeping in touch with family and friends and collaborating with tour mates were identified as situations conductive to social media utilisation during a group travel.

2-5-5. Academic Settings

Limberg's (1999) work was one of the first research studies that its findings provided deep and comprehensive understanding of students' information behaviour activities over completing a group task, however this research had not been originally conducted as a study exploring collaborative information behaviour, but rather students' attitude towards a group assignment. Participants who had a holistic approach (we-oriented individuals) to the group task were identified as students with positive attitude towards group work in academia. They appreciated the value of collaborating with their peers

to accomplish their shared goal and were involved in communicating and exchanging information within the group effectively. On the contrary, participants with individualistic approach (I-oriented) split the group assignment into distinct parts and were not engaged in searching, evaluating and using information collaboratively.

Scholars have specifically focused their attention on exploring collaborative information behaviour in educational settings. Several research studies have been carried out based on traditional information behaviour models developed for individual information seeking situations with the aim of investigating whether these models can be applicable to collaborative learning environments in either naturalistic or experimental settings. Hyldegård's (2006) study was one of those early works in this area of research and examined students' collaborative information behaviour using the Kuhlthau`s (1991) Information Search Process (ISP) model as her theoretical framework. The goal of her study was to find out whether group members' information behaviour was different from individual information seeking practices in the ISP-model and how this behaviour could be influenced by contextual factors including group work and group task as well as personal factors. She carried out two case studies involving five student groups and collected qualitative data over 14 weeks of performing information-related activities to complete a group assignment. A phenomenological approach was adopted for conducting the case studies and qualitative data was collected using surveys, printed diaries and scheduled interviews at three points (start, mid-point, end) over the course of completing the group task. Based on the findings, some similarities between the ISP-model and students' information behaviour within the group settings have been identified as well as disparities which were associated with personal characteristics, social and contextual factors. Moreover, results showed that at some points participants worked together and collaborated to resolve the issues they faced and sometimes they worked individually over the duration of completing the group project. The affective behaviour of group members also varied which was associated with the task process and group development. The study showed that ISP-model cannot be fully employed to examine groups` behaviour in collaborative settings and the author proposed an extension to this model named the *Group Member in Context (GMIC)* model with the aim of illustrating how information behaviour in academic group settings is affected by *group development process* and *work task process*.

Similarly, Shah and González-Ibáñez (2010) used Kuhlthau`s (1991) ISP model and examined it in a collaborative information seeking setting. They conducted a laboratory study with 84 undergraduate and graduate students comprising 42 pairs when performing collaborative search tasks using CIS system named Coagmento (Shah, 2010b) to investigate how their information seeking activities could be aligned with the phases of the Kuhlthau`s model. Results of their research showed that group members' behaviour shifted between different stages and their activities did not follow a linear path as implied by the ISP model. Over the course of the study, research participants were continuously involved in re-formulating search queries, browsing different sources and gathering pertinent information as they communicated and exchange information with other collaborators. Overall, Shah and González-Ibáñez (2010) concluded that comparing group information-related activities with this model can yield interesting and useful insights; however, it lacks the potential to depict group members' interactions and their collaborative practices, and most importantly the influence that contextual factors such as group work and group task can have on individuals` feelings and their behaviour.

In another study, Lee (2013) explored how students collaboratively search, assess, and use information over the duration of conducting a group assignment and theoretical frameworks of her study were Kuhlthau's (1991) ISP model and Yue and He's (2009) collaborative information behaviour (CIB) model. She used mixed methods to conduct the study and the total number of students who consented to take part in her study was 43 master students and they were enrolled in a blended course including online and on-campus study. Students were required to have initial face-to-face meetings when they formed their group but the majority of group work activities were performed through an online learning system (i.e., Blackboard) which provided students with different tools to be able to communicate and interact with one another including email, discussion boards, and chat rooms. Similar to Hyldegård's (2006) and Shah and González-Ibáñez's (2010) research findings, results of this study also indicated that there were some similarities between individual information seeking behaviour within a group context and the information seeking process presented in the ISP model but variations were also found owning to cognitive, social and group processes. Findings of this research further indicated that the level of collaboration among participants in this study did not match the collaboration level perceived at different stages of a group task as presented in Yue and He's (2009) CIB model. According to this

model, group members initiate the search task with a high level of collaboration to gain a shared understanding of the group information need, then they decide to search different paths independently and rely more on asynchronous collaboration and in the final stage, they will become more involved in collaboration to collate the retrieved information and solve the problem. Findings of Lee's research showed that research participants' level of collaboration was low at the beginning phase, so they could not identify and conceptualise the information need effectively which led to the problem of managing group project's scope in latter stages.

Kußmann, Elbeshausen, Mandl, and Womser-Hacker (2013) also investigated the collaborative information behaviour of university students by employing the Information Seeking Behaviour model created by Ellis (1989). They carried out a laboratory study with 15 students who were organised randomly in groups of three. Required data including participants' demographic information and their past experiences of working in groups as well as their information seeking behaviour were collected via a questionnaire. Ellis`s (1989) model includes eight stages: *starting*, *chaining*, *browsing*, *differentiating*, *monitoring*, *extracting*, *verifying* and *ending*. Findings of their research revealed that single phases of the model were applicable to collaborative processes; however, *monitoring*, c*haining* and v*erifying* could not be noticed which might be related to the duration of search sessions as they were too short. Additionally, *browsing* appeared to be the most important phase as all group members were actively involved in this activity. The researchers found out that collaborative information seeking behaviour has specific and unique characteristics which cannot be traced in individual information seeking models; specifically, the social element should be considered similar to previous studies that applied the ISP model. Moreover, they identified two distinct search strategies: scanning and reading. The groups that employed the scanning strategy found more documents but less relevant (high recall), while the groups that followed the reading strategy retrieved less information which was more relevant (high precision).

The aforementioned studies demonstrate the potential limitations of mapping collaborative information behaviour into models which were designed to describe the individual search process. In particular, these general models are intrinsically limited by their structure since they do not consider

social components. In order to properly map collaboration onto such models, changes to their structure would be required, such as adding intermediary stages and a social dimension (González-Ibáñez, 2013).

In contrast to the above discussed research studies, Shah and Leeder (2016) conducted a diary study with 41 participants in 10 groups by adopting the C5 model of collaboration (Shah, 2008) to explore students' behaviour working on collaborative projects. As previously discussed in this chapter, the C5 model of collaboration consists of distinct dimensions including communication, contribution, coordination, cooperation and collaboration. Collected data through the diary method were analysed quantitatively and qualitatively leading to interesting findings with respect to the relationships between the elements of the C5 model and students' collaborative behaviour; students' choices of communications as well as their work-style orientations. According to the findings, communication was identified as a crucial factor in collaborative group projects throughout all phases of group work, while coordination and contribution were the key elements of the initial stage and collaboration became important during the completion stage along with evaluation and reflection. Data analysis further showed three methods of communication that students used frequently including face-to-face communication, online chat and email. Face-to-face communication was found to be more related to collaboration, coordination and contribution which led to increasing satisfaction among participants. Giving/receiving feedback, clarifying and closing the loop were identified as activities generally conducted through online chat communication. Shah and Leader's (2016) findings also showed that email as an asynchronous communication tool was the only communication method related to cooperation. In terms of the work-style, findings of this research revealed that most of the participants (65%) preferred the task to be completed individually instead of group work. Further analysis confirmed that those who preferred group work expressed optimism and confidence in collaborative work, whereas those with individual work preference expressed tension and challenges. The authors recommend that instructors who are interested in increasing satisfaction among their students towards group work process can emphasise on coordination elements of group work including time management and planning tasks, cooperation factors such as providing feedback and clarification as well as reviewing and providing feedback on individual contributions over the course of group task completion.

In another study, Leeder and Shah (2016a) conducted exploratory research with 41 participants in ten groups over four semesters to deepen their understanding of students' collaborative information behaviour while performing authentic group projects. The authors also aimed to investigate how student groups that are involved in group information seeking use a collaborative search system (Coagmento) and which elements of this system are more useful to them. Their purpose for performing this research was providing helpful insights to both system designers and instructors who incorporate group projects into their courses. Through analysing quantitative and qualitative data collected based on participants' search activities over the duration of the group task, research findings indicated that satisfactory experience with prior group work process led to higher quality outcomes. Findings of this study support the notion that students who received teamwork training and had positive past experiences of group activities are quite willing to engage in working with others and would appreciate the merits of collaboration. It also indicates that explicit instruction might help students to consider group work as a learning activity instead of a complex task that they assigned to complete. Furthermore, their research results showed that participants' self-reported data regarding their level of topic knowledge, search expertise and enthusiasm did not correlate with superior outcomes demonstrating that students usually exaggerate the extent to which they are capable of finding and evaluating information. Based on findings, the authors suggest that CIS tools can be enhanced in order to provide tips on effective search, increasing awareness to encourage group members to search more information as well as providing guidelines on how to assess the quality of retrieved resources. Moreover, they found out that students prefer to use familiar tools as they felt more comfortable using rather than learning a new and unfamiliar system which was designed specifically for collaborative search. This suggests the significance of designing collaborative search systems handy, convenient and intuitive.

Leeder and Shah (2016c) also undertook empirical research to examine the strategies students adopt and the obstacles they face when they are involved in collaborative information seeking activities to fulfil their group assignments. In this study, students used Coagmento as a collaborative search tools to perform their search activities, therefore server log data along with questionnaire responses were analysed to develop a deeper understanding of participants' individual and group activities as well as their attitudes towards group work. Research findings showed that participants preferred to divide the

work between group members and assign one another specific tasks, set deadlines and communicate through email or text messages which explicitly demonstrate students' individual work-style orientation within the group context. Meeting options including scheduling frequent meetings, face-to-face meeting and online meeting received the lowest rankings based on participants' responses as well as tracking progress, while previous research demonstrates the significance of face-to-face communication in increasing group members' satisfaction with group work process as well as coordination and contribution practices. Furthermore, data analysis revealed the obstacles students faced over the course of completing their group assignment. According to participants' responses, communication with group members, coordination between group members, unequal participation and procrastination were identified as the most important challenges while working on their group project, whereas achieving consensus and leadership were the least important ones. In addition, the allocated grade to each group was compared to their search activities conducted via employing the Coagmento system. Results indicated that groups with the highest grade were more involved in performing efficient, focused and topic-related searches in comparison to their fellow groups that received low grades which demonstrate that information literacy plays an important role in collaborative searching and information utilisation. Findings of this research revealed that dividing the work and assigning specific task is the basic strategy that students employed to conduct their group project; however, their unwillingness to have regular meetings demonstrates their tendency towards working independently. These results indicate the fact that assigning students to work in groups does not always lead to a collaborative outcome, increased productivity or insights into the role of genuine collaboration.

Other studies of collaborative information behaviour carried out in the education field analysed and examined this concept generally so as to identify the patterns of collaboration in educational settings. For instance, O'Farrell and Bates (2009) examined students' information seeking behaviour and sharing activities while performing a group task. They, in particular, aimed at exploring the way students communicate with their teammates, how they shared information resources, and the challenges they face over the duration of competing a group task. They recruited 50 participants including graduate and undergraduate students and an online survey consisting of 25 closed and open-ended questions was used to collect data. They found that the number of meeting held by undergraduate groups was less than

the groups including graduate students. Students used text messaging as the most frequent way of communicating with other group members (97.8%) followed closely by email (95.6%) and in person (86.7%). Cell phones were used the least for this purpose (55.6%). Students shared relevant websites (95.1%) and journal articles (51.2%) with group members and ranked sharing information resources as one of the top reasons they liked working in groups. Motivation, problem with task division, communication setbacks, and difficult personalities were identified as the aspects of group work students least liked. Moreover, students identified the top five problems encountered during a group project: 1) problem with time management (65%), 2) poor communication between group members outside the formal meeting times (45%), 3) problem with division of labour and defining roles (42.5%), 4) general lack of information resources in the library about the research topic (42.5%), and 5) difficulty with information sense-making and reaching agreement on the relevance of retrieved information (37.5%). This was an exploratory survey with just 50 respondents from a single faculty and the authors believe that further research is needed to be done with a larger sample to provide a thorough understanding of students' communication and information behaviour within a group context with the aim of increasing awareness among academics of how students work together when they are assigned group projects.

Investigation of the impact of the task type on information behaviour is of great importance because tasks are the *driving force* underlying information behaviour, thus Saleh (2012) conducted a research study extending the conceptual understanding of students' collaborative information behaviour which provides profound insights into how distinctive characteristics of the group task can shape students' collaborative information activities. Saleh (2012) utilised a longitudinal research approach employing a constructivist grounded theory methodology. His research data collection tools were an online survey, semi-structured interviews (with 8 students) and project deliverables (from six groups) including weekly progress reports representing group activities and final reports. Research results showed that learning tasks associated with engineering design projects were information-intensive tasks; information seeking, searching, and use had been ongoing activities during the lifespan of these projects. There was found to be a strong relationship among different group task stages, task complexity, and group members' collaborative information behaviour. Collaborative information behaviour

activities occurred variably at different project stages and levels, and their nature were task-dependent. Students' perception of task complexity triggered collaborative seeking and utilisation of varied information resources, with preferences for information from perceived subject-experts. It was also found, in many situations, when students' perceived task complexity increased, their information behaviour tended to be more collaborative. This research emphasised the need for student groups to maintain awareness of group activities with regard to information seeking and information use through interacting by holding regular group meetings or use of collaboration digital tools. Detailed analysis of findings resulted in a holistic conceptual framework illustrating the dynamic interplay of the components of task-based collaborative information behaviour in learning tasks. Collaborative information behaviour was conceptualized with details in its three distinct but interrelated dimensions: (1) learner's knowledge, (2) learners' activities and interactions, and (3) information objects. The representation of interdependence of these three dimensions confirmed the complexity of collaborative information behaviour as a human behaviour that cannot be investigated by focusing on a single dimension at the expense of others.

Sormunen, Tanni, and Heinström (2013) also conducted qualitative research exploring how upper secondary student groups worked collaboratively to complete their writing assignments. They described and analysed students` collaborative information activities with the aim of identifying the patterns and strategies groups adopt over the course of group task completion. The researchers employed a semi-structured interview method to gather data during class sessions and at the end of the course. The analysis of individual interviews demonstrated that students adopted cooperation and collaboration approaches in order to complete their group task. Their findings revealed that those groups who followed a collaborative strategy worked together in all stages of the group projects including searching, evaluating, and using information to write the assignment as well as editing; while, those with cooperative strategy divided the group task into sub-tasks, assigned to each group members, and carried them out individually. The overall result demonstrated that most groups who chose to work cooperatively were not successful in integrating separate parts and providing a cohesive and consistent article. The researchers conclude that group assignments should be organised in a way that connects

students` individual efforts and provides them with an opportunity to realise and exploit the group work`s potential.

Toze (2014) conducted a study of group information behaviour from a slightly different perspective, analysing the process from the group level viewpoint as she asserted that the process through which a group rather than an individual transforms and integrates information is blurred. She applied information behaviour lens to deconstruct how groups worked with information to fulfil tasks. Her research focused on examining group interactions with regard to identifying information needs, seeking information through multiple channels, and then using information to better understand the emerging concept of '*group information process'*. She used observation method to investigate students` behaviour as their activities were recorded on video. She claimed that by employing this method she was able to address the methodological challenge of examining groups as it allowed her to capture all complicated details of working in a group in a natural way. Her analysis showed that group activities shifted among three phases: *planning*, *doing*, and *monitoring*. In addition, eight distinct purposes were recognised for seeking information: *confirm*, *decision support*, *entertainment*, *fact finding*, *how to*, *keep track*, *make sense*, *re-find*) requiring 19 different information activities under three information tasks: *information need* (need recognised, signal need, and understand need); *finding information* (formulate query, execute query, examine results, reformulate query, select search system, system setup, request for assistance, reflect and iterate, and share); *information use* (analysis, extract information, generate, questioning or clarifying, negotiation, synthesise and verification). It is worth noting that particular activities observed during this research might be specific to the assigned tasks and the specific student groups. Moreover, results showed that students used different kinds of digital tools to carry out information tasks such as email, YouTube, Google, electronic databases, SPSS software, Microsoft office software, cell phone, text messaging, and calendar. Group members also took on particular roles to accomplish their information tasks and activities including ten roles: *analyst*, *data analyst, director, editor*, *Integrator*, *leader*, *reader*, *searcher*, and *writer*. Roles were used in all phases, although more roles were required during the *doing* phase. Finally, she proposed the enhanced definition of group information process in student groups:

Group information process refers to the range of information task goals and activities required by groups to plan their work, accomplish tasks and monitor their progress over time. Through these information tasks and activities, facilitated by tools, groups integrate information from multiple sources, at times assigning different individual roles to make decisions, solve problems and generate new content. Traces of their information activities are embedded in group artefacts and final product (p. 258).

2-5-6. Summary

Reviewing the relevant studies on collaborative information behaviour in different settings showed research contributions towards advancing our understanding of this area of research. Figure 2-5 illustrates a summary of the major outcomes of research conducted in this area:
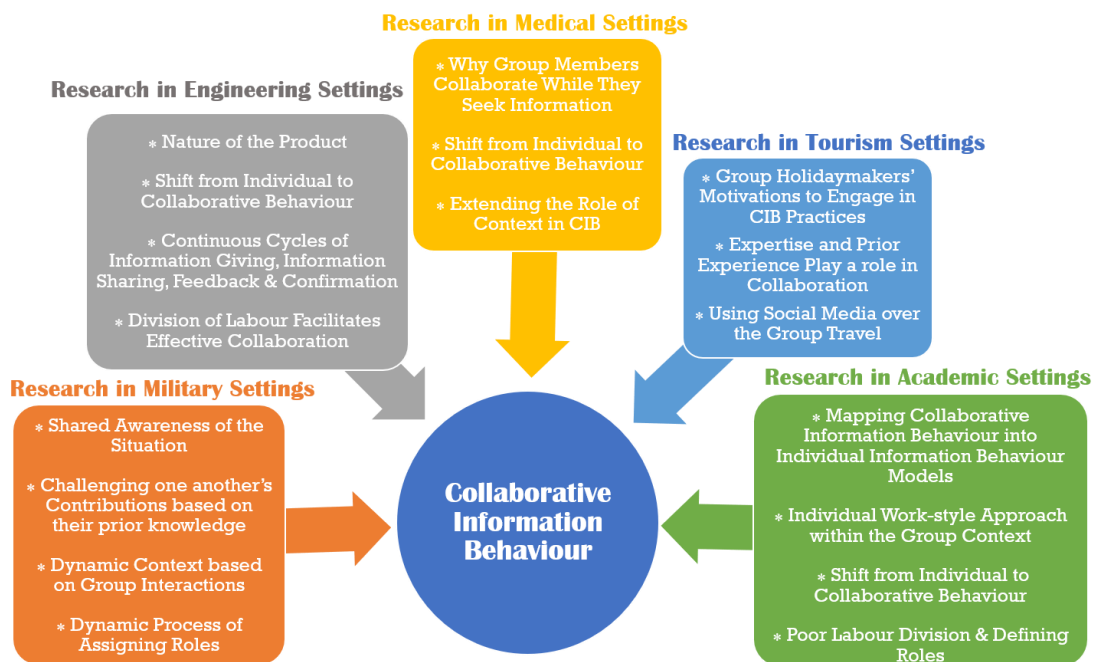
Figure 2-5. Summary of Collaborative Information Behaviour Research Outcomes in Different Domains

As it is shown in Figure 2-5, shared awareness has been emphasised in military settings, however common understanding of the situation needs to be shared not only among individuals but also across two other levels including intergroup and intragroup. Findings of research in this domain also highlighted the important role that context play in shaping group members' collaborative behaviour which has also been the focus of studies in other settings, in particular in medical domain. Researchers

who explored collaborative information behaviour in medical settings have extended the role of context by proposing the framework of contextual factors that can have an influence on collaborative information seeking practices in organisations. In this regard, scholars in engineering settings underlined the role of the nature of the task and its requirements in defining team members' collaborative practices. Based on the nature of the product, some engineering teams had well-defined roles while others must have found their way to define their roles and could not wait to be told what to do. Shift from individual to collaborative behaviour has also been noted in almost all research studies in these settings. Regardless of the task type, engineering teams collaborated in identifying the information need, retrieved information individually and evaluated the found information by sharing their expertise and past experiences which was similar to the research finding in military settings. This successful process of collaborative information behaviour has been experienced in these domains because of effective division of labour which facilitates collaboration unlike academic settings. Findings of research studies conducted in educational settings indicated that employing ineffective division of labour strategies by student teams would usually lead to unsuccessful collaboration specially towards the end of the group assignment when leaders are supposed to be responsible for reviewing all individual contributions. Motivations to engage in collaborative information behaviour activities have been explored in both medical and tourism settings to identify the events that encourage tourists or professional healthcare teams to collaborate with one another in order to solve a problem.

Review of the relevant research studies showed that researchers sought to explore and examine different facets of this phenomenon in different settings with the aim of identifying the patterns of members' behaviour and the factors that can have an influence on their behaviour with the aim of developing conceptual frameworks for describing and explaining collaborative information behaviour activities. In this regard, the present research study aims to advance and contribute to this field of research by exploring how group cohesion emerges and develops in learning contexts and in what ways this key group construct can shape students' collaborative information behaviour. Before introducing and providing more details about group cohesion, it is essential to define and conceptualise the group work concept which is outlined in the below section.

2-6. Conceptualisation of Group Work

Numerous definitions of '*group*' have been emerged over the years defining different attributes of groups. In 1959, Olmstead (cited in Alle-Corliss & Alle-Corliss, 2009) defined a group as "a plurality of individuals who are in contact with one another, who take one another into account, and who are aware of some significant commonality" (p. 4). In this definition, he emphasised that the most prominent characteristic of a group is the members` shared goal. Alderfer's (1977) definition, on the other hand, concentrated on interdependent relations of team members. He noted that group is a composition of individuals who have different roles but working interdependently towards a common goal. In this regard, it is worthwhile noting that some scholars believe that '*group*' and '*team*' are distinctive terms (e.g., Guzzo & Dickson, 1996; Katzenbach & Smith, 1993). Cohen and Bailey (1997) maintained that the term '*team*' is more popular in management literature, while the word '*group*' is more common in academic literature, but these terms are used interchangeably. Kozlowski and Bell (2001) provided a basic definition of work groups as:

> *Collectives, who exist to perform organisationally relevant tasks, share one or more common goals, interact socially, exhibit task interdependencies, maintain and manage boundaries, and are embedded in an organisational context that sets the boundaries, constrains the team, and influences exchanges with other units in the broader entity (p. 6).*

Kozlowski and Ilgen (2006) provided a broader and more comprehensive definition of a group:

> *Two or more individuals who socially interact (face-to-face or increasingly virtually); possess one or more common goals; are brought together to perform organisationally relevant tasks; exhibit interdependencies with respect to workflow, goals, and outcomes; have different roles and responsibilities; and are together embedded in an encompassing organisational system, with boundaries and linkages to the broader system context and task environment (p. 79).*

The controversial issue in this definition is group size. Some researchers differentiate between pairs and teams made up of three or more people. For instance, Laughlin, Hatch, Silver, and Boh (2006) carried out a study examining the impact of the group size on problem solving and their results demonstrated that groups composing of three members were necessary and adequate for group

participations while the performance of dyads was found to be at the similar level of individuals working on their own. Kozlowski and Ilgen (2006) also acknowledged that "the teams of three or more enable coalitions and related interpersonal interaction complexities that are absent in dyads" (p. 79). Furthermore, Blair (1991) believed when people work in groups, they face two distinctive and important challenges. The first is the *work task* and its related challenges that should be resolved. The second is the *processes* of a group work. Kozlowski and Bell (2001) defined processes as "mechanisms that inhibit or enable the ability of team members to combine their capabilities and behaviour" (p. 26). Repeated interactions among group members constitute processes and these dynamic processes create a social context that can encourage or inhibit collaborative behaviour of a team as Roschelle and Teasley (1995) concluded that "collaboration does not just happen because individuals are co-present; individuals must make a conscious, continued effort to coordinate their language and activity with respect to shared knowledge" (p. 94). Group processes play a dominant role in group effectiveness and exploring the impact of such processes on group outcomes and performance is of great importance, specifically in newly-formed groups such as group works in academic settings which their members interact differently comparing to members of fully-grown groups (Birmingham & McCord, 2004). Members of newly-formed groups cannot entirely rely on other members and a common goal does not seem interesting to them. They do not tend to disagree with wrong decisions as they prefer to save their face instead of challenging their teammates (McAliney, 2013). Accordingly, in the following section, the challenges of group work in higher education as well as influential factors which have an influence on students' interactions in small groups will be discussed.

2-6-1. Group Work in Higher Education

Group work has been identified as an efficient teaching approach which provides students with practical opportunities to apply the topic knowledge and technical skills they have learnt to further enhance their learning thorough communication and interacting with their peers which can lead to developing effective teamwork skills (Boese, Michelle, & Hall, 2008; Burke, 2011; Hansen, 2006; Miceli, 2019; Volkov & Volkov, 2015; Wong, 2018). Accordingly, collaborative learning is defined as a set of teaching and learning methods inducing collaboration among students working in small groups

with the aim of improving the effectiveness of their own and one another's learning (Johnson & Johnson, 1999). To achieve this aim, academics make an effort to design and incorporate group projects into their courses to foster students' knowledge learning and collaborative skills. Participating in group discussions, giving and receiving feedback and developing critical thinking through clarifications and evaluation of other's ideas has been indicated in several research studies as the learning outcome of group work (Forslund Frykedal & Hammar Chiriac, 2018; Hassanien, 2007). The opportunity to work on authentic, open-ended topics emulating real-world problems also offer the possibility of acquiring required skills needed for future professional careers that students would not be able to learn in traditional teaching environments (Fearon, McLaughlin, & Eng, 2012; Goold, Augar, & Farmer, 2006). However, research shows that we cannot be assured of students' capacity to gain the distinct advantages of group work experience as they face several challenges throughout the process which can reinforce negative attitudes towards group work in this context. In the following section, the most common obstacles that students face with regard to having effective collaboration over the duration of completing group projects will be discussed.

2-6-1-1. Factors Impacting Students' Performance in Academic Group Work Settings

Over the last decades, research has shown the benefits of implementing group work within the university context, yet students are not always enthusiastic about them. One of the most widely-documented challenges of effective collaboration in student group settings is unequal contributions leading to more workload for the rest of team members which then has a detrimental effect on students' perception of usefulness of group assignments.

Giving and receiving substantial feedback plays a prominent role in enhancing students' learning process when working on group assignments. Scholars are of the belief that students are required to communicate their feedback to their teammates and it should be constructive and easy to comprehend. In addition, they need to be able to debate, defend their opinions and justify their approach by providing reasonable explanations and ultimately reach a collective decision (Forslund Frykedal & Hammar Chiriac, 2018; Scherling, 2011). In an ideal situation, we can expect this process to take place in student groups but the reality which is based on the outcomes of research reports is different. Findings of

Wong's (2018) research indicated that students felt obliged to share their opinions and thoughts through each group session over the course of conducting their group assignment which led to their sense of satisfaction with group learning. However, passive members who were not engaging actively in group activities caused frustration among their fellow group members. In this regard, Mabley, Ventura-Medina and Anderson's (2018) research findings provided more details about the problem of non-contribution in student groups specifically during the planning phase of a group task when group members need to reach a shared understanding of task requirements and determine the process that they should go through to tackle it. Their results showed that in the majority of student groups one or two members make an effort to initiate a discussion about the task during the first meeting. Their observation demonstrated that in some groups, members were involved in off-topic discussions for about 20 minutes until one of the group members initiated the conversation about the group task. However, their efforts were met with silence which showed members' reluctance to participate or laughter which demonstrated that they do not take the task seriously. Their results further showed when these members changed the subject of group discussion from exchanging ideas about the task to assigning each member specific roles, group members started to make some suggestions. This indicates that reaching a mutual and shared understanding of group assignment is not an easy process and those students who care more, have to arrive at a decision about the task by themselves while it should be a collective effort. The authors conclude that due to the challenges students face during this phase of group assignments, they usually prefer simple tasks that can be easily divided among group members.

Several factors can have an impact on students' performance with respect to not fully collaborate with their group members and contribute to the group task. Scholars have always emphasised that the type of group assignment should be taken into serious consideration by academics as it plays a significant role in leading group members to work collaboratively or cooperatively. According to Roschelle and Teasley (1995), to accomplish a collaborative work, group members need to participate actively in a coordinated way to address the problem with the help of one another and applying their own special expertise, knowledge and experiences. Accordingly, they defined collaboration as "a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem" (p. 70). On the contrary, Roschelle and Teasley (1995) noted that

cooperation can be perceived as a group activity which would be accomplished by dividing the task into sub-tasks and distributing those among group members and each person assumes responsibility for a part of the group task. In this regard, Dillenbourg, Baker, Blaye, and O'Mally (1996) provided detailed description of the way that these two distinct types of a group task are performed. The authors stated that cooperative tasks are usually divided into distinctive parts and each portion of the task can be performed by an individual group member without a need to have active engagement and strong interactions with the rest of group members. They argued that collaborative tasks can also be divided into sub-tasks, but these sub-tasks require joint cognitive attempt form all or part of group members to be accomplished successfully and integrated into the final outcome. Dillenbourg et al.'s (1996) research indicated that during this part of the collaboration process, sub-tasks information should be critically evaluated by group members and they need to have frequent and effective communication.

According to Wu (2018), collaboration and cooperation are different concepts based on four elements of task interdependence: *task definition*, *instruction*, *technologies* and *resources*. According to her description, carrying out both collaborative and cooperative tasks would involve multiple people as collective work is an inherent part of these two types of tasks. Nonetheless, for synthesising a cooperative task, different parts need to be put together in a sequence with infrequent interactions, while collaboration needs regular communication and efficient interactions among group members. In terms of *instruction*, as cooperative tasks do not need detailed group discussions, they would be completed when each independent part of the task is finished, whereas for collaborative tasks, group members need to have a great amount of discussions, debate and negotiations which can be done through brainstorming, information sharing and exchanging opinions. With regard to *technology*, collaboration activities require digital tools that can provide synchronous communication among members, while for cooperative wok asynchronous types of communication technologies such as email would be sufficient. In terms of *resources*, for cooperative tasks, group members usually do not require sharing information sources as sub-tasks are not closely related to one another, while for collaborative projects, retrieved information must be shared amongst group members to be assessed based on the established criteria set by the group and everyone gains a shared understanding of it. Based on the description of different elements of task interdependence provided by Wu (2018), cooperative tasks can be classified as low-

interdependent tasks and collaborative tasks can be identified as high-interdependent tasks. Accordingly, assigning students cooperative tasks and expecting them to work collaboratively and develop effective teamwork skills is unreasonable.

Findings of the study carried out by Bremner, Peirson-Smith, Jones, and Bhatia (2014) showed that the existence or lack of a creative element of a group task and the requirement for a joint approach in designing the task have significant impact on the performance of student groups with regard to the level of brainstorming, task division, editing, reviewing and conflict management. Their research results showed that those task elements led students to devote more time to brainstorming ideas before determining and allocating the roles. Division of labour in these groups was conducted based on skills and strengths, while in other types of group projects, equity of workload was identified as a factor as well as group members' spontaneous tendency towards the specific roles or sub-tasks. Editing and reviewing one another's contributions were also a continuous and cyclic group effort in groups that assigned a task with those components and they also consider disagreements and conflict as an opportunity for learning while others usually avoid confrontation and creating conflict within a group. Nonetheless, high interdependence is just a factor that should be taken into consideration by faculty members when designing group projects as it stimulates collaboration among group members but it cannot guarantee that collaboration definitely takes place in student groups if they are not used to collaborative settings and lack the required skills to work collaboratively with others. Findings of Mabley et al.'s (2018) research indicated that student groups were assigned a complex task that needed all group members to work together to reach a shared understanding of the task before beginning the actual work but they faced difficulty at the very first phase of the assignments and preferred to be assigned simple and easily-dividable tasks. The possible explanation for this outcome can be the lack of instruction of how to tackle a group task that needs collaboration instead of cooperation as their results showed that as soon as the subject of assigning roles was discussed in groups, everyone started to give and share their ideas. The results of the research conducted by Le et al. (2018) also demonstrated that when students start working on their group assignment, they do not know how they should work with others such as dealing with different ideas and opinions, providing elaborate explanations,

receiving or providing assistance, coordinating their activities and supporting one another's progress with the task.

Findings of the research conducted by Forslund Frykedal and Samuelsson (2016) also indicated that some students are encountering difficulty in understanding the assigned task as a whole as well as the part that they are allocated to complete because of a lack of theoretical knowledge and academic capability. These students cannot collaborate with their peers in terms of contributing to group discussions and exchanging ideas, so they could be recognised as free-riders and high-capability members would usually take charge of the group and perform the task all by themselves and this process does not have any benefits to either of these two types of students.

Motivation is another influential factor that can have an impact on the way that students perform in groups. Based on Shah's (2010b) research findings, working together was a requirement of the assigned group project and students are not informed of the benefits of collaboration which led to frustration and loss of productivity. His research findings further showed that while faculty members provide students with an opportunity to complete the project on an individual basis or within the group, almost all students preferred group work. They are of the mindset that by working in a group context, they can share the workload and complete the assignment within a limited amount of time. It is evident that a lack of awareness of the merits of collaboration and justification of conducting group assignment for students lead them to work individually within a group context with the hope of accomplishing the task easier and faster without taking the learning aspect of this process into account. This issue has also been emphasised by the research conducted by Forslund Frykedal and Samuelsson (2016) concluding that instructors should be able to provide a satisfactory answer to the students' question of "what's in it for me" when assigning them a group project. Le et al.'s (2018) research findings also highlighted this issue and indicated that students are overloaded with group projects either simple or complex and that they lack clarity about the goals of group task when they start working on them, so they only focus on fulfilling the task. The results of their research also showed that academics usually emphasise the cognitive achievement more than social outcomes because they perceive collaborative learning as an effective instructional or teaching method to achieve the course aims and to help students learn the specialised knowledge and solve tasks quickly.

In this regard, Thom (2020) argued that there are fundamental differences between group assignments in university context and team projects in industry which should be taken into serious consideration, otherwise allocating group tasks would be a waste of time. He noted that students' poor performance with regard to active involvement in group discussions and making contributions to the task seem unlikely to have a major impact on them. Depending on the task assessment regime, they might get a lower grade but it would not usually influence employers' decisions while recruiting new graduates as academic credentials are more important to them than students' performance over the period of getting their degrees. Furthermore, in group assignments conducted in the university context, social-loafers are permitted to escape penalty for their poor or lack of contribution to the task and those who take charge of the group and fulfil it all by themselves rarely receive additional benefit. Thus, if cohesive groups make for successful projects, how such cohesion is developed or evidenced in the university context. In the following section, detailed description of this concept and its different dimensions is outlined.

2-6-2. Conceptualisation of Group Cohesion

The idea that group members have some sort of social bond and attraction as well as a tendency towards being stick together dates back to at least the 1930s, developing primarily as the result of research and theorising of Kurt Lewin and his colleagues (cited in Dion, 2000). Lewin believed that cohesiveness was a crucial attribute of groups which without it, groups could not exist and defined it as "the set of forces keeping members together, including both the positive forces of attraction and the negative forces of repulsion" (cited in Dion, 2000, p. 8). A formal definition and theory of this construct was proposed by Festinger et al. (1950) and they defined cohesion as "the total field of forces which act on members to remain in the group" (p. 37). They then turned to the factors that contributed to cohesiveness including attraction to the group and the extent to which group facilitates the context for members to achieve the shared goal.

From this early conceptualisation, it was evident that Festinger et al. (1950) highlighted at least two aspects of the group that could contribute to the group's overall cohesiveness. However, much of the subsequent empirical research operationalised cohesion as a unitary construct (McGrath, 1989) as

researchers tended to adopt Schachter's (1951) view that "whether cohesiveness is based on friendship, the valence of the activity mediated by the group, or group prestige, the consequences of increasing group cohesiveness are identical" (p. 192). Treating cohesion as a unitary construct resulted in incorrectly implying that the components of cohesion would led to similar effects (Craig & Kelly, 1999). Hence, an alternate practice of defining and comprehending cohesion as a multidimensional construct became apparent with its core idea being that group members have different reasons for joining and maintaining their membership in a particular group and those differences can result in different types of group cohesiveness. In other words, the underlying idea of the multidimensional view of group cohesiveness is that cohesion can take several different forms and that depending on which form(s) of cohesion is (are) dominant in the group environment, differences in group interaction and performance will be obtained (Heiney, 1998). In this respect, Mikalachki (1964) was among the first scholars who clearly identified and labeled the social and task components of cohesion. "Social cohesion referred to the interpersonal bonds that exist between members (e.g., liking, attraction, and trust), while task cohesion referred to the members` shared commitment to the team task" (cited in Severt & Strada, 2015, p. 7). Zaccaro, Gualtieri, and Minionis (1995) were of the view that "this shared commitment separates task cohesion from individual task motivation. In task-cohesive groups, members care about the success of other group members because their own goal attainment is often inextricably bound to collective achievement" (p. 79). In addition to the task commitment and achievement of desired personal and collective goals through group performance, task cohesion has been associated with liking the task, finding the task to be attractive and deriving intrinsic pleasure from completing the task (Mullen & Copper, 1994). Findings of several empirical investigations have supported a two-dimensional perspective on group cohesion demonstrating that each aspect of cohesion has a distinct effect on group performance and it depends upon how outcomes are defined (Beal et al., 2003; Kozlowski & Bell, 2001). In a study conducted by Zaccaro (1991), it was shown that the relationship between task cohesion and individual performance was significantly stronger comparing to interpersonal cohesion. Likewise, in their meta-analysis of cohesion and performance relationship, Mullen and Copper (1994) concluded that the sense of commitment towards achieving a common goal is relevant to the group performance independent of other elements of group cohesion. Findings of other empirical investigations have

revealed that group cohesion and affective outcomes are closely related, highlighting the impact of interpersonal cohesion (Cohen & Bailey, 1997). Studies have also demonstrated that members of cohesive teams were more stratified with their membership and their activities as a group member than members of non-cohesive teams. Friedkin (2004) believed members of cohesive teams enjoy socialising with other members and being in company with other members which can lead to increasing their sense of belongingness to their team and enjoying positive attitudes towards working as a group member. In short, previous studies examining the impact of cohesion on group performance indicate the importance of different categorisation of this construct which can lead to produce distinct types of outcomes.

Another bi-dimensional conceptualisation of cohesion was suggested by Bollen and Hoyle (1990) called perceived cohesion. They defined it as "an individual's sense of belonging to a particular group and his or her feelings of morale associated with membership in the group" (p. 482). It apparently demonstrates people`s judgment of their association with a specific group consisting of cognitive and affective elements. Cognitive element is rooted in the experiences that individuals have gained from taking part in group activities and engaging with other group members and affective element is depending on feelings about the aforesaid experiences. Morale is based on the overall affective respond from belonging to a group combining both positive and negative emotional reactions (Dion, 2000). Bollen and Hoyle (1990) maintained that belongingness and morale are two essential and main components of perceived cohesion, specifically the sense of belongingness is central to groups` existence. They stated that, if people do not regard themselves as members of a group, they will face difficulty in comprehending how group values and norms as well as other group attributes can have an impact on them. In their opinion, "use of the term 'group' implies some minimal sense of belonging on the part of group members, otherwise the collection of individuals is an aggregate" (p. 484). In short, perceived cohesion can apply to groups of different sizes such as communities or even societies which members do not or cannot even know all, as well as to small groups in which members usually know each other or are able to get familiar with one another. Scholars in this field believe that there is a paucity of research within this area and investigators need to carry out more research studies to explore how perceived cohesion can have an impact on group performance.

2-6-2-1. Overview of Research Studies Examining Group Cohesion

As noted previously, cohesion has been acknowledged as a key determinant of team success and scholars believe that without cohesion, individuals are less motivated to participate in group activities and cooperate with others to achieve their common goal. Extensive research has been carried out to explore and examine the relationship between group cohesion and people's performance which has led to developing several scales to measure this group construct (e.g., Evans & Jarvis, 1986; Henry, Arrow, & Carini, 1999; Martens, Landers, & Loy, 1972; Moos, Insel, & Humphrey, 1974; Treadwell, Lavertue, Kumar, & Veeraraghavan, 2001; Widmeyer, Brawley, & Carron, 1992). Researchers have employed different methodologies to investigate cohesion-performance relationship with the aim of understanding how cohesion can influence individuals' performance; identifying the factors that can lead to developing group cohesion and exploring which aspect/s of group cohesion has more impact on people's behaviour in different group settings.

In the higher education context, Yang and Lin (2019) conducted a research study using surveys to explore the relationships among cohesion, knowledge sharing and team performance in student teams undertaking graduation projects through teamwork. Their findings showed that teams with high cohesion engaged more frequently in knowledge sharing behaviours leading to more interactions, information exchange and effective communication which in turn resulted in better team performance and successful outcomes. The authors maintained that sharing a common goal and enthusiasm for presenting the best quality work created a sense of identity which led to enhancing cohesion in teams. Similarly, Lam (2015) measured the impact of cohesion on students' performance in terms of social loafing. Findings of his research revealed that task cohesion and quality communication in student groups significantly reduced social loafing regardless of how teams were formed. According to the research results, more social loafing was reported by self-selected groups suggesting that the method of team formation has no impact on either individuals' performance or developing group cohesion in student groups. Findings of Lam's (2015) research seem to be in line with Forrester and Tashchian's (2006) research as they argued that students' main aim of working collaboratively in groups is to achieve task goals instead of satisfying social needs. This demonstrates that "social aspects of cohesion

are unrelated to workgroup performance" (Carless & De Paola, 2000, p. 84) and cognitive diversity in student groups including different ideas, beliefs and unique skill sets will result in a more cohesive group than similar race, gender, age or professional background (DiPillo, 2019). Findings of the research study conducted by Aubé et al. (2018) also revealed that promoting the perception of being on the same page and having a shared understanding of the group task would encourage members to take a proactive approach and to enhance team performance.

On the contrary, findings of Picazo et al.'s (2015) longitudinal research showed that social cohesion plays a role in members' individual satisfaction with the team over the duration of completing a group project. With a sample of newly-formed project teams, they examined the emergence of task cohesion and social cohesion in student groups and found out that task cohesion emerges more strongly than social cohesion during the early stage of group work. Findings of the research revealed that individuals seemed to be more satisfied with their teams when the members had shared a general orientation towards maintaining social relationships within the team demonstrating the role of social cohesion. However, task cohesion plays a complex role in this process as results of data analysis showed that this dimension of cohesion mediated the relationship between social cohesion and individuals' satisfaction over time. Consistent with these findings, Bell and Brown (2015) state that interpersonal attraction and shared identity evolve as teams collaborate over time. During the early stage of forming groups, individual are attracted towards those who are more similar to them or more familiar to them but over time they prefer to work with those team members who complement them in terms of knowledge, skills and abilities.

Given that findings of research studies and several meta-analysis (e.g., Beal et al., 2003; Castano & Tekleab, 2013; Chiocchio & Essiembre, 2009; Evans & Dion, 1991; Gully et al., 1995; Mullen & Copper, 1994) have confirmed the positive relationship between cohesion and team performance, researchers have focused on identifying the factors and mechanisms that can lead to the emergence and maintenance of cohesion in teams. Emergence is a phenomenon "originates in the cognition, affect, behaviours or other characteristics of individuals, is amplified by their interactions, and manifests as a higher-level collective phenomenon" (Kozlowski & Klein, 2000, p. 55). With regard to cohesion, during the early stage of group formation, team members initially form their perception about the cohesiveness

of the group based on the surface-level attributes of team members such as age, race, education level and professional background. As teams go through the stages of development, their initial perceptions are influenced and shaped by individuals' pattern of interactions, information exchange and deep-level attributes of members such as personality traits, values, knowledge, skills and abilities. Over time those perceptions and different ideas about the cohesiveness converge and thus emerge as a shared state of team cohesion (Bell & Brown, 2015; Santoro, Dixon, Chang, & Kozlowski, 2015).

Evidence indicates that cohesion plays more important role for team effectiveness when members are assigned a highly interdependent and complex task as carrying out such tasks requires more coordination. In this regard, Schaffer and Manegold's (2018) research results demonstrated that task interdependence acts as an influencing factor in enhancing students' motivation to invest more in their group project and deliver high quality work. They concluded that task interdependence is an important structural component to the task design in student work groups as it provides an opportunity for sharing and exchanging information which in turn can have an impact on both task commitment and task attraction in student teams. They also identified the key intervening process variables that help explain the interdependence-cohesiveness relationship. Findings of their research showed that coordination activities and goal/performance monitoring operated as explanatory links between task interdependence and both task commitment and task attraction.

Severt (2016) has examined the effect of leadership behaviours and team processes on cohesion emergence. His research findings demonstrated that particular behaviours of leaders such as communicating about the team's history, providing clarification about members' roles and giving them more control over planning and coordinating activities towards achieving the team shared goal have an impact on developing cohesion. The researcher found out that these specific behaviours led team members to engaging in higher quality communication about the assigned project as well as interpersonal communication which subsequently had a positive impact on team performance. Similarly, findings of the meta-analysis carried out by Grossman (2014) indicated that not the leaders' attributes but what they do and the quality of their relationship with team members play a role in forming group cohesion.

McLaren and Spink's (2018) research findings indicated that communication as information exchange (i.e., cognitive property) can positively predict task cohesion in groups. Similarly, findings of Hui's (2019) research also showed that group cohesion was improved in student groups that were more engaged in the process of effective participation in collaborative knowledge building activities such as information sharing, conflict negotiation and group reflection. In another research study, McLaren and Spink (2019) explored the impact of member communication as network structure. They found out that those members who had interactions with larger proportion of teammates reported greater task cohesion than those interacting with moderate or small proportion of teammates which highlights the role of network density in anticipating task cohesiveness in small groups. With regard to the type of communication and developing cohesion in teams, research has produced conflicting findings. Shin and Song (2011) explored the role of face-to-face and computer mediated communication time in the cohesion and performance of mixed-mode student groups. Results of their study revealed that time spent in face to face communication led to enhancing social cohesion and contributing to the social aspect of the group while task cohesion was predicted to develop and improve by the time spent in computer-mediated communication and was identified as a strong predictor of group performance and task-related aspect of the group work. On the contrary, Barbosa's (2006) research findings showed that computer mediated communication did not have significant effect on group cohesion. The researcher examined the impact of using instant messaging by participants to communicate with group members and based on their responses, it took longer for participants to complete the task and they demonstrated less likeability for the task. This finding is in line with Knight, Pearson, and Hunsinger's (2008) research indicating that development of group cohesion seemed to decline in groups that communicate exclusively by email. In this regard, Irmer, Chang, and Bordia's (2000) research explored the different effect of asynchronous and synchronous computer mediated communication tools on group cohesion suggesting that asynchronous CMC groups were significantly less cohesive at all times compared to the synchronous conditions. Nonetheless, results of Yang and Lin's (2019) research showed that there should be a balance between using CMC and face-to-face meetings for completing group tasks. They particularly suggest that duration of student teams' meetings need to be concluded within one to two hours to improve efficiency.

As noted earlier, there is an established relationship between cohesion and performance, however "cohesive groups achieve performance benefits when group performance is contextualised as a behaviour instead of an outcome" (Beal et al., 2003, p. 998). Collaborative behaviour in the context of group settings is a complex process and solely bringing students and having them interact might lead to produce a suitable outcome but it cannot be considered as true collaboration. Accordingly, understanding students' perceptions of cohesion in their groups in terms of task commitment, social relationship and shared identity and the role these aspects play in shaping students' collaborative information behaviour would contribute to this area of knowledge by providing explanations that how and why students engage in collaboration with their group members to achieve their shared goal.

2-7. Summary

This chapter demonstrates that collaborative information behaviour is a complex area of research owing to distinctive influential factors that have an impact on how groups perform. This could be contextual factors including the task type and group processes that can stimulate or hinder collaborative activities as well as collaborators' attributes such as specialised knowledge, academic capability and skills set and their attitudes towards group work. This review highlights the prominence of exploring the development of group cohesion in educational contexts and its influence on shaping students' collaborative behaviour while they are involved in accomplishing a group task.

3.   RESEARCH METHODOLOGY

This chapter outlines the study research paradigm, research approach, the chosen research methodology and the research design in terms of recruitment procedures and participant selection, data collection tools and data analysis techniques. This chapter also outlines the process of conducting pilot study and reflections on the changes resulting from it.

3-1. Research Paradigm

Thomas Kuhn (1962) was the first philosopher who used the term *paradigm* to define an "approach to a problem" or a "way of thinking". A research paradigm exerts a major influence on how research is conducted and findings are interpreted as it defines researchers' particular worldviews (Mackenzie & Knipe, 2006). Guba and Lincoln (1994) defined paradigm as:

A set of basic beliefs (or metaphysics) that deals with ultimates or first principles. It represents

a worldview that defines, for its holder, the nature of the "world", the individual's place in it,

and the range of possible relationships to that world and its parts (p. 107).

A paradigm helps a researcher to scrutinise the methodological elements of their research study to come to a decision about the process of carrying out a research study including the research method, data collection tools and how the gathered data should be analysed and interpreted. Scholars have proposed different paradigms but Candy (1989), one of the influential people in this area, put forward an idea of classifying the proposed paradigms into three primary categories, namely Positivist, Interpretivist and Critical paradigms. The current research study aims to understand and interpret how students perceive different aspect of group cohesion in the context of performing group assignments and how those perceptions can shape their collaboration behaviour in terms of identifying the information need, searching for information and using information. The Interpretivist approach suits this study as it was concerned with the interpretations and the way in which participants explain or perceive events or particular actions. Morrison (2007) clearly delineated the concept of this paradigm:

All human life is experiences and constructed from a subjective perspective. For the

interpretivist, there cannot be an objective reality which exists irrespective of the meanings

human beings bring to it … therefore, the data collected and analysed have qualitative rather

than quantitative significance (p. 27).

This paradigm aims to understand, interpret and explain what the study subjects are thinking about specific events. Researchers put considerable efforts into understanding participants' viewpoints and perspectives on a single, complex and multi-layered phenomenon as it can have numerous interpretations due to participants' distinctive experiences. Therefore, applying theory for interpretivist researchers is fundamentally different as "theory is emergent and must arise from particular situations; it should be 'grounded' on data generated by the research act. Theory should not precede research but follow it" (Cohen, Manion, & Morrison, 2000, p. 23).

According to Guba (1990), research paradigms can be described through their ontological and epistemological characteristics. Ontology is seeking answers to "what is the nature of the 'knowledge'? Or what is the nature of 'reality'?", and epistemology is looking for "what is the relationship between the knower (the inquirer) and the known (or knowable)?" (p. 18). Accordingly, this paradigm presumes a *relativist ontology* and a *subjectivist epistemology*. Relativism delineates that world has not been presented to us 'ready-made'. It perceives that the world is socially constructed as humans construct and conceptualise the reality in multiple, distinctive forms through their interactions with the reality in different contexts (Baghramian & Carter, 2019). Crotty (1998) defined subjectivist epistemology as "meaning that is imposed by people's minds without the contribution of the object" (p. 7). Denzin and Lincoln (2005) maintained that in subjectivist epistemology "knower and respondent co-create understandings" (p. 25) which implies some sort of interactions between the investigator and participants. Accordingly, the researcher interprets the data and constructs knowledge through their own way of thinking and their interactions with subjects.

3-2. Qualitative Research Approach

Interpretivist paradigm was chosen for carrying out the present research, accordingly qualitative research approach has been followed as it enabled the researcher to explore, interpret and understand a social phenomenon or a social process in a holistic view in terms of how and why they occur within a particular context (Creswell, 2007; Sumner, 2006). Denzin and Lincoln (2005) provided a thorough definition for qualitative research:

> *Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them (p. 3).*

Flick (2007) put an emphasis on the statement that is included in the above definition: researchers' 'practices transform the world'. He noted that this statement highlights the role of the researcher over the process of conducting a qualitative study. Accordingly, qualitative researchers do not act invisibly but they participate actively when they gather data by conducting observation or stimulating interviewees to reflect on their experiences and their perspectives on specific events which would lead to new insights into the way participants behave or the situation they were involved. Corbin and Strauss (2015) also maintained that in qualitative research, investigators play "as much a part of the research process as the participants and the data they provide" (p. 4). Qualitative researchers choose this approach as it enables them to explore the experiences of participants and the meaning they make regarding specific events or situations with the aim of providing a thorough understanding of the phenomenon or discovering relevant variables that can be empirically examined by conducting quantitative research (Corbin & Strauss, 2015).

In this study, the main research objective was to explore and develop a thorough and rich understanding of how group cohesion can shape students' collaborative information behaviour.

Adopting the Interpretivist paradigm for carrying out a research study exhibits a notion of interdependency between causes and effects as well as the prominence of contextual factors in providing a thorough understanding (Kivunja & Kuyini, 2017). Accordingly, qualitative research approach conforms to this standpoint and grounded theory was chosen as a research methodology for carrying out this study. Detailed description of this methodology and justification of its use for this research is outlined in section 3-5-1.

3-3. Pilot and Main Study: A Significant Change of Approach

It is important for the reader to understand that unlike some research in which the pilot study informs small changes and tweaks to the resulting main study, in this thesis the outcomes of the pilot lead to a significant change of approach for how this study was undertaken. (Khatamian Far, 2018). Figure 3-1 outlines the proposed research approach (pilot study) and the revised approach (main study).

Pilot Study	Main Study
Methodology	
Mixed Methodology	Grounded Theory Research
Research Instruments	
Surveys, Digital Diaries, Interviews	Focus Group Interview
Recruitment	
Active Recruitment	Passive Recruitment
Participants	
9 out of 52 Participants Completed the Pre/Post Surveys & Digital Diaries	39 Participants – The Point of Saturation
Data Collected	
Lack of Meaningful Data	Rich Data

Figure 3-1. Pilot Study versus Main Study Research Approach

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Figure 3-1 compares different aspects of two research design developed for this research study. This research was originally proposed to be carried out by employing mixed-research methodology, accordingly surveys, digital diaries as well as interviews were considered as research instruments to collect data based on previous relevant studies in this area of research. The researcher employed active recruitment strategy for performing the pilot study which was successful in terms of recruiting students but not their retention. None of the participants agreed to attend individual interview sessions and lack of richness of their responses to surveys and digital diaries indicated that no level of refinement of this research design would suffice for successfully completing this research. The research approach was revised, and grounded theory methodology was identified as a research methodology best suited the aims of this research due to its exploratory and explanatory power which led to collecting meaningful and rich data. Using grounded theory methodology enabled the researcher to respond to the supporting research questions and to present an integrative model of group cohesion and collaborative information behaviour. Detailed description of the initial research design (pilot study) and the adjustments that have been made afterwards (main study) is delineated in sections 3-4 and 3-5.

3-4. Pilot Study

This research study was initially proposed to be conducted by using a mixed research methodology. The researcher undertook a pilot study after getting Ethics approval before initiating the main data collection to ensure the feasibility of carrying out the research by the proposed research methodology as well as assessing the validity and reliability of research instruments.

3-4-1. Mixed-Methods Research Methodology

Reviewing the relevant research demonstrated that employing multiple methods approach provides researchers with an opportunity to effectively investigate how group members work and act together as it is hard to capture all behaviours with a single method research (Lee, 2013; Toze, 2014). McGrath (1989), a well-known researcher in the field of small groups stated "all methods have inherent flaws – though each has certain advantages. These flaws cannot be avoided. But what the researcher can do is to bring more than one approach, more than one method, to bear on each aspect of a problem"

(p. 30). Santoro et al. (2015) also argued that due to complex and dynamic nature of group cohesion, research studies on this aspect of group processes should take a multi-method approach. The strength of the mixed methods research for investigating and exploring collaborative information behaviour is also shown to be helpful for collecting data from various sources and data verification to enhance the understanding of information behaviour in collaborative settings (e.g., Hyldegård, 2006; Lee, 2013; Toze, 2014). Accordingly, mixed research methodology was proposed for conducting the current PhD research project.

3-4-2. Research Design

The proposed research design for the pilot study was based on a mixed methods and longitudinal research approach with the aim of understanding individual group members' information behaviour and their experience of collaborative practices over the lifespan of a group project. According to the study's main goal, the triangulation design (Creswell & Plano Clark, 2011) was considered to be best suited to carry out the research and addressing the supporting research questions. Based on the proposed research design, data collection would start by obtaining quantitative data via pre-survey and post-survey as well as qualitative data by sending semi-structured digital diaries to participants for recording their group activities, information behaviour practices and using communication technologies at three stages over the lifespan of their group task (i.e., initial stage, mid-point stage, completion stage). Then, quantitative and qualitative data would be analysed using descriptive inferential statistics, and thematic analysis respectively. At final stage, semi-structured interview would be employed to enhance, elaborate, clarify, and validate the results from the previous mentioned data collection. Details about the recruitment strategy and research instruments based on the adopted approach and research design will be provided in the following sections.

3-4-3. Research Instruments

The proposed research instruments included two surveys (pre-survey, post-survey) and three digital diaries over the duration of group task completion as well as final interview after assignment submission. Surveys included several items with regard to measuring different dimensions of group cohesion as well as particular items about students' individual and collaborative information behaviour

activities. Pre-survey included demographic questions and items measuring students' perceptions of different elements of cohesion covering task cohesion, social cohesion and perceived cohesion within groups (see Appendix E) and it was sent to participants after they formed their group. Post-survey encompassed questions about participants' use of communication technologies and their information behaviour activities including sensemaking and identifying the information need, seeking information and using information over the course of a group assignment to measure the extent to which these activities had been performed individually or collaboratively (see Appendix I). Moreover, same items measuring different aspects of cohesion were also included in the post-survey to discover whether there would be any changes in participants' perceptions of cohesion after submitting the group assignment. Digital diaries were designed as semi-structured and pilot study participants were asked to fill it out at three stages of their assignment (initial stage, mid-point stage, completion stage). Open-ended questions were formulated for digital diaries with the aim of getting more detailed information about individual and collaborative practices of participants during different stages of their group assignment in terms of seeking, evaluating and using information in a group context and their interactions with other group members. In addition, each digital diary included same questions about group cohesion which would have enabled the researcher to explore the level of cohesion over different phases of performing a group task (see Appendices F, G and H). The researcher aimed to invite participants to attend individual interview sessions as well to reflect more on their group activities based on their responses to surveys and digital diaries.

3-4-4. Recruitment Procedure and Participants

Participants for the pilot study were recruited from teaching units which included group assignment at the Edith Cowan University. By analysing the information provided in the university handbook, the researcher selected four units that had a group assignment as part of their assessment. The researcher contacted the course coordinators and asked for their permission to recruit students from their units. This process was challenging and particularly problematic as the researcher first sent an email to course coordinators and those who replied to her email requested to have one-on-one meeting with her. During the meeting, the researcher provided detailed description of the main goals of the PhD

research project, the types of data collections tools and the length of time that students should devote to this research if they consent to participate. Those course coordinators who were convinced of the usefulness of this research then referred the researcher to the lecturers who were responsible for teaching the units. The researcher went through this process again to get the lecturers' permission as well, and then she discussed the timings for attending lectures in order to make an announcement and call for volunteers. After getting all the permissions, the researcher commenced the recruitment process and she was successful in recruiting 52 students.

3-4-5. Pilot Study Outcomes: Lessons Learned from Conducting the Pilot Study

Being able to recruit 52 students for carrying out the pilot study was a success; however, only 9 participants fully collaborated with the researcher in terms of filling out surveys and three digital diaries. The researcher outlines the possible explanations for this outcome including the recruitment method, the research design and devised data collection instruments as well as the incentive selection considering the particular characteristics of the population selected for this research study (Khatamian Far, 2018).

Nonetheless, prior research carried out with the aim of investigating students' collaborative information behaviour was successful not only in recruiting student groups instead of individual group members but also participants' retention despite their longitudinal research design and employing different sorts of data collection instruments. In defence of the pilot study design, a number of authors had used similar approaches with varying levels of success. Hyldegård (2006), for example used the multi-method case study to explore the collaborative information behaviour of three student groups over a period of 14 weeks. She used surveys, diaries and interview at three phases during their group assignment. For recruiting participants, Hyldegård (2006) published an email describing the project on students' Intranet as well as contacting the involved teachers with regard to providing an introduction to the project in class. Likewise Lee (2013) was able to recruit 13 groups including 43 library and information science students and she employed a survey before participants start their group projects as well as a behaviour survey at three points over the lifespan of a group project. Lee (2013) also had access to the groups' online communication channels including the discussion boards and chat rooms.

Toze (2014) provided more details about recruiting student groups for her research. She attended selected classes to announce her research as well as posting flyers; nonetheless she was approached by a professor who volunteered his class to participate as he was eager to give his students the experience of participating in group research, so students for her first study (single session groups) were recruited by this method.

According to the above discussion, prior research has not indicated any difficulty with students' recruitment and retention despite their longitudinal research design, so close working relationship or familiarity might be the possible reasons for their success with regard to this aspect of research. For the pilot research study, the researcher made a great effort to recruit a high number of students, results of the pilot study showed a high rate of drop out which led to the change of recruitment strategy and revising the research design in terms of data collection tools with particular emphasis on collecting qualitative data instead of quantitative data. In spite of recording live experiences of working on a group project at different stages of group task completion which was proved to be impossible for the pilot study, participating in one-off focus group session was adopted which allowed the participants to reflect on their experience and elaborate on their explanations for individual and collaborative information behaviour activities. Some studies in this area of research have adopted a qualitative approach and conducted their study by employing a grounded theory methodology which can provide comprehensive details about the process, behaviours and motivations of individuals who take part in collaborative information behaviour activities within a group context (e.g., Saleh, 2012; Ye et al., 2019). In a review of collaborative information seeking studies in terms of selected methodologies, Hertzum and Hansen (2019) note that empirical experiments, observation and questionnaires are the most popular and commonly used data collection tools which leaves this area largely unexplored in terms of experiences and reasons behind collaborative or individual behaviours in group settings. The following sections will outline the new research methodology and its associated research design adopted for the main study.

3-5. Main Study

3-5-1. Grounded Theory Methodology

Grounded theory was developed by Barney Glaser and Anselm Strauss, two academics with sociological background but diverse perspectives on carrying out research. This methodology was introduced by their joint work published in 1967 named *The Discovery of Grounded Theory: Strategies for Qualitative Research* which placed an emphasis on developing theories and conceptual frameworks from specifying the relationships among the concepts that are emerged, developed and integrated based on data collected during the research process. Their work offered systematic procedures for conducting qualitative research and challenged the prevalent assumption among scholars that quantitative methodology is the only approach for conducting scientific research (Charmaz, 2000).

Various grounded theory approaches have been proposed by scholars, namely Glaserian approach, Straussian approach and Constructivist grounded theory. These three dominant versions of grounded theory are noticeably differing due to their distinct philosophical positions which have led to fundamental differences in terms of data analysis procedures including coding stages and the analytical tools used during data analysis process. However they all are developed based on the original grounded theory (Glaser & Strauss, 1967) which results in essential similarities among them including concurrent data collection and data analysis, constant comparative method, theoretical sampling, memo writing and generating a theory grounded in the data.

The classic version of grounded theory is commonly recognised as the Glaserian approach (Glaser, 1978). Some scholars believe that this approach is based on postpositivist stance (Annells, 1996), while others assert that it is actually based on positivist ontology (Charmaz, 2000). It is further argued that epistemology of this approach to grounded theory is objectivist which delineates the separate role of researchers in the research process as well as developing unbiased knowledge (Charmaz, 2000). The second type of grounded theory is called Straussian approach and this approach emerged when Anselm Strauss and Joliet Corbin started working together and published the *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* in 1990 with the aim of offering well-described guidelines for carrying out grounded theory approach. The philosophical

position of this approach is based on symbolic interactionism and pragmatism as they emphasised that theories develop based on "interpretations made from given perspectives" (Strauss & Corbin, 1994, p. 279). According to Charon (2010), symbolic interactionism has an interpretive perspective on defining the process of human activities and social interactions based on the symbolic meanings people make to describe their interactions. Based on this philosophical position, human behaviour can be comprehended through people's subjective interpretations of the events and the meaning they construct. It should be noted that over publishing several editions of Strauss and Corbin's joint work, an evolution in their philosophical stance was evident. In the latest two versions, they explicitly point out to the existence of multi-layered, complex realities which are shaped based on distinctive way of thinking and perspectives of people who experienced the events as well as the role of researchers in the process of generating a substantial theory (Corbin & Strauss, 2008; Corbin & Strauss, 2015). The third version of grounded theory which is commonly known as the constructivist grounded theory is developed by Kathy Charmaz, a sociologist whose mentors were Barney Glaser and Anselm Strauss at the University of California. Unlike her mentors, she adopted a constructivist philosophical position which is defined based on the relativist ontology and subjectivist epistemology. This philosophical stance delineates that the "world made real in the minds and through the words and actions of its members" (Charmaz, 2000, p. 523). For this study, Straussian grounded theory (Corbin & Strauss, 2015) is adopted and the justification for this choice is provided in the below section.

3-5-1-1. Straussian Grounded Theory

One of the unique features of the Straussian grounded theory is its specified analytic strategies which are thinking techniques employed by researchers to help with their interpretations which according to Rieger (2019) advance the interactions between the researcher and the collected data. In contrast to other grounded theory versions, Straussian grounded theory provides three stages of coding, namely open coding, axial coding and selective coding or theoretical integration. These coding phases are highly structured and can play a major role in simplifying and clarifying the analysis process for novice researchers and those who are not familiar with this methodology.

The coding process starts with open coding to discover concepts and define them based on their properties and dimensions. Axial coding helps the researcher to put broken data back together by applying the coding paradigm to find and clarify the relationships among the concepts emerged over the open coding process. The paradigm model consists of three components, namely conditions, actions-interactions and consequences leading to structure the data. Over the last stage, selective coding helps to identify the core category and enables the researcher to conceptually establish a link between the central category and rest of concepts (Corbin & Strauss, 2008; Corbin & Strauss, 2015; Strauss & Corbin, 1998).

While Strauss and Corbin (1990) had already stated, that the application of their proposed coding paradigm should be flexible depending on distinctive circumstances and research studies, Glazer and Charmaz started to criticise their work. Glaser (1992) contended that due to the complexity of their coding procedures, data is forced to be defined by 'preconceived' concepts for developing and building a theory. Charmaz (2000) also argued that their coding procedures turned the original guidelines characterised as flexible to the ones that are over-complicated. Nonetheless, some scholars such as Creswell and Plano Clark (2011) noted that this structured approach are highly beneficial to novice researchers as it clearly defines the steps for identifying the categories and exploring the relationships among them. Hutchison, Johnston, and Breckon (2011) also encouraged researchers to use various techniques to deeply involve in interpreting, and then they are able to identify the concepts and delineate the connections among them.

Accordingly, the process and coding techniques of Straussian grounded theory were considered appropriate as an alternate methodological approach to that used in the pilot study, as they were likely to give a thorough and deep understanding of how different aspects of group cohesion can be developed through the interactions between the group members and in what ways they can shape students' collaborative information behaviour. The below section examines the data collection method used for the main study.

3-5-2. Data Collection Method: Focus Group Interview

As outlined earlier, the focus of this study was on understanding how group cohesion develops in student groups and in what ways its different aspects can shape students' collaborative information activities. By adopting a grounded theory methodology, it was decided that dynamic discussions and iterative conversations with students who had experience of conducting group projects would provide the researcher with rich data about their behaviours, feelings, opinions and attitudes towards group work in the university context. Accordingly, this research was not conducted based on observing collaborative activities; instead it focused on exploring participants' reflections on what they had done. Based on this perspective, focus group was selected as the most suitable data collection method for addressing the proposed supporting research questions. Looking back at the proposed pilot study data collection process, it was largely 'as it happens' data of a reactive nature whereas the final approach used in the main study was 'as it happened' data of a more reflective nature.

It is worthwhile to note that the researcher also got Ethics approval for running individual follow-up interview sessions. There were two rationales for this amendment to data collection methods. As focus group sessions are limited to a particular timeframe, the participants who are eager to provide more details about their experiences of conducting group tasks would have the opportunity for a further one-one-one interview. Furthermore, in focus group settings, some participants might not be overly talkative and understandably reluctant to describe their experience in front of others. Therefore, this amendment could have a positive impact on mitigating the potential challenges of focus groups. Nonetheless, the main topic of research (i.e., collaboration and group work in academic settings) has always been a challenging matter for students in higher education. Accordingly, the participants of this study all had a common interest in sharing and describing their experiences (bitter or otherwise) of working on group projects. During the 10 focus group sessions that took between 2 and $2^{1}/_{2}$ hours with three to five participants attending each session, research participants were attentively listening to one another's distinct experiences. It was observed that in some sessions, participants encouraged those who were silent to take part in group discussions more actively and provide more details about their group work experience. In some cases, participants who had successful and enjoyable experience of conducting a group project gave advice to others on how they can effectively collaborate with their

group members. Thus, due to development of empowering and reciprocal group dynamics among research participants over the duration of focus group sessions, the participants felt that they were gaining something from the focus group session as well as contributing significantly to it. Furthermore, given the high level of participant engagement, there was no need to invite any of the participants to attend an individual follow-up interview session.

3-5-3. Research Participants: Sampling and Recruitment

Students who studied at Edith Cowan University were eligible to participate in this research if they had the experience of completing a group assignment over the last 12 months. With regard to recruitment strategy, the invitation to take part in the study was published on the university's website (Figure 3-2) over two successive semesters: semester 2, 2017 and semester 1, 2018. As well as a short and clear description of the study, the researcher recorded a short video and explained the concepts and the process of running focus group sessions for this study. Unlike the incentive scheme designed for the pilot study (entering into a draw for four $50 gift vouchers), participants who attended focus group sessions were individually compensated for their participation ($40 gift voucher). In addition, the researcher distributed flyers (Figure 3-3) around the campus but those who contacted the researcher to express their interest in participating in this study indicated that they were notified of this invitation through the research promotion item on the Intranet. This demonstrates the impact of communication technologies' ease of use for students. Students might have seen the flyers around the campus but they might not have had a chance to write down the contact details of the researcher or they might have easily forgotten to make a contact while they were interested in taking part in this research as they could not send an email immediately. Whereas, publishing the research promotion on the Intranet gave the interested students an opportunity to immediately email the researcher.

Figure 3-2. Research Promotion advertised on the Student Intranet on ECU University Website

Figure 3-3. The Flyer Distributed in ECU Campuses for Recruitment

The researcher was successful in running 10 focus group sessions by recruiting 39 students from different disciplines. The focus group sessions took between 2 and $2^{1}/_{2}$ hours with three to five participants in each except for one session which was run by two participants as the rest of invited participants did not show up. Participants were accepted based on the timing the researcher received their emails but their eligibility to attend research was confirmed before being invited to take part a focus group session. Participants' demographic information is found in table 3-1. A full list of focus group sessions including the numbers of attendees and the participants' individual demographic information is available in Appendix D.

Demographic variables	Number	Percentage
Gender		
Male	13	33.3%
Female	26	66.7%
In Age range		
18-30 year	29	74.3%
31-40 year	4	10.3%
41-50 year	2	5.1%
50 and older	4	10.3%
Domestic or International		
Domestic	25	64.1%
International	14	35.9%
Degree		
Bachelor	28	71.8%
Master	8	20.5%
Graduate Diploma	3	7.7%
School		
Business	16	41%
Education	6	15.4%
Medical and Health Sciences	6	15.4%
Arts and Humanities	4	10.2%
Engineering	3	7.7%
Science	3	7.7%
Nursing and Midwifery	1	2.6%

Table 3-1. Participants' Demographic Information (n=39)

3-5-4. Process of Running Focus Group Sessions

After receiving an email from potential participants, the researcher emailed them back and acknowledged the receipt of their request and asked them to provide more details about their group assignment. Although, it was noted that students who had the experience of completing a group assignment over the last 12 months are eligible to participate in this research, the criteria about the type of task had not been mentioned in the study as the researcher aimed to determine their eligibility on individual basis before inviting them to task part in focus group sessions. At this stage, when the researcher emailed back the interested students making a request to provide her with more information about their task, some did not respond to her email even after sending two more emails and some described their task as group problem solving tasks during tutorials or carrying out group tasks which their length was less than five weeks. The researcher then emailed them back providing explanation that the described group task does not meet task characteristics criteria for this research.

When the researcher made sure that participants are eligible to participate in the research based on the aforementioned criteria, she emailed them confirming their participation and proposing different times scheduled for focus group sessions asking participants to let her know which session they can attend. After making that arrangement, each participant received a calendar invite including the time and place of running the focus group session based on their availability along with a copy of the information letter (see Appendix A) and the consent form (see Appendix B) reminding the participant the main aims of the research, the range of topics that would be discussed during the session and expectations from them. The participants were also asked to accept the calendar invite and confirm their attendance.

Furthermore, one day before running a focus group session, the researcher sent a reminder email to participants along with a document including the time and place of running a focus group session as well as a guiding map to the place and its image (Figure 3-4) to reduce the burden of finding the location for those participants who came from the other ECU campus. Almost all the focus group sessions were run in the library where all the students are usually familiar with and feel comfortable with as some of the participants stated, somewhat ironically, that they usually book that specific room for carrying out their group assignments.

To further entice students to participate in the focus group sessions, light refreshments were provided, such as fruit, water and biscuits. The researcher went so far as to ask participants if they had any food allergies prior to the session so as to avoid distractions of this nature. Copies of the communications between the participants and the researcher can be found in Appendix C.

Figure 3-4. The Document Sent to Participants: Time and Place of Running Focus Group Sessions as well as a Guiding Map

Focus group sessions started with a short overview of the study by the researcher including the key topics that would be discussed during the session. The researcher explained to participants that they were going to be asked specific questions about the individual and collaboration activities they conducted over the duration of completing their group task at three distinct phases (initial, mid-point, completion). She intentionally avoided using 'information behaviour' and 'group cohesion' terms not to confuse participants with respect to comprehending the meaning of these concepts. She reminded focus group participants that they should describe their experience of completing the group assignment that they have accomplished over the semester or the one that was conducted over the last 12 months. The researcher also added that participants have the opportunity to describe two different experiences in terms of the process and outcomes if they wish.

At time during the data collection phase, some focus group participants did not respond comprehensively to interview questions even by posing several probing questions. In these circumstances, the researcher made a decision not to heavily focus on those participants to maintain the group discussion. On the contrary, some participants started to explain all the process of conducting their group task from the first meeting until the last stage by asking the very first question. In these situations, the researcher had to stop those participants to avoid others feeling bored and she reminded them that they were required to provide details about the first stage of the assignment when the group was still trying to make sense of the task requirements. With regard to shy attendees, sometimes other focus group participants nudged them to get them talking and make them feel more comfortable by comments such as "*we do not know your group members; we do not tell anyone; there are always challenges*". Nonetheless, there were some occasions that the researcher actually had to ask participants to describe another group assignment as those participants clearly stated that they could not remember the details. In the following section, focus group interview questions will be outlined.

3-5-5. Focus Group Interview Questions

Semi-structured interview was employed as it enabled the researcher to maintain some consistency over the concepts that needed to be covered in each focus group session. This approach allowed the researcher to ask further questions to clarify certain points and participants were also able to add more information relevant to the discussion.

It should be noted that the focus group process and guiding questions were not pilot tested. In grounded theory, the process of conducting data collection and data analysis is concurrent, therefore researchers can develop few broad open-ended questions to commence data collection. Once the first piece of data is collected, researchers will start analysing the data and that will enable them to include specific questions into subsequent interviews (Charmaz, 2006; Corbin & Strauss, 2008). Accordingly, interview questions can be adapted based on the concepts emerge in interview sessions. Researchers who employ grounded theory need to remain open to changing the interview guide and ask participants to provide additional information about the categories that seem fundamental to the emerging theory.

In this research, during each focus group session, participants were initially asked to briefly describe the group task they were assigned in terms of its structure and topic and to provide information about how they formed their group, the number of group members, the duration of completing the task and their specific role in the group if they had any. The researcher continued the discussion by posing questions relevant to participants' individual and collaborative information-related activities at different phases of the group task.

The researcher asked a general question about the activities that participants were involved in, at each stage of completing their group tasks (initial, mid-point, completion):

- *Would you please describe what you did during the first stage of completing your group project when you formed the group and had your first face-to-face group meeting*?

- *Would you please describe what you did during the mid-point stage of completing your group project when you were required to search for detailed information to accomplish the task requirements*?

- *Would you please describe what you did during the completion stage of your group project when you were required to prepare the final document and practise for presentation*?

By posing these general questions, participants were not confined to talking about specific sorts of activities or behaviours. These questions provided participants with an opportunity to elaborate on how they performed their group assignment by providing a true description of the activities and group actions with respect to different stages of the group task. Based on the description provided by participants, they were posed several follow-up questions relevant to each stage of task completion. These follow-up questions helped the researcher to gain a thorough and clearer understanding of different aspects of collaborative information behaviour (formulating information need, information seeking, information evaluation and use) and communication over the course of task completion. In the following, the probing questions are outlined:

Initial Phase

- *Did you need to search for general background information about your assigned group task to gain a better understanding of it?*

- *If you did, how did you conduct that search? Each group member searched for information individually then you discussed the outcomes and your understanding over the group meetings or you performed that search activity during the group meetings?*

- *Can you provide more details about how your group reached a shared understanding of the task requirements and whether everyone had a clear idea of the group task?*

- *How did your group identify sub-task and divide them among members?*

- *How did your group assign roles or divide sub-tasks among each other at this stage? Do you believe that roles/sub-tasks had been assigned equitably?*

- *Did your group discuss each member's expertise and skills?*

- *Did your group establish ground rules for the group work?*

- *Did your group schedule regular times to have face-to-face meetings over the course of the task?*

- *What communication technologies your group chose to maintain the group communication during the time that you were not able to have face-to-face meetings?*

Mid-point Phase

- *How did your group search for information at this stage as you each had your own sub-task/ as you did not split the task among each other?*

- *Would you please tell me whether there were occasions that you/your group members share the search results with one another?*

- *Would you please tell me whether there were occasions that you/your group members seek help with regard to retrieving credible and relevant information?*

- *How did you evaluate the information you retrieved in terms of relevancy and credibility of resources? Are you seeking others' opinions about the information you found? Did your group set evaluation criteria for retrieving information?*

- *Would you please tell me whether you/your group members needed to talk to people outside your group to obtain the information for completing your task?*

- *Did you/your group members share information within a group? How? What sorts of information you did share? How did you make sure that the shared information would be incorporated into the relevant section?*

- *Did you have any face-to-face group meetings at this stage? What you did during a typical meeting?*

- *Did you use communication technologies to maintain communication at this stage as your group planned earlier? If yes, how often? What sorts of information your group shared through communication technologies at this stage?*

- *Can you tell me how did your group review the individual contributions of group members?*

- *Can you tell me whether you/your group members need to search for more information at this stage to fill in the gaps?*

- *Can you tell me how your group collated the individual representations of sub-tasks into a shared representation?*

- *How did you/your group perform formatting, outlining, organising and revising the final document before submitting?*

- *Would you please tell me how your group reached an agreement on the quality of the final submission?*

- *Can you elaborate on your level of group communication at the final stage? You had more face-to-face meetings before submission or you were in contact with one another through using communication technologies?*

This research also aimed at exploring how group cohesion can develop and emerge in student groups and in what ways this group construct can shape students' collaborative information behaviour. Accordingly, participants were also asked to talk about different aspects of group cohesion including task cohesion, social cohesion and perceived cohesion at each stage of performing the group task. As previously noted, these specific terms were not used by the researcher, instead she formed specific sorts of questions based on the established scales that developed over the past years for measuring different dimensions of group cohesion such as *Sports Cohesiveness Questionnaire* (Martens et al., 1972), *Group Environment Scale* (Moos et al., 1974), *Group Attitude Scale* (Evans & Jarvis, 1986), *Group Environment Questionnaire* (Widmeyer et al., 1992), *Group Identification Scale* (Henry et al., 1999) and *Group Cohesion Scale-Revised* (Treadwell et al., 2001) .

Participants' perceptions of task cohesion, social cohesion and perceived cohesion were identified by posing the following questions:

Task Cohesion

- *Can you tell me how did you feel about your group's sense of commitment to the task?*

- *Can you tell me how did you feel about the group sense of motivation towards the task and their effort for doing a good job?*

- *Did you feel that your group members were all actively involved in group activities required for completing the task? Why?*

- *Did you feel that you were all on the same page? Why?*

Social Cohesion

- *Can you tell me about the sense of closeness and unity among your group members?*

- *How do you describe your group atmosphere?*

- *Can you tell me how did your group members get along with each other?*

- *Can you tell me whether you felt comfortable expressing your ideas and opinions or approaching other members for assistance with regard to the task? Why?*

- *Would you please tell me whether you had off-the-topic discussions with your group members? Why?*

- *Do you think that forming a group with friends could have an impact on your collaboration? Why?*

Perceived Cohesion

- *Can you tell me whether you are happy that you were part of that group? Why*

- *Would you please describe your sense of belonging to your group?*

- *Can you talk about your overall feeling towards your group? Do you think that your group was one of the best groups in the class?*

The researcher made an effort to fully understand how participants conceive distinct dimensions of group cohesion over the course of their group task by asking different sorts of questions which they were all related to one specific dimension. This helped the researcher to seek clarification, validate the participants' responses and make sure of consistency in their explanations. In addition, the researcher was continuously asking participants to elaborate on their responses and provide examples. For instance, they were asked to provide an explanation of why they think that their group was committed to do a good job. These sorts of conversations over the focus group sessions enabled the researcher to identify the antecedents of emerging and developing distinct aspects of cohesion in student groups.

Towards the end of focus group sessions, participants were also asked to provide more details about the use of communication technologies in comparison with face-to-face meetings with respect to collaboration at different stages of group task completion. Ultimately, they were offered a time to speak about the challenges of group work in higher education and how it would prepare them for future teamwork at workplace.

As it was noted earlier, participants were continuously asked to provide *explanations* for the activities they performed, behaviours that they exhibited and feelings they shared about their group

members which enabled the researcher to discover and explore the factors and reasons behind their actions and the outcomes of those actions. Follow up questions and the responses provided by participants encouraged other focus group members to jump in the discussion, making a comment about those participants' experiences and themselves as well if they had similar experiences. This led to detailed and comprehensive group discussions which in turn facilitated emerging common themes. Focus group interviews were directed by the content and nature of the participants' responses and group discussions instead of being heavily restricted to the original interview questions. Therefore, focus group interviews were sort of spontaneous which ensured a true description of situations instead of recollection. The following sections will outline the process and steps of data analysis in detail.

3-6. Data Analysis Procedures

3-6-1. Data Preparation

Focus group interviews were audio recorded and then transcribed in full by the researcher. It allowed the researcher to reflect on her interviewing strategies and style as well as moderating focus group sessions. In addition, it provided the researcher with an opportunity to become familiar with data and generate insightful ideas before beginning data coding. Corbin and Strauss (2015) recommend reading the entire interviews before starting data analysis and coding to feel what the participants experienced through their words and actions.

Furthermore, transcription is a process where researchers make a decision about the level of details, they require the transcripts to include. This study aimed to identify the students' collaborative and individual behaviours while working within a group and explore their explanations for exhibiting those behaviours, therefore the researcher focused on transcribing all the narrations articulated by the participants and not only their specific responses to interview questions.

Initially, the researcher decided to use a word processor and media player to start transcribing, however she soon found out that this procedure was unhelpful. Through researching and reading other similar dissertations she came across a software package named Express Scribe. The interface of this program includes a word processor, so the researcher was able to carry out the whole transcription

process in a single window instead of switching between media player and word document. She easily uploaded the audio file, pressed play and started typing. The additional features of this program such as pausing, rewinding and controlling the speed of the audio player also made this process easier. Afterwards, the researcher listened to the audio-recordings again to proofread each transcript and correct the mistakes.

With regard to data analysis, literature shows that qualitative data analysis software packages provide users with interesting features but they cannot replace the researchers' analytical skills and relying too much on using them for coding would add complexity to the analysis process in terms of identifying the main themes and their conceptualisations, specifically for researchers who are new to qualitative studies in general and to grounded theory in particular (Alammar, Intezari, Cardow, & Pauleen, 2019; Bringer, Johnston, & Brackenridge, 2004; Maher, Hadfield, Hutchings, & de Eyto, 2018; Queen, 2013; Saleh, 2012). Computer software programs for qualitative research are commonly known as "Computer-assisted Qualitative Data Analysis Software" (CAQDAS) do not take the place of qualitative researchers, instead support them in storing, retrieving and making connections between and among codes, concepts and categories. Employing CAQDAS is *neither necessary nor sufficient* in grounded theory which implies that high-quality analysis can be performed manually and using software programs may not necessarily lead to better results (Foley & Timonen, 2015). Therefore, the researcher made a decision to perform the data analysis manually by printing out the focus group transcripts on A3 papers and using traditional tools such as coloured pens and sticky notes for deep interactions with data.

3-6-2.   Data Coding

3-6-2-1.   Open Coding

Data analysis began by open coding when the researcher examined the focus group transcripts on a line-by-line basis, breaking down the data into manageable pieces, reflecting upon that data in memos and conceptualising it. The process of open coding is exploratory and the initial interpretations would lead to identifying provisional concepts. These initial concepts provide a sense of direction into the analysis of subsequent interviews through the progressive process of data collection. The

conceptualisation level of the initial concepts can be changed, they might become a property (i.e., characteristics that define and describe concepts) or dimension (i.e., variations within properties) of a concept or they might turn out to be categories (i.e., higher level concepts). Due to exploratory nature of this level of analysis, the descriptive terms that researchers allocate to initial concepts might also be altered as new interpretations are made and the meanings of data become clearer by proceeding with data collection and data analysis processes so the concepts can be named and renamed (Corbin & Strauss, 2015). During the open coding process, there were occasions where the researcher faced difficulty with assigning a code to a piece of data or creating a conceptual name for a generated category from the data. Literature shows that in these circumstances, researchers usually develop codes by utilising the participants' actual words and language (in vivo coding), by using their own knowledge and experience or with referencing to specialised literature and relevant area of research (Alammar et al., 2019; Maher et al., 2018; Vollstedt & Rezat, 2019). The researcher acted based on those approaches for labelling the codes.

An example of open coding process conducted for this study is shown in Figure 3-5. As it can be seen, several concepts emerged from the provided focus group interview excerpt such as *division of labour*, *task type*, *definition of collaboration*, *leadership* and *doing the majority of the work*.
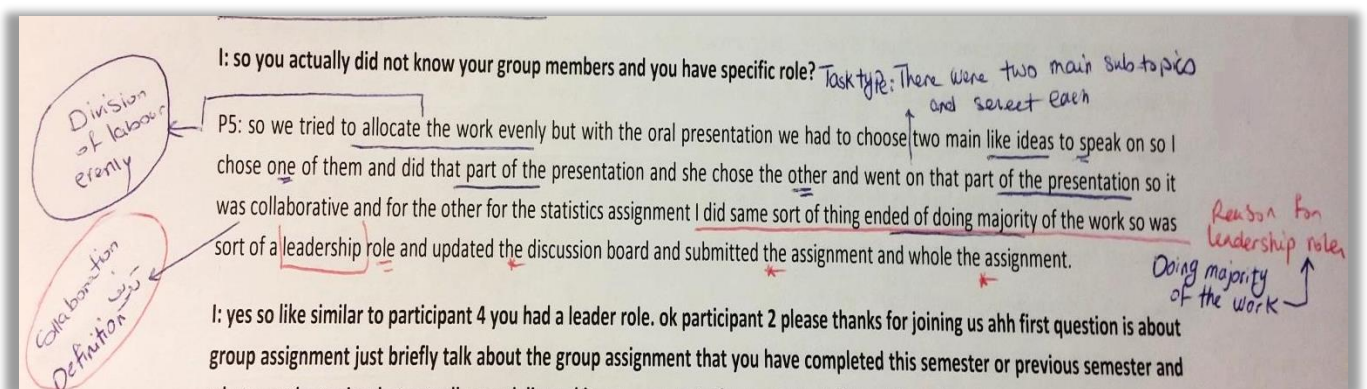
Figure 3-5. Open Coding - Focus Group Interview Excerpt

Division of labour which is a commonly-used term in group work literature was assigned to the participant's description of working on their group project: *we tried to allocate the work evenly*. The participant then described the group project in terms of its structure: *two main ideas to speak on, so I chose one of them … and she chose the other….so it was collaborative*. This segment shows the type of

group task which can be categorised as a *well-structured task* and the other important concept emerged from this piece of data is *definition of collaboration*. From this participant's point of view, collaboration takes place when the task is divided evenly and everyone does their job and she emphasised her perspective by comparing her experience with another one that by '*doing the majority of the work'* (in-vivo code) she was 'sort of' a leader. So '*doing the majority of the work'* is a property of '*leadership'* which was emerged as a higher-level concept (category) from this piece of data.

With regard to moving from concepts to categories, as the analysis continued, the number of emerged concepts increased and they became more abstract through the process of constant comparison. Concepts which were related to the same phenomenon grouped together to form categories as they represented activities towards a similar process. For instance, some of the participants began the discussion by describing their group members' performance explaining that everyone was sort of a leader (*no one takes the leadership role*), everyone was involved in developing ideas (*brainstorm ideas*), everyone was contributing towards making decisions (*collective decision making*). These concepts were all conceptually related representing what leadership approach they took to guide their actions, so these codes were grouped under a higher order category '*shared leadership'*. Visual illustration of this process is shown in Figure 3-6.
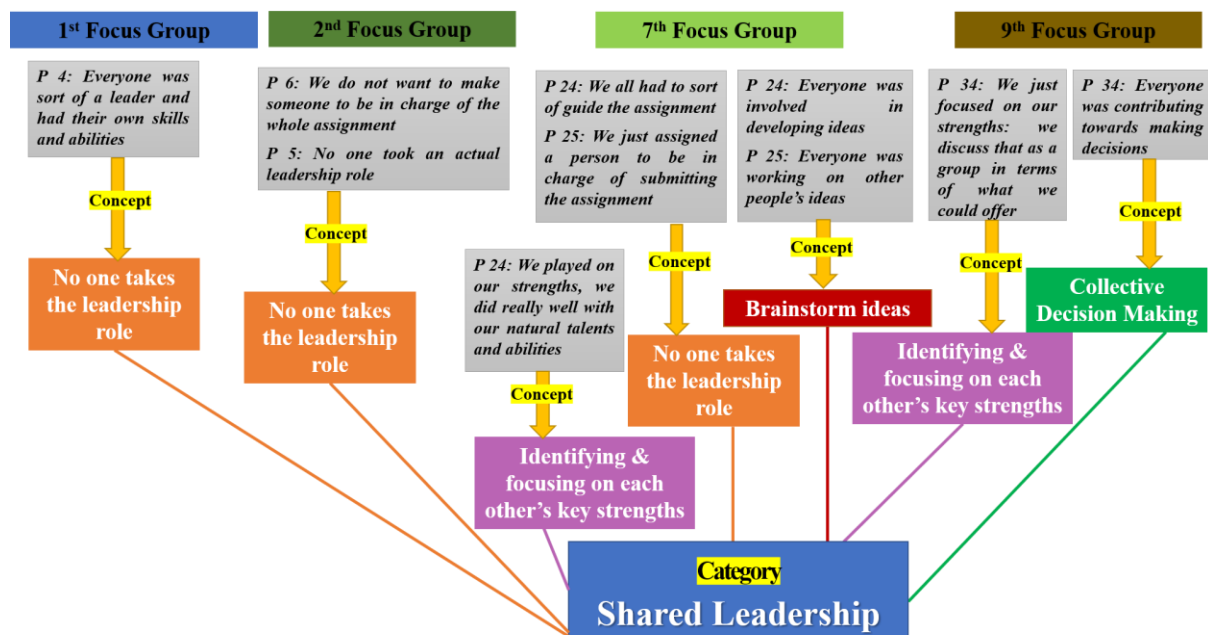
Figure 3-6. Open Coding – An Example of Moving from Concepts to Categories

3-6-2-2. Axial Coding

Axial coding begins when categories and sub-categories become apparent, then researchers start to find casual relationships between categories because a list of concepts and categories do not make theory. They should be linked together to tell the story of the research but in conceptual terms. Corbin and Strauss (2015) proposed the paradigm model as an analytical tool to help researchers carry out the axial coding which consists of three main features: conditions, actions-interactions, consequences or outcomes. Conditions refer to the perceived reasons and explanations people give for why they respond in the manner which they do through actions-interactions. Researchers should inspect the data for responses to questions about why, when and how come. Action- interaction denotes the activities that people do to manage the problematic situations or reaching their goals and consequences are the actual or anticipated outcomes of the actions that are taken by individuals. The logic behind the paradigm is to sort out and arrange concepts or categories by asking questions and thinking in terms of possible linkages.

Accordingly, during this phase of coding the researcher focused on identifying the contextual factors with regard to developing different aspects of group cohesion in student groups that shaped the participants' behaviour and actions they took to respond to the changes in conditions and the outcomes of those actions and strategies they employed.

The following quote is an excerpt from 4th focus group interview (Participant 17) which demonstrates the reasons the participant provided not to have regular meetings with group members to check one another's progress with task (conditions), the actions they took and the consequences of their performance.

Conditions

Actions

Consequences

Participant 17; 4th Focus Group: With the first assignment because we were friends, we were in the same classes together so we did not really need to meet up because we did have a whole semester to complete this assignment and it was just sort of like we just kind of quickly discuss it every week and it seemed that she was actually doing but she (group laughter) [...] we did not really have to collaborate all that much because the assignment was pretty cut down in the middle. To me just kind of have the same topic really but we still every week we have the same classes together just kind of mentioning where we are up to and that kind of thing but we did not really need to come together till the very end [...] yeah what happened was we were meeting up few hours before the class like the class was on Monday and the assignment was due on the Tuesday and she came into the class and she was just like "ah forgot to tell you I was really busy and I was not able to do it" and I thought she was joking. I did not what to say and the next day I got an email form her at 5 o'clock during the class time saying and she cannot hand in her part she is really busy. We should have met up earlier to do it which was fair enough but everybody was doing it the day before because it was just putting everything in a PowerPoint slides basically and yeah I was up all night and did not go to bed that night finishing the assignment the whole semester work I was spending probably five to six hours of week of this big assignment and she got the same mark as me which was frustrating specially after I told my lecturer that as well I feel like group assignments are not good at all like they are not enough for representation of your learning like splitting it up so not learning the whole picture

- Friends
- Attending same classes
- Duration of group assignment
- Type of the assessment task
- Common strategy (divide and conqure)

Conditions

Actions

- No need to have regular meet up
- Ne need to collaborate
- Updating (superficial & verbally)

- Unequal contribution
- Unfair grade
- Developing negative attitude
- Lack of deep learning

Consequences
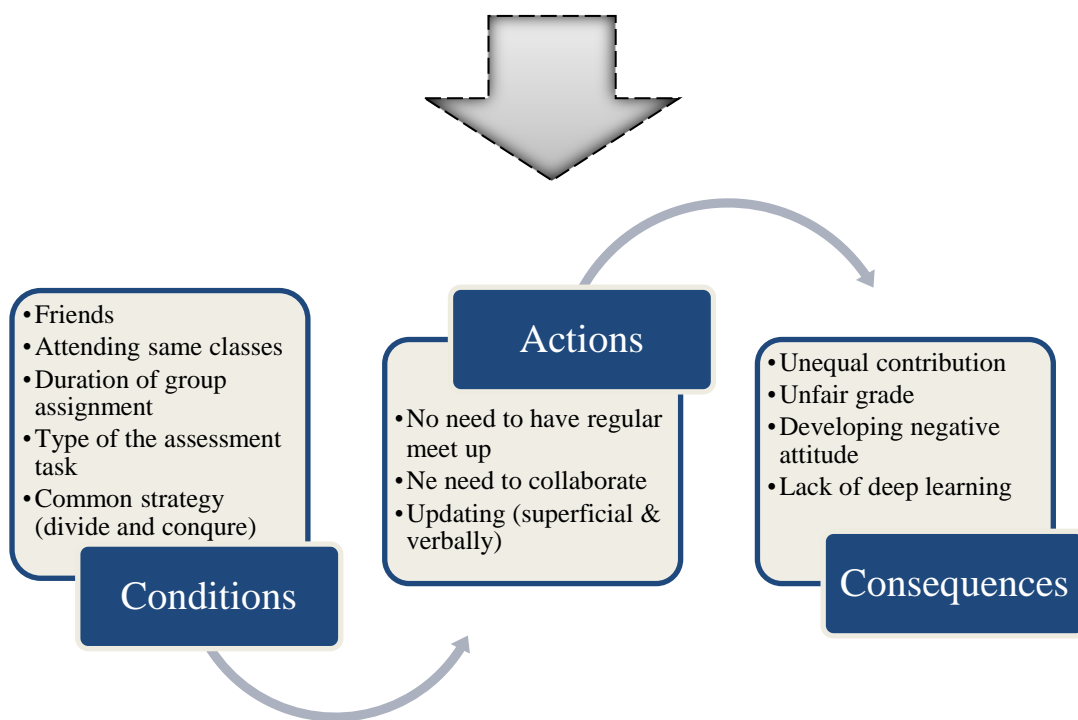
Figure 3-7. Axial Coding - The Paradigm Model (Example, Focus Group Interview)

3-6-2-3. Selective Coding

Selective coding is the last phase of the coding process which involves the identification of the core category that integrates and synthesises other themes that have been developed, elaborated and mutually related during the axial coding phase into an explanatory conceptual model to generate a story. This storyline depicts the main factors that impact on the researched phenomenon and the implemented strategies which can lead to certain outcomes (Creswell, 2012). In fact, it clearly delineates "what is the research all about?" and "what seems to be going on here?" (Corbin & Strauss, 2008, p. 14). In this study, selective coding process enabled the researcher to integrate the links among themes and to explain why and how students engage in collaborative or individual information-related activities over the lifespan of accomplishing a group task.

The process of selective coding was also conducted through employing the constant comparative method which allowed the researcher to analyse and compare the data with the data collected previously before conducting the next data collection. According to Corbin and Strauss (1990), poorly-elaborated categories are likely to be identified in this phase of coding and they need to be developed with more descriptive details to gain conceptual richness. This process will then enable researchers to identify the core category representing the central phenomenon of the study and to generate a theory which has explanatory power. It has been emphasised that "sufficient coding will eventually lead to a clear perception of which category or conceptual label integrates the entire analysis" (Corbin & Strauss, 1990, p. 14).

With regard to this study, the researcher employed theoretical sampling to further explicate the emerged categories and sub-categories. Applying this procedure in terms of recruiting new participants with relevant experience to the concepts that needed to be further expanded was impossible to be conducted concurrently. Instead, themes that emerged from earlier data collections were explored further during subsequent focus group sessions to enhance their contextual density in terms of their properties and dimensions. As a result, some participants provided information about the questioned concepts from the other group work experiences which led to distinct quotes about one concept from one participant. This process continued until all theoretical categories are fully specified in terms of

their properties and dimensions and the collection of additional data yielded no further theoretical insights about the emerging grounded theory; a point referred to as theoretical saturation. Figure 3-8 demonstrates the snapshot of theoretical sampling process for the current research:
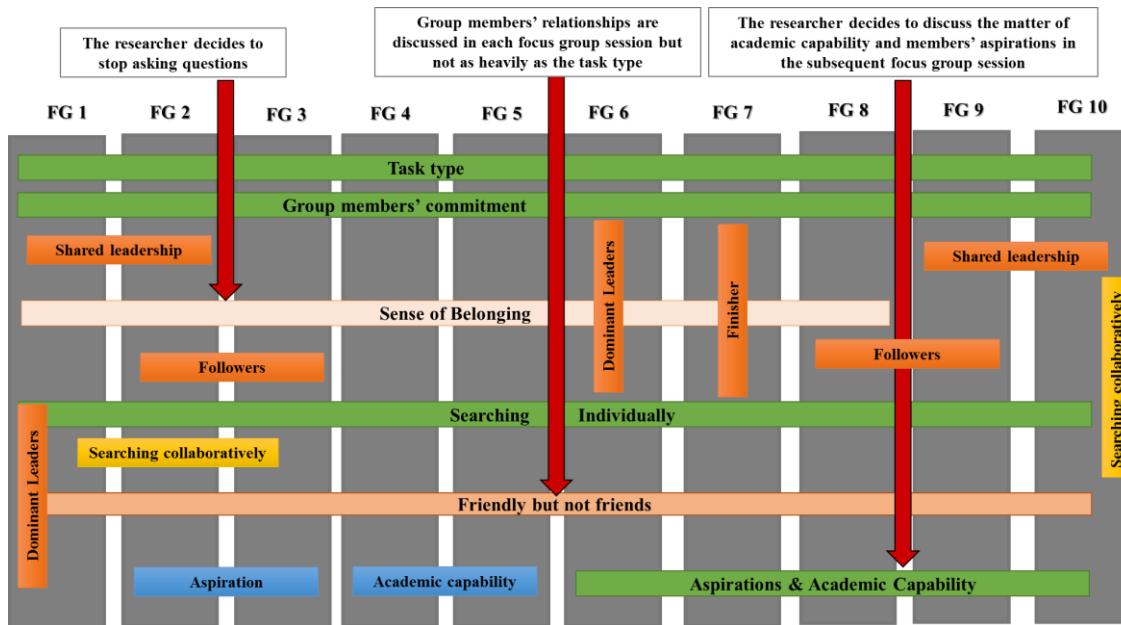
Figure 3-8. A Snapshot of the Theoretical Sampling Process for the Present Research

As it is demonstrated in Figure 3-8 concepts that are shown with the colour **green** are those that were discussed in every focus group session. It should be noted that some of these concepts were prompted by the researcher's questions, for instance the researcher asked participants to speak about their experience of conducting search activities. As can be seen, *searching individually* was mentioned in all focus group sessions while *collaborative searching* which is highlighted in **yellow** was the response provided by few participants. The concepts that are shown with the colour **white** indicate that the researcher stopped asking questions about those concepts as responses were typically uninformative, and frankly, were more 'eye rolling' than anything else. For instance, after running a couple of focus group sessions, the researcher found out that participants do not intend to develop emotional attachment and feeling of belonging to the group that they were part of in the university context. The concepts that are shown with the colour **orange** are the ones that emerged during focus group discussions and were frequently brought up by participants. Concepts highlighted in **blue** were also the ones that were discussed by participants, were not prompted by the researcher's questions and were only discussed

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infrequently. After the initial analysis and determining the importance of those themes, the researcher decided to ask questions about those concepts in the subsequent focus group sessions.

Articulating what the research is all about is not easy and researchers, in particular novice ones, usually experience difficulty with moving beyond solely describing the events. With regard to the current study, the researcher used diagrams to visualise her initial interpretation of the relationships between categories. Use of integrative diagrams over the last phase of data coding was useful in identifying the core category and linking concepts around it to formulate the grounded theory. Figure 3-9 demonstrates an example of diagrams that helped the researcher in the process of selective coding.
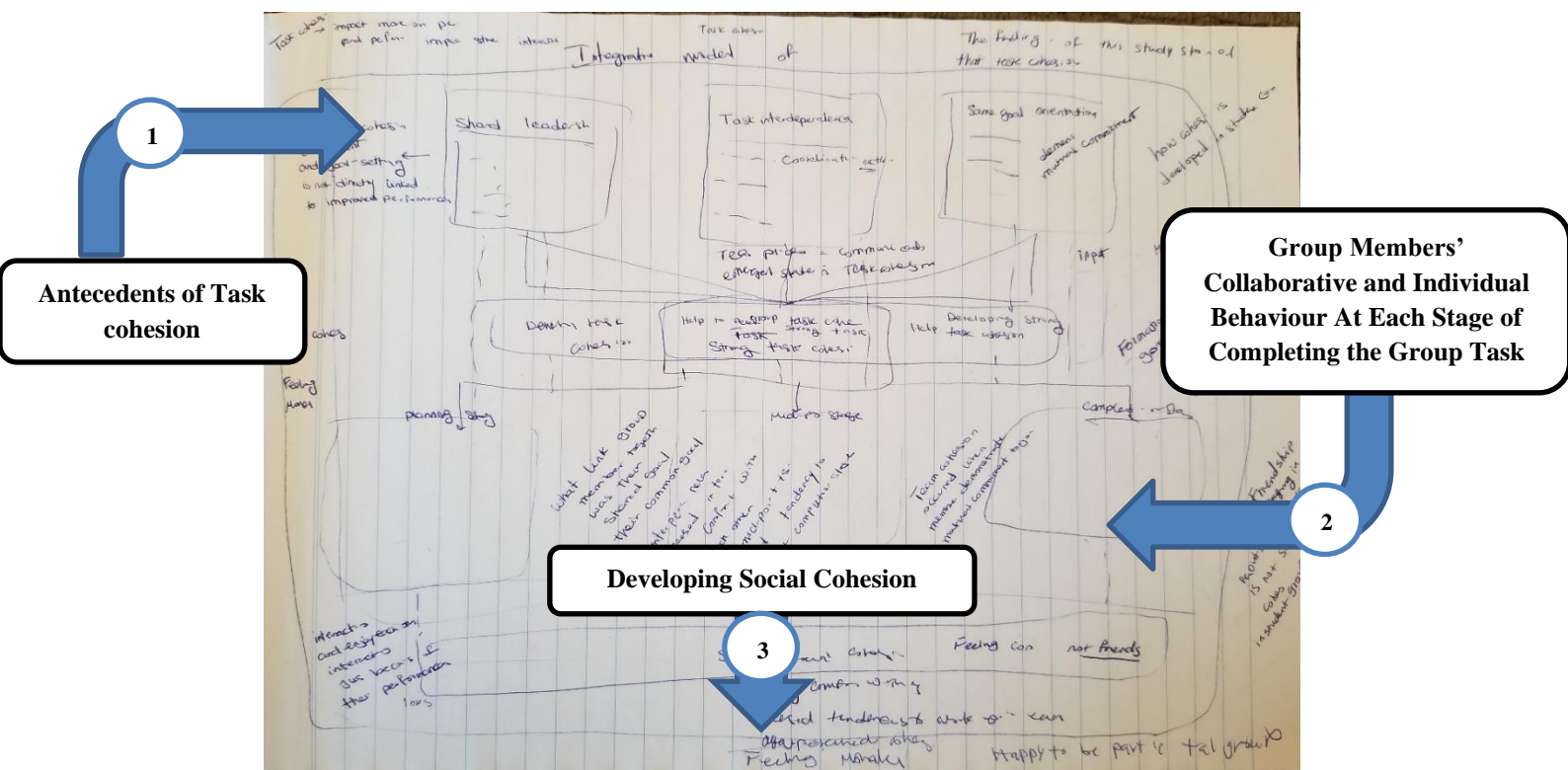
Figure 3-9. An Example of Using Integrative Diagrams Over the Selective Coding Stage

Keeping memos was also helpful in the process of choosing the core category. The researcher kept a record of each step from collecting data, conceptualising the data, making statements of relationships among the emerged concepts and linking them all together. This helped her not to end up with a long list of concepts and some quotes from the data relevant to each concept. In the following section, more details about keeping memos over the duration of conducting this study is provided.

3-7. Memo-writing

Written records of analysis or memos provide researchers with an opportunity for deeper reflection as they are interacting with data over the lifespan of data collection and data analysis. Memos serve as structured means to keep track of all emerged categories, their properties and dimensions and conceptual relationships among categories that evolve over the data analysis process. With regard to this study, coding and memoing took place simultaneously meaning that when a code was developed and assigned to a segment of interview transcript, the researcher would also write a brief memo to capture her initial thoughts and ideas about the code or data. This process was also helpful for adapting the interview guide for subsequent focus group sessions, specifically when the researcher had some questions about the emerged concepts or saw gaps in the data. An example of memo-writing is presented in Figure 3-10 for the code: *Task type*.

Aqua: Focus Group (1); Olive Green: Focus Group (2); Purple: Focus Group (3); Orange: Focus Group (4); Dark Blue: Focus Group (5); Red: Focus Group (6); Green: Focus Group (7); Light Blue: Focus Group (8) ; Tan: Focus Group (9); Grey: Focus Group (10)

Interview Transcript	Code	Analytic & Descriptive Memo
We had not really split up the assignment because it was …it all kind of seemed like you would have to do it all together, they all seemed relevant (you cannot progress and do the next part before finishing the previous parts) Because of the nature of this assignment - It is not possible to break it down - If we find information we could bring it to the group to discuss it further - All of us had background knowledge about the assignment as we have learnt about it in class - We went do research find information and put it into Google Doc The topic was criminology for all the class and each group should determine something in the news and apply a model to it as solution - We narrowed it down, broke it up into sub-topics - Divided into three parts so we could have one part each - It was spontaneously (without any plans happens by itself) The assignment was on Nano technology it was kind of a broad theme and we should narrow it down We had the marking key what was required - There was four main topics - I had two he had two - You research your part I research my part	Task type Pre-selected topics Creative assignment List of topics to select from Given broad subject and groups should narrow it down and find a topic	Some tasks are interdependent in nature When all the group members together select the topic which means collaboratively search for background information and make sense the found information and formulate and define the information need they have an idea of what is going on they have a better idea of a whole topic and then they can break it down to subtopic together based on the found information and choose the one based on their interest and their abilities and then as all of them have a shared understanding of the whole topic that they are working on then when they are working individually on their own part and search individually they can identify the information related to other subtopics which is the responsibility of other team members and then they share it discuss it in the group and comment on that but when just one of members decides on a subject and identify subtopics and assign others specific task they do not have common understanding of the whole assignment and it is kind of individual topic for them and just get it done which sometimes they do and sometimes do not and that is why they do not share information they do not comment on the shared information There is not an opportunity to collaboratively formulate the information need and reach a shared understanding, no collaboratively search for information, no collaboratively making sense of the information found and what team members did, just combining different pieces of information and submit it I can bring an example of a lady form FG10 (or 2nd Participant form FG2) who had comprehensive information about the whole topic and subtopics while another guy I think form FG8 who said the other member's part was not related to him and he even could not remember what was it about while it was a pair assignment and just

Figure 3-10. An Example of Memo-writing During the Course of Data Coding

3-8. Theoretical Sensitivity

Sensitivity means having insights and being able to pick up on relevant issues, events and happenings during data collection and data analysis. Background knowledge and experience can enhance sensitivity as they enable researchers to understand the significance of some things more quickly, be more sensitive to concepts in data as well as seeing connections between concepts (Corbin & Strauss, 2015). In this regard, researchers need to keep in mind that what participants are saying is more important than their perception of an event. With regard to the current study, the researcher, as an information science professional, knew the characteristics of information searching behaviour but it was not her knowledge that was relevant, the meaning of information searching to the participants and how those meanings were formed and transformed over the lifespan of the group work mattered most. Sensitivity also grew over the course of the research as the researcher became more comfortable with both the research area and the research context. Performing literature review during the process of collecting and analysing data also enabled the researcher to see certain data and relationships that were not obviously evident in the participants' words. Nonetheless, researchers should remain aware that findings are the results of the interplay between data and what they bring to the analysis and all interpretations need to be considered provisional until supported by additional data or verified by participants.

3-9. Trustworthiness in Qualitative Research

The quality criteria that should be applied to qualitative research designs are different from those that are established for quantitative research. In qualitative research the term trustworthiness is used to support the claim that the research outputs are "worth paying attention to" (Lincoln & Guba, 1985, p. 290). Corbin and Strauss (2008) proposed ten criteria that can be used to evaluate the quality of research findings including *fit*, *applicability*, *concepts*, *conceptualisation of concepts*, *logic*, *depth*, *variation*, *creativity*, *sensitivity*, *evidence of memos*. The applicability of these criteria to findings of the current research study is elaborated in the following:

Fit refers to the extent to which research findings reflect the experience of both the research participants who took part in the study and the professionals in the area of research that the study was

conducted. This criteria in this research is demonstrated by the use of lengthy engagement with participants through devoting sufficient time to achieve the research goal in each focus group session. During focus group interviews, the researcher usually reiterated the participants' responses to make sure that she got the same understanding of the group discussions as participants aimed for. This process could be considered as sort of a 'member checking' technique for ensuring the credibility of their responses.

Applicability refers to the usefulness of research findings. Research findings should offer new insights leading to significant contributions, both conceptually and practically. This study resulted in rich description of how different dimensions of group cohesion emerged and developed in student groups over the duration of completing the group task and its association with students' collaborative and individual information behaviour practices. The process of conducting selective coding and theoretical integration led to identifying the core category and integrated theory that explains the process of successful group work in higher education environment which can be applicable in different academic settings.

Concepts are necessary for developing shared understanding of research findings. They should be rich enough to add something more to the participants' words. High quality research needs to go beyond description by providing evidence of abstraction and contextualisation. In this study, emerged concepts became abstract by developing in terms of their properties and dimensions of the phenomenon they represented. This status was achieved through employing constant comparison method and theoretical sampling.

Conceptualisation of concepts is an essential process of quality grounded theory study as without context the reader of research cannot fully understand why events occurred. Accordingly, researchers need to identify the conditions which give rise to concepts, the actions/interactions by which they are expressed as well as the consequences they produce. In this thesis, particular emphasis was placed on the importance of context through the application of the research paradigm during the second phase of data coding (axial coding) as previously discussed in this Chapter. *Logic* is another criterion implying that findings need to make logical sense ensuring that the reader is not left confused and or in doubt about their integrity. In this regard, methodological decisions should be clear so that the reader can

judge their appropriateness for gathering data and doing analysis. In the current study, thick description of the research process including all the steps that were taken from designing research instruments, collecting data and data analysis process are provided.

Depth refers to the descriptive details of emerged concepts that can add richness and variation to the findings. Depth of concepts will lead to findings that have the potential to make a difference in policy and practice. This research study provides in-depth and vivid illustrations, accounts and details which explicate the participants' perceptions of group cohesion and experiences of engaging in individual and collaborative behaviour. Employing theoretical sampling and making use of constant comparison method as well as applying research paradigm led to providing richness and density to findings of this research process.

Variation is another indicator of high-quality grounded theory study meaning whether there are examples of cases that do not fit the pattern. By applying variation, researchers demonstrate the complexity of the research subject by accommodating the multiple and varied voices of participants in the analysis and final report by providing examples of negative cases. As mentioned earlier in this Chapter, the process of theoretical sampling led to discussing emerged concepts in subsequent focus group interview sessions and some of the participants provided examples from other group work experiences with regard to discussing concepts which were different from the current experience they had. Those discussions led to richness, density and variations of concepts which demonstrated the complexity of collaborative information behaviour in student group works.

Creativity is another criterion denoting whether the research findings are presented in an innovative way to represent something new or provide a new understanding of a previously researched topic. In this regard, the current study employed the procedures of data analysis consistently and creatively which led to identifying the antecedents of developing group cohesion in student groups and exploring how they could shape students' individual and collaborative behaviour.

Sensitivity refers to the process of handling the data collection process whether the analysis drives the research, or the research is driven by some preconceived theories or assumptions. Employing theoretical sensitivity in this thesis has been described in detail in this Chapter, section 3-8.

Evidence of memos is the final criterion of high-quality grounded theory research study and is recognised as one of the most important criteria. Researchers are not able to remember all the thoughts, ideas and questions that arise over the data collection and analysis process. Therefore, memos are amongst the most essential procedures of carrying out a grounded theory research. In this research study, using analytical memos helped the researcher to add depth to the discussion of her findings and evidence of memos are presented in the last two chapters, in particular, the Discussion Chapter. The Discussion Chapter provided detailed description of the process and conceptualisation of the impact of group cohesion aspects on students' collaborative information behaviour by using diagrams based on the memos created throughout the data collection and analysis process.

3-10. Ethical Considerations

Ethics approval was granted from the ECU Human Research Ethics Committee at Edith Cowan University for the period of the research. Considering the results of the pilot study, two Ethics applications with regard to amendments to research methodology, recruitment method and data collection methods was submitted to the committee and the approval for those amendments was granted for performing the main study. Information letter and consent forms were available on the student Intranet where the invitation for participating in the research was promoted. Furthermore, these two documents were also individually emailed to students who volunteered to take part in this study before attending focus group sessions, but the researcher asked participants to sign the consent form in person before starting the session. At the beginning of focus group session, the researcher provided a short overview of the process of running the session and the key concepts that were going to be discussed. Participants were also clearly notified that participation in this study was voluntarily and they were able to withdraw from the research at any point. The information letter and consent form are attached as appendices to this thesis.

During the focus group session, each participant was assigned a specific number so their identity cannot be disclosed in either audio files or transcripts. Comments or questions posed by the researcher have been labelled with (I/Interviewer) and responses form participants have been labelled with (P/Participant) and a number (P1, P2, P3, etc.) depending upon the number of participants attending the

focus group session. Participants were reminded not to mention any names including their course name, their lecturer or their group members' names during the focus group interview session.

3-11. Summary

This chapter has given an overview of the research methodology for this research. This research used Straussian grounded theory to explore how group cohesion develops in student groups and in what ways the different aspects of group cohesion can shape students' collaborative information behaviour activities in terms of identifying the information need, searching information, assessing and evaluating information as well as using information to fulfil their group tasks. Grounded theory has been used as a research methodology owing to its ability to provide the researcher with in-depth understanding, rich description and comprehensive explanations of behaviours which has also been used in several research studies carried out in collaborative information behaviour field (e.g., Prekop, 2002; Reddy, Jansen, & Krishnappa, 2008; Ye et al., 2019). This chapter gave an overview of the pilot study and reflection on the changes resulting from the outcomes of pilot study which led to modifying the research design and recruitment strategy which yielded better outcomes in terms of the number of participants and the type of data that was collected. It enabled the researcher to elaborate on students' actions and interactions over the course of completing their group tasks as well as exploring the contextual factors with regard to different aspects of group cohesion in student groups.

4.   FINDINGS

The main purpose of this study was to explore and explain the formation of group cohesion during the lifespan of a group task to identify its contribution to the way students make sense of their assessment task, search for and use information collaboratively to complete their project assignment.

As Chapter 3 outlined, this study recruited student participants who were undertaking project units as part of their university degrees from different disciplines.

Participants were asked questions in regard to the individual and collaborative activities they performed while they were working on their group task to uncover their collaborative information behaviour activities while working on their group assignments. Developing cohesion in student groups was also explored by asking participants to describe their feelings about the group members' sense of commitment and motivation towards the group task; group atmosphere, sense of friendliness and closeness among group members and their own feeling of belonging to their groups. Several relevant probing and follow up questions were also asked from participants based on their responses during the focus group sessions which helped the researcher to explore how cohesion had been perceived and experienced by students to identify the salient antecedents that contribute to emerging and developing cohesion in student groups.

With regard to the structure of the last three chapters, it should be noted that this research does not follow the format of traditional research. According to Corbin and Strauss (2015), writing quantitative dissertations follows a standard format while guidelines for writing qualitative thesis are less clear. They put an emphasis on this issue by stating that following the standard format of quantitative dissertations does not work for qualitative ones. They state that unlike quantitative research that "requires a structured design, grounded theory studies require an open and flexible design" (Corbin & Strauss, 2015, p. 322). Due to richness of grounded theory findings, they suggest that introducing and defining the main categories and sub-categories can be presented in one chapter and another chapter would be a more detailed one, explicating the relationships among categories (pp. 322-324). In this regard, Dunne and Üstűndağ (2020) also have the same viewpoint on on presenting grounded theory studies. They noted that grounded theory methodology is more than a methodology as it goes beyond

the scope of a traditional methodology as it has importatn implications for the sequencing and structure of the final wrritten output.

Figure 4-1 demonstrates the structure of the last three chapters of this thesis with respect to the Straussian grounded theory data coding approach:
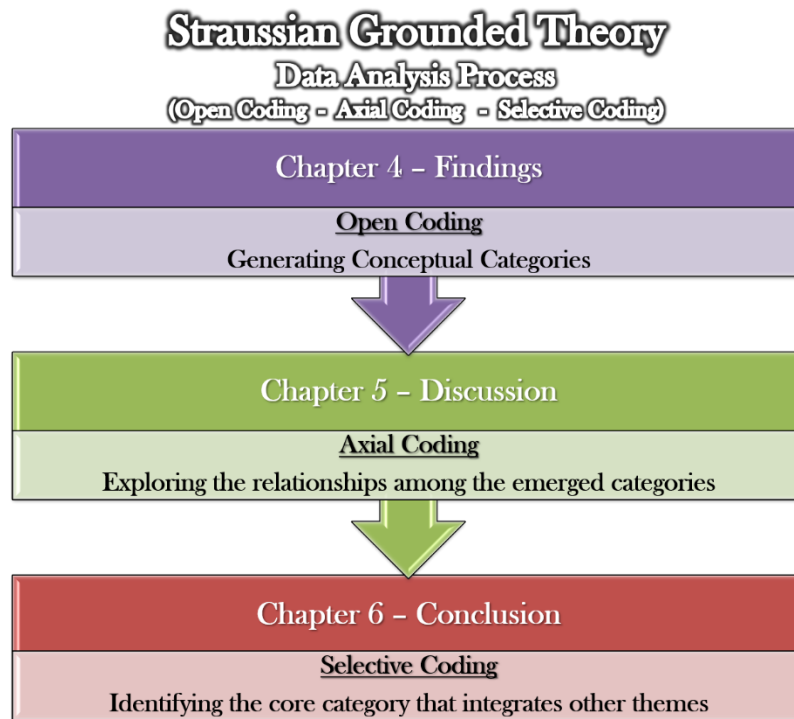
Figure 4-1. The Structure of the Last Three Chapters Based on the Straussian Grounded Theory Data Coding Approach

A detailed and comprehensive discussion of the emerged categories and their associated properties/dimensions (open coding) is provided in this Chapter with the aim of establishing a solid foundation for discussing the relationships among the categories. Axial coding enables the researchers to explore casual links between categories because a list of concepts and categories do not make theory. By employing the coding paradigm model proposed by Corbin and Strauss (2015) as an analytical frame for analysing the relationships between the emerged categories, the researcher addressed supporting research questions in Chapter 5. The core category was identified through the selective coding process. At this stage, all other emerged categories which their relationships were elaborated through the axial coding process, were synthesised and integrated. This process is delineated in Chapter 6 by bringing together the main identified categories and their relationships, which were explicated in Chapter 4 and Chapter 5, in a holistic presentation of the phenomenon investigated in this research.

Accordingly, this chapter outlines the findings of this research across three distinct sections:

1. How group cohesion emerged and developed in student groups over the duration of group tasks

2. Students' individual and collaborative information behaviour activities

3. Communication in student groups: face-to-face communication and communication technologies for digital collaboration

Each of the above sections starts with a short introduction, presents the emergent categories in detail and ends with a summarisation of the main results. Quotations from focus group interviews are referred to by the participant number, then the number of the focus group session. It is also important to note that the researcher compared and contrasted the emerged categories with existing theoretical concepts and empirical results. This process was carried out with the aim of contextualising the current research findings and enriching the iterative process of data analysis which ultimately assisted in the development of the grounded theory (Dunne & Üstűndağ, 2020). According to Dunne and Üstűndağ (2020), "flagging connections between emerging themes and extant theoretical concepts can be very useful, and in no way compromises the ethos of GTM [grounded theory methodology]" (para, 34). They believe that some emerged themes might be closely related to the extant theoretical frameworks and this process communicates the researcher's awareness of the broader context; however, the literature should not be discussed in detail in the findings chapter.

4-1. Emergence of Cohesion in Student Groups

The main research question for this study was 'How does group cohesion shape students' collaborative information behaviour over the duration of group tasks?'. According to Picazo et al. (2015) "a prerequisite before analysing the impact of level of group cohesion on team results is that cohesion has previously emerged as a group construct" (p. 298). Therefore, it is of great importance to develop a deep understanding of when and how task, social (interpersonal) and perceived cohesion emerge in a group and whether these different aspects of cohesion are related to one another throughout a group's lifespan. For this purpose, questions ranging from broad to more specific were posed to the research participants, allowing them to give their own viewpoints on their perceptions of cohesion.

4-1-1. Influencing Factors of Task Cohesion in Student Groups

To respond to the first supporting research question 'What role does group task cohesion play in students' collaborative information behaviour?', the researcher needed to identify the conditions (implicit or explicit) that lead to or predict students' perceptions of unity surrounding the group's task goals and objectives. Understanding these conditions then enables the researcher to analyse the participants' collaborative information behaviour practices considering the explanations and perceived reasons participants provided for their actions/interactions.

4-1-1-1. Leadership

Findings of this study revealed that there are two distinct approaches to leadership in student groups including *'shared leadership'* and *'leader-follower'* approach.

Shared leadership has been defined as "a dynamic, interactive influence process among individuals in groups for which the objective is to lead one another to the achievement of group or organizational goals or both" (Pearce & Conger, 2003, p. 1). In this situation, individual group members have a collective viewpoint towards leadership and the responsibility of decision making would be shared among all the members (Serban & Roberts, 2016; Yammarino, Salas, Serban, Shirreffs, & Shuffler, 2012).

According to the current study data analysis, student groups that did not appoint someone as a leader could form a strong bond with each other and felt more committed towards the group and the task itself. Participants were of the mindset that they did not expect someone to assign them specific tasks; they rather experienced collective decision making and discussed their roles as a group. Shared leadership encouraged them to collaborate with rather than ignoring each other; therefore, they recognised one another's special expertise and found necessary skills amongst themselves to share responsibility for group processes and outcomes. According to the comments, focus group participants who experienced shared leadership reported that '*everyone was sort of a leader with specific skills and abilities*' (Participant 4; 1st Focus Group) and highlighted motivating and encouraging atmosphere as '*it just felt like you need to do your part*' (Participant 9; 3rd Focus Group). The following quotes can provide more elaboration:

Participant 6; 2nd Focus Group: Nobody to the role of leadership. It kind of like put a negative impression, we just did not want that discrimination that you are the boss and we take orders from you. So we kept things soft and we did not make someone in charge of the whole assignment.

Participant 32; 9th Focus Group: No leader role. We used the outline to sort of review the assignment and split it up into parts, we talked about each other's strengths, we just focused on our strengths and then said oh ok I can offer this and sort of discuss that as a group in terms of what we could offer [...] that was a music-sound project with an art piece. We had two students in the group one artist and one public relations (broadcasting) so the artist took the art portion and the broadcaster tool the sound part and the rest of us took the writing part.

Participant 36; 10th Focus Group: We all took turns on leadership at different points and we all respected each other enough and were professional enough to be able to acknowledge everyone's contribution and constructively disagree as required. We were all very motivated and committed to the project and it all flowed quite well.

This finding is consistent with prior research results delineating a significant correlation between shared leadership and group cohesion. Their findings indicated that teams adopting a shared leadership style are all actively engaged, taking care of what has to be done and working at the same skill level (Bergman, Rentsch, Small, Davenport, & Bergman, 2012; Mathieu et al., 2015; Rafferty, 2011; Serban & Roberts, 2016).

The official appointment of a team leader has also been emphasised in teamwork literature. In this regard, taking a leader-follower type of leadership is also quite common in student groups (Xie, Hensley, Law, & Sun, 2019). Findings of the current research showed that a majority participant asserted that their group work leadership style was a leader-follower type, however data analysis revealed two different patterns in regard to this style of leadership:

Based on the participants' description of their group work experience, there were some groups composed of dominant students who took control of the group. When groups formed, without discussing and arriving at a consensus about appointing someone as a group leader, they behaved as if they were in charge of the group. They divided the sub-tasks among the group members and did not seek other's opinions and ideas. Their strongly-held belief about their capabilities, knowledge and experience inhibited collaboration and sharing ideas, and decisions about the task were taken individually which led to group members' dissatisfaction. This is in line with prior research findings (e.g., Le et al., 2018)

showing that influential members tend to underestimate the intellectual capacity and efforts of their fellow group members, thus dominating the group. The following interview extracts elaborate this further:

Participant 2; 1st Focus Group: There was a girl who gave her email to everybody in the group and said 'I want to do this, I want to do that' [...] we had not met each other before and she assumed herself to be a leader, no one told her to be and then assigned each member specific task to do and asked to send our parts to her email and about sub-tasks we just say 'that is Ok, I can do it'.

Participant 21; 6th Focus Group: I have always own my own company so I have always been a leader and just delegated the tasks and I just take that natural role in a group assignment [...] I decided what we were going to do [and] my partner was more than happy with it, the other guy kept disagreeing but we kept saying this is what we are going to do we told him what he needed to do.

Furthermore, data analysis showed that some participants who had prior negative experience of working with non-contributing members made a decision to take charge of the group and exercise control over the group task from the beginning to avoid the risk of being blindsided by members' poor performance and doing the majority of the work in the end:

Participant 17; 4th Focus Group: Because of the bad experience I had I think that was why I was kind of did the leadership role so in the tutorial when we first met the other two group members that the lecturer had assigned to us, I was kind of bossy. I did not have time to chit chat, just get it done.

On the contrary, most research participants explicitly stated that they were forced into the leadership position as they ended up doing the majority of the group assignment. They claimed that they had to take the initiative and make individual decisions due to non-cooperative members. They had to coordinate every aspect of the assignment including brainstorming ideas, division of labour, monitoring of task progress, evaluating the quality of the work, reminding people constantly to contribute and finalising the assignment. They maintained that the final product was not the result of group effort because group members did not collaborate on assessing and providing feedback on one another's contributions to enhance the quality of the project. Research participants were of the mindset that these types of students prefer to be said what to do instead of making contributions to the group

task by actively participating in group discussions and the group project would eventually turn out to be a '*one-person game*'. Working in such environments does not promote task cohesion as participants in this particular sample clearly noticed that there was not a sense of collective responsibility among group members and it had negative influence on their perception of group's ability and commitment to successfully complete the assignment and get a good result. This observation is supported by the following interview quotes:

> *Participant 8; 2nd Focus Group: They considered me as a leader and that made them feel a bit relaxed. They thought that I am the owner of the [assignment] and eventually I ended up doing most of the work [...] getting closer to the deadline I realised that a lot of things need to be redone. I started brainstorming myself, took initiative and asked them to do their contribution based on their capabilities and gave them my feedback but I was the one who was dealing with finalisation, accumulation all the parts and reviewing. So it was lots of work for me.*

> *Participant 3; 1st Focus Group: My role was basically to do a little bit of everything [...]our assignment was due in 2 weeks and we had not actually done anything so I kind of assigned myself to a role of the leader by prompting and telling other students 'actually you know what we should start doing something' [...] I basically told them what to do and they agreed on everything that I was saying [...] but they did not do it properly, I did kind of take on their roles and they noticed that I started doing their tasks. So, overall I was mainly the person who was kind of prompting them and telling them that they should really contribute.*

The above discussion could be the most probable explanation for promoting shared leadership in student groups. Findings of the research conducted by Mabley et al. (2018) showed that in student groups that everyone are assumed to have the same level of knowledge and expertise, group members should maintain shared ownership of the team's performance and leadership as it would be more productive and have a positive effect on group processes.

4-1-1-2. Nature of the Assessment Task

Gully et al. (1995) and Beal et al. (2003) found out that there is strong relationship between cohesion and group performance when the assigned task is recognised as highly interdependent due to a necessity for coordination, communication, sharing information for effective team functioning. In this regard, some researchers are of the opinion that complex and interdependent tasks leads to promoting

task cohesion owning to a necessity for group members to come together and coordinate their efforts to carry out the task requirements (Grossman, 2014; Schaffer & Manegold, 2018).

Findings of this study also showed that those participants who had been assigned a task constituting multiple interrelated components decided to have regular communication and more group meetings over the duration of the assignment. They reported that different parts of the task could not be performed individually as each component depended on a single precedent or many previous elements. These participants believed that the whole process of conducting their assignment was performed collaboratively and it was not the sum of individual works. They concluded that '*no one felt left out doing work on their own*'. This has been clearly mentioned in the following quote:

> *Participant 1; 1st Focus Group: Everything is done together due to the nature of the assignment [...] it was about rebranding an organisation, it was basically changing things like logo, new set of ads, you know sort of doing advertising [...] one thing kind of had to be done to do the next part, you could not do things separately because you could not do part 'b' without doing part 'a' if you got the right information [...] for instance if we found some sort of details about some parts of the assignment we just added it to the Google docs that we created then we had to discuss it and actually do the full proper work as a group.*

However, some participants had been annoyed by the *approach* their group members adopted to perform the assigned task. They argued that their group had been assigned to a task which its interdependence was high and it required all group members to work together on problems and suggest proper solutions. However, their group members broke down the assignment while it should have been done collaboratively as they believed that separating the task evenly would make the group work fair. They maintained that they should have understood the task together at the same time to be able to complete the task and solve the problems; while, by taking that approach group members were not able to use their skills effectively. In this regard, Rafferty (2011) research results also revealed faculty members' dissatisfaction with dividing the group assignment into multiple individual tasks and they considered it as one of the biggest problems and a lost opportunity in student groups due to absence of group-thought and students' inability in synthesising and coordinating the project:

> *Participant 31; 8th Focus Group: It was not sort of a task that could be assigned to individual people it was more of complete collaborative thing you come together you think about the*

problem together and you work on it together but they decided to structure it. It ended up kind of being two people working too actively and then two people in the end will be writing the report so every time we got together it was obvious that two people not really doing anything to the task when two other people be working on it.

Prior research has shown that a fair share of workload is indispensable to students who are involved in group projects as it has a positive impact on students' attitudes and it would enhance the group effectiveness by preventing social-loafing (e.g., Pang & Hung, 2012; Pfaff & Huddleston, 2003). However, methods that students adopt to keep the fairness in terms of workload allocation among group members would have a profound effect on their level of collaboration and participation in group activities. Findings of the current research indicated that the majority of participants' basic belief of working equitably is dividing the work equally, even based on the word count without giving the quality of the work serious consideration:

<u>*Participant 19; 6th Focus Group*</u>*: It was a 1000 word assignment so we split it into 500 words each. I would do the introduction and conclusion and he would do the method and results and two or three weeks before the assignment was due we had met up to put it together and his part only had 250 words [...]I just a bit shocked that his part which was kind of equal to mine in the way we split it would have so little words and I tried to expand on my introduction portion as much as I could [...] his methods section was really short, his expected results was short and it just affected the whole group assignment in terms of word count aspect.*

<u>*Participant 16; 4th Focus Group*</u>*: We really did not have roles to begin with because it was all report format and we did not really know what we are doing so we later designated our roles such the introduction the body and maybe like research and I focused more on the researching and just putting our dot points on to the discussion board to try and help everyone understand what we are doing but on the report it did say, it recommend that each member write 500 words so they try to make it even but some people wrote more than the others [...] it was funny because everyone was very uptight about how long everyone was spending on their parts they really focused on that 500 word length and I just thought you know no one is going to write exactly 500 words everyone was going to do different parts you know.*

The second quote clearly demonstrates the impact of the given instruction with regard to the process of performing their group task which promotes individualistic viewpoint towards group work and can play a major role in instilling this type of approach among students over a period of time.

In contrast to those participants who experienced working on high interdependent tasks, some other participants' descriptions of their assignments indicated its low interdependence. Their assignment consisted of subtopics outlined by their instructor; therefore, they could easily divide the subtopics among each other more often spontaneously. Their tasks can be classified as *fully-assigned* tasks, defined as "those that have both the main topic and aspects of the topic imposed on the user" (Bilal, 2002, p. 1171). Thus, they did not need to search for more information to gain more understanding of the topic and share their ideas to formulate the information need collaboratively. They decided to go off, do research individually and then send their sections to the member who is responsible for putting pieces of information together. Research participants who had this experience explicitly stated that there was no need to have more communication or face-to-face meetings because each member had their own specific sub-task to work on. In this regard, some of the research participants also mentioned that their task was not particularly difficult and complex; therefore, they briefly discussed the task and its requirements during the initial meeting, divided it and went away to complete their sub-tasks. Thus, they worked individually on their parts, did not have strong communication, as they did not need to, and got together in the end to collate all pieces of information and submit the assignment. The following quotes provide more clarification:

> *Participant 17; 4th Focus Group: So in the assessment sheet there was like dot points the things that we had to cover and I was just lucky that it was like even number so it could be divided by four so we just all got two dot points each and we just like 'ok go away research them and then we'll come back and then we kind of put it all together'.*

> *Participant 19; 5th Focus Group: Maybe the first face to face meeting would be enough just to exchange information and just talk thorough what the topic is about, what we are going to do and assigning roles. Then maybe during tutorials we can just update each other what we have done and then most of it can actually be done online because it is our specific parts, we split it to individual tasks as part of the whole group assignment and maybe come back again at the end to compile the assignment.*

> *Participant 28; 8th Focus Group: We had the marking key, what required was there. There were four main topics, I had two, he had two and we said 'you research your part and I research my part' then we came together to see any parts crossed over so we were not overlapping in the presentation.*

Participant 27; 7th Focus Group: *It was very set up for us, so I think that made it easier for us to kind of get in there and get everything done. So we were given a list of countries to choose from that we had to basically answer a set of questions so we only had the choice of those ten countries so we did not have to go through many arguments about what we could choose, so it was pretty easy to choose one thing and then getting everything done.*

Participant 26; 7th Focus Group: *My experience of group work is that when we meet for the assignment, we would just subdivide the task according to the numbers that we have. We have four participants 1/4 each and they would pick the one according to their likes according to their experience according to which part they are more comfortable with.*

The above comments also indicate that the vast majority of students in this particular sample were quite comfortable with this type of task structure which allowed them to break it down into different pieces leading to an increased propensity to take a 'divide and conquer' approach and work individually within a group context. For these students, fair division of labour matters more than collaboration which does not always lead to fair contribution. Meanwhile, some of the participants were not satisfied with this type of structure and approach describing it as '*do your own complete thing and no real collaboration*' (Participant 1; 1st Focus Group). Another participant validated this viewpoint by describing her experience of conducting a group assignment with this type of structure:

Participant 25; 7th Focus Group: *It was as we opened a textbook, had a look at the topics under that chapter we will be looking at and did a little bit of a research together like any extra things that we could talk about and then we kind of just split out what topics in that book to specific people and then we just left to do our own things which was bad.*

On the other hand, there were other participants whose task interdependence was neither high nor low. They reported that they had been assigned a broad theme and were asked to narrow it down and select a topic themselves. These types of tasks are considered as *semi-assigned* tasks that "have only the main topic imposed on the user and the user can choose an aspect of the topic that interests him or her to pursue" (Bilal, 2002, p. 1171). They could divide the assignment into multiple interrelated components, but it still needed collaborative effort to be completed. These participants maintained that group members worked together to come to a shared understanding of the topic at the initial stage which was a necessity and they had regular communication and group meetings during the latter stages. They

consistently worked on each other's part to avoid overlapping, to gain a better understanding of different parts of the assignment and to provide each member with constructive feedback, which enabled them to prepare a cohesive and integrated report. They specifically pointed out that division of labour does not mean to go away and come back with work, they had frequent communication between the group meetings to monitor each member's progress in their parts, and making sure that everyone is on the same page. This finding is consistent with Hardy's (2011) and Rafferty's (2011) research results on student groups who also found that division of labour does not always mean that there is an absence of collaboration and group cohesion:

> *Participant 6; 2nd Focus Group: This unit was about management so we had to look at the project and break it down into small bits like introduction, description of the project, analysis and recommendation and competencies that we learned from that project. So we broke it down into three parts and I took the charge of analysis of the project […] there was strong communication among all of us. While I was doing my part, I received feedback and suggestions from other team members. Our parts of the assignments were linked together so we were looking at each other's parts, giving suggestions and trying to improve the project.*

> *Participant 20; 5th Focus Group: We were required to create a report on specific problem in public health […] we agreed to go away and think about topics and pitch them to each other as one sentence pitch of whatever topic we came up with and then we would discuss them and agreed upon them in the next class […] we eventually chose to look at domestic violence in sport.*

Thus, we can infer that in situations of high task interdependence, group members are expected to coordinate actions more effectively, have frequent information exchange and develop strategies to complete the task comparing to those who assigned to low interdependent tasks. Although this characteristic can help to develop perception of task cohesion among group members, the findings of the current research study revealed that it would not happen necessarily in all groups due to students' distinct approach to completing their assignment and working with people who are at different level in terms of being conscientious and accountable towards their common goal.

4-1-1-3. Conflicting Aspirations and Capability

When students form their groups with people who are not sure about their abilities, skills, knowledge and performance, they try to perceive their group members similar to themselves to be able

to feel comfortable and socially connected to them. They view other members as teammates who recognise the importance of the assignment and the urgency in planning as themselves, which drives a sense that they are '*in it together*'. Thus, they usually do not explicitly discuss one another's personal aspirations with regard to achieving the group's common gaol.

In this regard, participants commented that during the first stages of completing their task '*everyone was excited about what they were doing*' and '*it seemed that everyone wanted to do well and get a high mark*'. They even characterised the first weeks of group work as '*honeymoon*' (Participant 38; 10th focus group) because they believed that everyone would do a good job. These participants reported that their group members were actively participating during the first weeks. They were involved in brainstorming; giving creative ideas and working on other members' opinions, which made them feel that everyone in the group was cooperative and motivated to accomplish the group's objective. During mid-point stage of the group work or towards the end, they noticed that group members did not put sustained effort into the task. The input they provided was not substantial or its quality was poor and they stopped showing up to group meetings and lectures. Sometimes, they managed to improve the quality of other group members' work and sometimes their work fell short of the group's general expectations, which led to growing dissatisfaction with group's capability to complete the task successfully and the inevitable consequence was more workload for the rest of group members:

Participant 7; 2nd Focus Group: [...] he left that section blank while it was an important section he said 'no that is Ok I've done it before in another assignment I get at least 50 marks in total anyway so it is fine' I said 'oh Ok' so I guess when he backed off and let me write his part for him that was more relieving because at least the standard was similar across the work [...]his work was getting done by me which in a way was relaxing for me because he actually presented initial drafts and they were really bad and it drove me nuts so I suppose that writing it properly was easier than trying to explain what he did wrong because he did not understand the feedback anyway [...] he was like a visitor showed up every now and then.

Participant 23; 6th Focus Group: We were like 'come on we need to get it done' and they were like 'oh we have done the rest of it, the conclusion is not that important' and we 'YES, IT IS'.[...] it does not seem like that they wanted high marks they were quite happy to see how it went whereas I would rather get as much good mark as I can.

Participant 25, 7th Focus Group: [...]we kind of just split out what topics in that book to specific people and then we just left to do our own things which was bad [...] I did my research and started to put together the PowerPoint and was messaging other members asking to put their information on our document but I did not get replies from anyone and it made me feel very stressed and I feel obligated to do more work to look up things that they were supposed to be doing because I was not getting any information from them [...] so I did a lot more to get a good mark because I had no hope that anyone was coming to present with me [...] I could not do anything about getting reply from people, it was just put your head down and do it yourself.

Participant 26; 7th Focus Group: The input that you get from your teammates sometimes cannot be that substantial and you end up doing I mean your part that you do finally blows up into the whole thing your 1/3 sometimes becomes 2/3 and even 3/3 so it happened but at least we got a good mark this is what actually was cheering in the end.

In worst-case scenarios, they realised that the input provided by the group members was copy paste from other resources and even not relevant to the topic, then they had to re-write the whole part to prevent plagiarism and its dire consequences:

Participant 16; 4th Focus Group: [...] the girl who came into our group was not really that determined to get high marks so she would not drop to class, we did meet sometimes in the library but not really often and she would not drop to that. She rarely emailed us but she was saying she was keeping it under control and she was doing it, she was reassuring us that she was on task [...] she did not hand anything in till the midnight the day before it was due and what she handed in was copy paste from different sites not really even relevant to the topic so my friend stayed till 5 am writing her part and finishing it all, I printed it off in the morning and we all went to the class except for her.

Participant 37; 10th Focus Group: One of the guys he did not show up to group meetings and so when he did show up to group meetings it was kind of just me trying to catch him up on kind of like what is going on and then he would leave the group meetings early and he would not come to the class afterwards he was not in classes so he would miss a lot of the content and suggestions from our lecturer [...] so we were all kind of just done with him specially towards the end, we got his part about a week before the report was due and in the middle of his part we found out that he plagiarised so we had to redo all his sections.

Based on participants' comments, 's*ome members wanted to get the assignment done and receive a pass grade'* which creates a difficult and tense environment to work in for high achieving students

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because they perceive that their group members are not as dedicated and committed to the group goals as they are. They are always concerned of their mark being affected by those who have lower mark aspiration and ending up being responsible for a majority of the work:

> *Participant 35; 10th Focus Group: [...] he and she both would have been very happy with just getting a pass grade. I could tell by the way that they were talking. He mentioned to me that he had had a distinction in one of his units and he felt very that was his pinnacle whereas I am definitely HD student so there was a different approach in there [...] If I had my time again, I would be more cognisant of observing in the class who takes notes and finding out about the ones that are going to work because I would work with people whom I know have got an investment in getting high marks as opposed to those who just want to get through.*

> *Participant 13; 3rd Focus Group: Every time they came [to the meetings] with another reason that why they did not do the work…they were excited about actually passing the unit, they were kind of like oh yeah go with this group to get a good grade [and] yeah it impacts the collaborative work because there is no way to be collaborative without the rest of the members of the group participating which heavily impedes all the work because I had to do four times the workload rather than just one.*

This is in contrast with situations in which groups include mixed-capability students based on the comments. Research participants pointed out that '*some members were really interested in the task and intended to do their best*', they seemed dedicated and committed as they always showed up to the group meetings, attended the classes and shared ideas but needed extra help to complete their parts and reach the group's standard. The strong members of the group were indeed satisfied with their efforts and were willing to help them and collaborate with them to accomplish the task together:

> *Participant 39; 10th Focus Group: She really wanted to do well and she really wanted to understand and she did put a lot of effort into the assignment as well to understand which is why I did not mind helping her with the assignment like whatever she did not understand I did not mind staying at university or waiting for her to finish the work because I knew she also wanted to get a good mark and I wanted HD so she knew that I wanted a good mark as well and in the end we got high distinction.*

> *Participant 16; 4th Focus Group: An international student from Vietnam joined our group and she had problems speaking and writing in English so I was going to help with some of her work [...]she was really interested in getting high marks as well so she was getting everything done early and tried to pressure us as well which was quite good [...] her English was kind of broken*

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but she did really tried to be friendly and she was really committed to make this so she was really nice to get along with and it felt comfortable being in that team.

Nonetheless, one of the participants also described her experience of conducting a group assignment with students whom she characterised as low-capability ones. She reported that her group members showed enthusiasm and put effort into doing a good job but they did not have the required skills and knowledge to accomplish the group task which caused her to complete the whole assignment herself to get a high mark:

> *Participant 20; 5th Focus Group: I like to achieve a high level and they would just get passes and I think there is a big difficulty when teachers assign people into random groups without looking into their individual abilities because you would stuck in a group with people who do not like to achieve as highly as you like to achieve and it can be extremely painful[…] they liked to communicate a lot so they sent me you know 10 to 15 emails within one day period saying 'it this what we should be doing' or 'I found this, I found this, I found this' and constantly asking questions about really simple things that they should have known because it was all in the unit guide or you know really simple stuff in relation to the course so they were constantly asking questions and they constantly did not understand the answers that I was giving to them so they were making a big effort to try and do it but their ability just was not there.*

This participant expanded on her viewpoint by providing a convincing explanation for exhibiting this behaviour within a group context in educational settings. She questioned the value of group work in academic environments due to its emphasis on the outcome not the process which enforces high-achieving students to take charge of the group to get the desired high mark. It also indicates that high-capability students do not always tend to develop teacher-student relationship with low-capability ones reported by some research studies (e.g., Cen et al., 2016):

> *Participant 20; 5th Focus Group: I think with group assignment the biggest problem for me is that the group work aspect is not actually graded so you are graded on your outcome not on the group work itself and so there is no reason for us to work well as a group because the only thing we are graded on is our outcome we are not graded you know how well we communicate. Therefore the only thing that you are looking at is getting a good grade, is your outcome so the other things kind of become irrelevant if you focused on getting a good grade because of the fact that the grade is what you are submitting if that makes sense so because of that I find group work assignment to be quite difficult I find that especially if you are assigned to groups with people who have different skill levels that can be incredibly difficult to manage.*

Thus, when students' aspiration and capability are quite incompatible for the team's performance, they cannot develop a shared sense of commitment towards their task and have meaningful interactions. The students with high mark aspirations make a conscious effort to achieve their main goal, while those who aim for a pass do not put effort into working effectively with fellow group members to accomplish the task which leads to dissatisfaction and frustration among high achievers.

4-1-2. Influencing Factors of Social/Interpersonal Cohesion in Student Groups

To respond to the second supporting research question 'What role does social/interpersonal cohesion play in students' collaborative information behaviour?', the researcher needed to explore the participants' conception and understanding of interpersonal cohesion and the contributing factors behind their perceptions. The researcher then could discover whether there is any association between satisfactory relationships and friendships with other members of the group and students' collaborative information behaviour practices.

4-1-2-1. Familiarity with Group Members

Familiarity has been defined as "the degree of interpersonal knowledge that individuals have regarding one another. Individuals might come into groups as strangers having no knowledge of one another, or they might have some knowledge of each other based on previous experience" (Rockett & Okhuysen, 2002, p. 176). Considering the method of group formation, students might have a chance to be able to work with their friends, with those who had prior work experience or with complete strangers. The findings of this study showed that during the first weeks when students had formed their groups and been introduced to the group members, the level of familiarity with their teammates can be categorised into *'High Familiarity'*, *'Low Familiarity'* and *'No Familiarity'* which have distinct impact on the emergence of social cohesion based on participants' comments.

High Familiarity: The groups with high level of familiarity were the ones whose members had already been together for some time and previously performed joined activities; therefore, they knew that they could work together. These participants reported that they were familiar with each other's strengths and weaknesses, more importantly work ethics and they decided to join together to form a group without

any delay. These participants also pointed out that they got along with their group members very well, they felt very comfortable and they were all respectful of each other:

Participant 36; 10ᵗʰ Focus Group: We worked together early in the semester so kind of knew each other as a group so we knew that we could work together [...]we were all aware and open about our situations so we knew each other's availability and commitments outside of the university and what we could bring to university.

These groups start working together on the task with higher level of interpersonal cohesion owing to shared positive work experiences, thus their perceptions of the level of liking the group can be established fairly quickly and will remain stable throughout the course of the group task. These participants who chose their group members based on prior shared experience, determined their degree of familiarity with group members considering both cognitive and affective elements, which can predict and explain people's behaviour.

Low Familiarity: The groups with low level of familiarity can be divided into three types based on the data:

1) *Proximal Familiarity*: Group members who did not know each other personally, but they had seen one another in different classes and had a chat for a couple of times:

Participant 25; 7ᵗʰ Focus Group: We chose our groups which was nice and the girls I was in a group with, I was not necessarily friends with but I was friendly so we were general classmates we chatted a couple of times and I had not seen them outside of university at all.

Participant 12; 3ʳᵈ Focus Group: We sort of knew each other because of the first class we took in semester one. We sort of saw each other in class but we were never really engaged until this unit that we worked together.

2) *Performance Familiarity*: Group members who did not know each other on a personal level and did not work together before but formed a group based on one another's performance in class:

Participant 20; 5ᵗʰ Focus Group: I chose to only have a group of two people instead of three based on picking up one student from the class who I felt to be a more high achieving student I felt like she had a higher level of English competency than the other people in the class.

3) *Cultural Familiarity*: Group members who were from a same country and they thought that it would be easier for them to work together owing to common and shared cultural background:

Participant 38; 10th Focus Group: *The person I chose I was not familiar with but we just came to sit next to each other in class so we chose to work together [...] the fact that we were from the same country that was just a good basis just to start the conversation and then the more we were interacting the more friendly we got [...] already there was friendliness there so it was an easy decision to work with him.*

Common feature among these participants is that they were quite unaware of the members' performance in groups in spite of stating that they rather knew them. Due to this level of familiarity, they pointed out that they did get along with the group members but did not feel overly friendly and it was nice to start working in that group. These participants formed a group with whom they feel more comfortable to work with based on an affective component of familiarity not its behavioural implications. Therefore, they might feel the social bond during the planning stage but their fellow members' practices and contributions to the task had an impact on their sense of social integration and attraction to the group as they went through the assignment.

For instance, one of the participants stated that he had the opportunity to form his group, and then he chose his group members based on three factors: his interactions with them in few classes, same nationality and having distinct expertise which was beneficial for completing the group project. He mentioned that '*we thought Ok we now know each other and then probably we can start talking about the assignment*' (Participant 8; 2nd focus group). According to his explanations, he started the group work with the feeling of closeness and friendliness, specifically the same cultural background helped him to feel more comfortable and communicate easily with his group members. However, after reading the first draft of their work, his perception of developing successful collaboration with them was changed as the quality of their contributions was not based on what they had discussed, agreed on and expected from each other.

Another example is student groups including friends without prior shared working experience. Reviewing the past literature showed mixed results as findings of some studies demonstrated no fundamental difference between the performance of groups that are consisted of friends and those

composed of members who are acquainted with one another (e.g., Hanham & McCormick, 2018), whilst other studies indicated friendship as an obstacle to collaboration (e.g., Le et al., 2018). Results of this research study is in line with the latter mentioned research showing that students who were friends, formed their group quickly and were excited at the beginning of their group work but later on they got frustrated due to their friends' non-cooperative behaviours:

Participant 22; 6th Focus Group: We chose our groups because we were friends, we were four friends and one other guy, with one of my friends I feel very comfortable with her and we can work together because we had other assignments together and we did really a good work because we did check on each other every day by emails and text messages, we met at university whenever we got a chance [...] but for others like just had a negative feeling they said to us that they do not have any accounting background so they cannot do that and they stick to that [...]some of them were just acting like they were doing too much of a work but at the last moment I found out that they had not done anything [...] we could not say anything to them because they were our friends [...] friendship was there but as a group member we were not happy with them because it was like too much of work for the two of us [...]actually it is not necessary to be friends because with the other guy I had a good connection, whenever I asked him to do something then he was ready to do that and even with meetings if it was late evening he was ready to come and we were just sitting for a long time discussing the assignment. It is better to work with someone you know you can work well; with friends we cannot say anything to them.

Participant 19; 5th Focus Group: We were friends because of common interest we had in Sports [...] we both got together forming a group knowing that we were friends and hoping that we were also working together well in a cohesive way but the professional aspect of the work that he produced was not up to standard [...] so I really struggled with the fact that I knew him on a personal basis and the fact that the work he had come up with was not perfect. So I took his work and did my best to expand on it more and edit it before sending it to him to review before final submission [...] we played in the same social sport and it was just difficult to say like you need to get your things together, let's get this sorted knowing that we are still friends and will see each other outside the work.

Other participants validated this viewpoint in regard to difficulty with working with friends and put emphasis on forming a group with strangers:

Participant 26; 7th Focus Group: It is easier to work with strangers; I would say not really friends or those you have known from before because it gets you work more quickly because if you were in a group and see oh I know this one then I am thinking about did he do well last time, does he

mess up this time. I am thinking of all those past experiences but if you have all new team members in fact you will jump into it straight to get the work done.

Participant 20; 5ᵗʰ Focus Group: I think if you are friends it is harder because if you are friends if I messaging one of my friends I am going to say ok you know how you are going with the assignment and what did you do last weekend and you know how thing going with this and this and this and so the communication about the assignment can get lost I think with friends it can also be very difficult because if you are already friends then it is more difficult to tell them this is not ok you need to do this you need to make this deadline [...] you just assume that you can work together you have different expectations and it is very difficult to tell someone that you are friends with we have different expectations whereas if someone is just a colleague that I am working with then I can say to them straight up front these are my expectations this is how it should go forward whereas it would be a little bit more emotionally complex doing that with your friend.

No Familiarity: The last category of student groups in this particular sample in terms of familiarity includes the groups composed of members who had no past association. They did not know one another before and had no experience of working together, thus they were not aware of how well they would work together. The research participants who had the experience of working in these types of groups pointed out that their relationship during the first weeks was professional and they did not have the sense of friendliness towards each other. Unlike the above-mentioned groups, the emergence of interpersonal cohesion in these types of student groups was slow due to unfamiliarity and would be less urgent based on the participants' comments. They were of the view that the group would be dissolved after completing the assignment; therefore, developing a friendly relationship with one another was not their priority:

Participant 12; 3ʳᵈ Focus Group: It was just let's get this done let`s do our best work, so you do not really have time for catch up or to be friends. The only reason I have your phone number is because we are on WhatsApp and we are not going for drinks, dinner or lunch later we are not friends we got together for the task [...] let's get a good grade let's do good work and see you, bye so there is no emotional connection.

These participants were of the mindset that '*the group work is all about commitment*' (Participant 26; 7ᵗʰ Focus Group) and their main purpose of working with their group members was accomplishing the task and they did not intend to develop close and friendly relationship with one another. Some of them

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provided a reasonable explanation that due to adopting 'divide and conquer' strategy, they did not need to be friends with to be able to work together and some of them were of the opinion that developing close relationship might lead to being taken advantage of by other group members constantly asking them to do extra work:

> *Participant 21; 6th Focus Group: I actually do not think it matters if you are friendly or not purely for the way I work in as much as I divide or we divide up the task into chunks and we go away and we do it and then we would email or meet up in the next lecture and say this is what I have done so I do not need to be friends with you to be able to work in that way maybe people work much better if they are friends and make it all get together and chat about it but to me that is not productive because I can sit and chat with you for two hours about of particular subject whereas I could sit at home for two hours and write that 2000 words in those two hours so I do not need to have that interaction so it is good for me if I have a partner who is willing to work like that as well but I do not think we need to be friends to perform well*

> *Participant 13; 3rd Focus Group: You know we were told at the start of the unit that for this assignment you are not here to make friends you are here to get the work done which to some extent true because you do not want the emotional barrier get in the way of an important project…if you have emotional attachment they [group members] are going to say 'can you do these extra things of the project' and it is kind of keeps going.*

> *Participant 20; 5th Focus Group: We were not friends at the start, and I did not expect to be friends with her at the end. I just wanted to work with her in order to get the best possible outcome for the assignment.*

Nevertheless, some of the participants mentioned that they did not have the sense of closeness and friendliness at the beginning but during the latter stages they started to get to know one another more and the emerging bond started to form among them but the group members' contributions to the group task exerted a direct influence on this feeling:

> *Participant 11; 3rd Focus Group: Within the first couple of weeks, the was not very much there [but] yeah there was friendship forming at this stage, people were coming out of their shelves a bit more and we got to know each other a lot more, a bit more about each person on a personal level; I felt that was great and that made me more excited about the groupwork. But, I still felt that I was the person who was constantly checking up on them, 'where we are at, how are you feeling, who has read this resource, let's get the discussion going'. I think they would not start themselves and it was still pushing from myself.*

Participant 28; 8ᵗʰ Focus Group: You could see that there was definitely one person who was not pulling their weight and that makes you a little bit frustrated with people and makes your relationship also go down the hill [...] I probably got along with him best out of everyone however because his work ethic was not good it made me frustrated with him and in terms of relationship you do not want to see that person again [...] I found as you go through the assignment if the assignment is going well you do respect each other and you become more friendly with each other however if it goes the other way and they have not done their things you start to getting frustrated.

Therefore, those participants who were satisfied with their group members' performance and the effort they put into conducting the group project reported that friendship developed on this basis, over the course of completing their task and continued after finishing the assignment. They also emphasised that the group atmosphere was motivating and encouraging which helped them work more efficiently:

Participant 27; 7ᵗʰ Focus Group: More of a friendship was there and that encouraged both of us to put more work in because we always from the start wanted to do a good job and later on maybe felt more closer and we wanted to make sure that we both got good grades [...] I feel like me and her would be friends after the assignment and would speak to each other in class from never spoken to one another before.

Participant 25; 7ᵗʰ Focus Group: We were not friends like we had never spoken to each other before, we started this group assignment and the more we talked about it, the more we got ideas, the more we collaborated with each other we realised that these people were actually really interested and had really good ideas and I liked working in a team with them so it kind of made us more motivated to get things done because we were excited to be doing it together.

This participant expanded on her experience and added that friendly environment within the group would help members participate more actively in group activities specifically when students do not have adequate background knowledge about the project topic:

Participant 25; 7ᵗʰ Focus Group: I also think that like knowledge on the topic is a big factor because if people are not confident with what they know about that topic they are not going to speak up because they feel like it would be embarrassing because I know that I am a quite extroverted person and I constantly have ideas and bam bam bam you know here is what I am thinking what do you guys think about that but I know that there are people who are not so confident with their ideas and they do not want to say that loud because they just think that it might be embarrassing and other people might not like it so I think mutual respect and

understanding within your group members are also very important so I think that having the idea of like a friendship within your group is important to have successful group work because you need to feel happy in that environment otherwise you do not want to participate.

Some of the participants also could not confirm that they had a sense of closeness and friendship with group members even by the completion stage. They maintained that group members got to know each other a little bit more due to having regular meetings and constant communication but they did not think they would be really bonding. They reported that it was rather feeling more comfortable working in the group, feeling a bit more relaxed and it was easier to talk with one another:

Participant 29; 8th Focus Group: As time went on everyone became more comfortable and I also became more comfortable around that group so making jokes and it was just nice atmosphere to work in rather than the start that I had nothing to do with these people. I was not necessarily friends with these people by the middle though, it was just easier to talk to them and I felt more comfortable getting feedback.

Participant 14; 4th Focus Group: We were constantly seeing each other, constant conversation, informal conversation so it became a bit more easier to talk to them because I got to know them a little bit more so I got a bit more relaxed so I have got a bit more comfortable with the group and they have got a bit more comfortable with me as well because for me it is not like oh let's see what we make for dinner it is more like how was your day how was your assignments going on how is your unit going how is your jobs and these stuff going as well and then just collaborate and talk about how the assignment is going.

Based on participants comments, feeling comfortable with group members could help them share their honest opinion about one another's work and participate actively in group processes in terms of sharing ideas and making suggestions:

Participant 37; 10th Focus Group: I think being close to each other, like being comfortable around each other helps actually makes your paper better just because you are able to give each other feedback and you do not think that it is really negative it helps the whole group and I think that made it a lot easier kind of what we can say to each other to work better as a group.

Participant 30; 8th Focus Group: We were able to share our honest opinion if someone is going down the wrong track or you know or to provide constructive criticism and yeah it is helpful if you feel comfortable when we build a report together

According to participants' comments, sense of friendship is limited to working at university not outside the university interests. A majority of the participants who previously worked with their group members and built some form of friendship relationship asserted that although they felt a social bond and closeness with their teammates but what led to that sense was their shared goal which was accomplishing their group task. They reported that they would definitely work with them for future group assignments but due to personal differences, strong friendship between them would not be formed:

> *Participant 12; 3rd Focus Group: There was no friendship. When we are done, we are out. Sometimes, it depends on personalities, maybe if I had worked with someone else we would have been friends and yeah say let's go out let's talk about other stuff but with these members we are so different and we have different backgrounds and different interests. Just get to work and then go with our lives.*

> *Participant 28; 8th Focus Group: We both were getting our work done efficiently. If there was a problem there was always a solution […] we got to know each other a little more, a little bit of banter, had a few laughs and that was when I think a friendship started to form […] You start to have that friendship as you do get along personally but if you also worked together effectively in a team that is why we are here at university we are not here for making friends if you can do both in one that is awesome […]I would probably catch up with him if I have time, I would not say that he would be someone that I will catch up with but it is not that I dislike him we are probably into different things outside the university.*

> *Participant 23; 6th Focus Group: We did not know each other but we all just wanted to get it done we were really good at email reply email reply as well as meeting up I think if we all have got the same mindset of dedication and have got the same end goal that all matters whether one of them is your friend or whether they live the other side of the world […] I think if you are dedicated and other persons are also dedicated it does not matter whether you know them or whether they are your friends*

> *Participant 4; 1st Focus Group: everyone's goal was achieving a good result I did not know any of them no one knew each other there was like oh this is going to be hard because no one knew each other but it did not matter because everyone was dedicated everyone was on the same page everyone was happy to share or to accept someone else's ideas and it was a great experience […] every experience is going to be different and then at the end of the day it comes to who your group members are.*

4-1-2-2. Age Diversity in Groups

Analysing focus group data revealed that those research participants who formed a group with mature students characterised them as dedicated and conscientious ones who started working on the group task without wasting time and off-topic discussions during group meetings:

Participant 15; 4th Focus Group: My group was made up of mature students who I found them very dedicated in comparison to school leavers, we met directly after our lectures and one of them decided to book us a room in the library for all the successive weeks until the presentation was due for two hours so from that I got the indication that they were particularly quite conscientious and they really wanted to do well.

Participant 23; 6th Focus Group: I was paired with two girls one was a mature student and the other one was I think she was around my age maybe a bit older maybe early 30's, full time working mom it was really good down to the point, this is what we have got go away and do it […] they seemed committed they wanted to get it done they wanted to get a good mark really good

In regard to sense of friendship and forming close relationship, they were of the idea that generation gap among group members would not allow them to develop friendly relationship; instead they developed a fixed order of doing things:

Participant 15; 4th Focus Group: Probably in the first week when we met, we talked very briefly about ourselves but I did not particularly feel like want to be friend with them because it was quite a generation gap between myself and the other group members I would say maybe 20 years[…] they were looking to be friendly but they were looking to do a good job, dedicated absolutely. They were working and they had children and they were married so they had limited amount of time that they could meet. When we did meet they wanted to get it done and start working immediately so they did not really have time for like niceness and be like 'oh how are you, how was your day' it was like 'ok I will do this part, you do this part, you do this part' so I had the feeling they wanted to do well […]I do not think we would be really bonding it was just getting used to having and establishing the routine […] we were not really friendly we were just like let's get it done this is what we have to do and this is what we are going to do next week.

On the other hand, those mature research participants who formed a group with younger students also had the same viewpoint that they could not develop strong social relationships with their group

members maintaining that younger group members had common interests and in terms of interpersonal relationships, they formed subgroups within the group:

Participant 29; 8th Focus Group: The other four members got along really well and I could see there was a bond among them and formed even stronger as the weeks went along but I just kind of stayed outside did my work [...] they had more in common they were fresh out of school and I was 22.

However, their opinions in regard to younger students' performance differed. While some of them were happy and satisfied with their young members' contributions to the group project, the vast majority of mature students reported that young students specifically school leavers were not dedicated to do a good job as they usually aim for a pass:

Participant 17; 4th Focus Group: [...] with the other team members there was an age gap like they were straight out of school and just kind of wanted to you know mess around a bit and they were not really as dedicated I guess as we were they probably have got a lot more time to complete it so they did not really I guess understand the whole point of meeting up every week and you know be on the same page all the time.

Participant 28; 8th Focus Group: Two of us aimed to do well at university and prioritise it and I felt there were two that just wanted to pass just kind of out of high school [...] you become frustrated as you are putting a lot of effort and they are not putting as much effort so that will decrease your overall mark which may jeopardize your grade.

4-1-3. Influencing Factors of Perceived Cohesion in Student Groups

To respond to the third supporting research question 'What roles does perceived cohesion paly in students' collaborative information behaviour?', the researcher needed to delve into how students in this particular sample conceive perceived cohesion over the course of completing their group task in terms of sense of belonging to their group and their feelings of morale related to group membership. It then would enable the researcher to explore whether there is any relationship between this facet of group cohesion in student groups and their collaborative information behaviour practices.

It is presumed that sense of belonging "reflects an individual's appraisal of their relationship to a particular group. This can take place both cognitively based on information individuals have gathered with regard to experiences within the group and with group members and affectively based on feelings about the aforementioned experiences" (Dion, 2000, p. 17).. Fiske (2004) also noted that belonging refers to social identity which formed based on individuals' experience of being a member of group in terms of the value and their emotional attachment. In educational settings, students are expected to engage in a collaborative relationship operating within a limited timeframe to complete a group task. Under such circumstances, group members need to develop and maintain a 'sense of membership' and experience of being a 'member' in a student group including individuals with different capacities to work together in this context (Hassanien, 2006). While this might be a true statement in theory, it does not always take place in reality in student groups as they usually do not have a tendency or a desire to be identified with the group that they are assigned to due to its short-term context and membership changes. Hughes (2010) also argued that student groups in university context are not usually considered as groups with a strong need for social and shared group identity and it does not necessarily facilitate collaborative learning.

In this regard, findings of the current study indicated that almost all the research participants were of the mindset that they did not have a sense of belonging to their group and they did not intend to develop such feelings while working on group tasks in university context:

Participant 28; 8ᵗʰ Focus Group: I guess I do not really look for a sense of belonging in a group at university. Here it is more like get this done and do it well let's just do it and do well.

Participant 12; 3ʳᵈ Focus Group: It [group work] was more machinery. We got together for the task and once it was done, we would just wait for the grade and then there would be no follow up session.

Participant 29; 8ᵗʰ Focus Group: I did not necessarily feel the sense of belonging as I said before I was just there to [complete the task] because outside of the university I was not going to speak to these people so I did not necessarily feel the sense of belonging, the other members may have but I did not really speak to them much so not too sure.

Some of the research participants argued that they could not develop such a feeling towards their group specifically during the initial stage when they formed a group due to not knowing the group members and being unfamiliar with them:

Participant 2, 1ˢᵗ Focus Group: Well, I had no … to tell the truth I did not have strong feelings of belonging to this group. We were just a group made by the teacher I did not know how the teacher chose us and then I was assigned to the tasks. It was not feeling of belonging to the group, it was just feeling of work and we did that.

Participant 3; 1ˢᵗ Focus Group: I did not feel the sense of belonging in fact I didn't we did not know each other we are in the same class for two years already and still do not know each other.

Some of the research participants also mentioned that they would not develop such a feeling due to forming a group with classmates whom they had prior negative experience with:

Participant 7; 2ⁿᵈ Focus Group: At the initial stage we all had sort of sense of belonging to the group because we all wanted the same thing but we got an additional guy who was not supposed to be there and my friend and the other team member did not want to work with him because they worked with him before and his work was not that great […] the new guy was the unknown factor and we were kind of bonding against him, which sounded terrible. So sense of belongingness was kind of dropped with the new guy because he was not really motivated and the other two members did not really like him.

On the contrary, a small number of participants claimed that they had such a feeling towards their group due to gaining support from their teammates. This finding is also supported by Mossholder, Settoon, and Henagan (2005) research findings who stated that creating a supportive climate would increase members' attachment towards the group and may foster team cohesion through a sense of belonging:

Participant 6; 2ⁿᵈ Focus Group: One of our teammates he was directly involved in the actual project (Robotic Competition) so it was easy for us to get the information because he had all the information about the project and if we needed anything about our specific part we could ask him and he was giving the information but the thing was that we were working on a project which was not finished yet and the last day of competition and our presentation was on the same date [...] so I got a little bit stressed because the team member who was the source of information was not among us. My team members realised that I was stressed and I could not finish my part they actually immensely encouraged me and helped me with my part so that stress was kind of more of a positive catalyst in our teamwork and feeling of belonging to the group was increased because I received a lot of encouragement and support from my teammates.

Nonetheless, some of the participants were of the view that everyone in the group should be able to do their sub-tasks; they should have had the background knowledge and the required skills to complete their work without looking for assistance from other group members. Thus, they did not intend to form any sort of attachment to either the group or the group project as well. This particular viewpoint does not represent collaboration as the participant has a highly individualistic approach towards group work:

Participant 13; 3ʳᵈ Focus Group: It is a multi-million project, it is designing an App for a bank so you guys are project managers you need to be able to do your job [...] it is such a lot of work so as soon as one person falls behind you are supposed to either help them get that done or cut them out of the entire link so it is kind of if someone falls behind it is not your responsibility to look after this person they are students they are in the same position as you.

Some of the participants were also of the view that they had such a feeling towards their group when they began working on their group task because they perceived that everyone was united to achieve their shard goal and accomplish the group task successfully. However, group members' performance and contributions to the task had an impact on increasing or decreasing this feeling:

Participant 15; 4ᵗʰ Focus Group: In week one everyone has a very positive outlook "yeah we'll be going to get HD" and then the wheel has started to come off as it goes along. People's true colours started to show.

Participant 8; 2ⁿᵈ Focus Group: Sense of belonging got decreased and I would have withdrawn myself from that game because I did not see that much seriousness and sincerity form team members.

The other aspect of perceived cohesion named 'morale' primarily reflects members' affective reactions derived from being members of the group (Dion, 2000). In this regard, research participants were asked to describe their feelings in terms of being content with and happy that they were part of the group they were assigned to. Analysing students' comments in this particular sample indicated that group members' performance would produce positive and negative emotional reactions. The participants who were satisfied with their group members' contributions to the work and the group work outcome reported their feeling of happiness from being part of that group marinating that they would work with the same people again on future group work projects. On the other hand, those who did not feel pleased with the process and outcome of their group work expressed their dissatisfaction with being part of that group wishing that they had the chance to join another group:

Participant 14; 4th Focus Group: Most likely happy with the group because it seemed that everyone wanted to do well in this assignment which is not usual. When other people talk about group assignments, you usually hear 'oh, not again' which was not like that in this group.

Participant 24; 7th Focus Group: I was really happy with the experience that I had with that guy because we were enthusiastic about what we were doing and we wanted to do well. [With the other experience] I was still happy because the other two wanted to do well and we all just made up for that girl who did not do so good. We just put more information into her work and reedit some of it to get the best result we could.

Participant 23; 6th Focus Group: I got annoyed because we had done it, we just needed that one separate bit and then we could go off and focus on our other assignments. I was not getting any response it was annoying because it was like talking to the break wall.

Thus, findings of this research suggest that while students do not usually look for developing a sense of belonging and attachment to their group in university context, they would feel happy that they are part or member of a group if they are satisfied with the process and the outcome.

4-2. Collaborative Information Behaviour in Student Groups

To respond to the main research question of this study 'How does group cohesion shape students' collaborative information behaviour over the duration of group tasks?', research participants were asked to describe their experience of individual information practices as well as collaborative activities they performed during different stages of their group task. That included how they defined the focus of their group project, how they searched and retrieved relevant information to their topic and how they used the found information to fulfil their group task. In the following, a detailed description of students' information behaviour in collaborative settings emerged from the data analysis is provided.

4-2-1. Formulating the Information Need Collaboratively

During the initial stage, participants reported that they interacted with their group members to conceptualise the task and its requirements to be able to structure it. Reaching a unified conceptualisation of the problem is an important and a necessary step at this stage at it provides the foundation for the subsequent activities including decomposing the task into subtopics and perceiving the relevance of different kinds of information or solutions. This process largely depends on the nature of the task and its complexity as well as group members' common background experiences as each member generates their own conception of the task which can be similar or different from others. Division of labour was also reported as an important activity at this stage by research participants, which supports prior research studies suggesting that student groups usually employ a 'divide-and-conquer' strategy to fulfil their group tasks (e.g., Chang & Brickman, 2018; Leeder & Shah, 2016c; Rafferty, 2011; Tao & Tombros, 2017; Xu, 2018). Nonetheless, the nature of the task has a profound impact on implementing this strategy as some group projects had inherent structure leading to breaking up the task easily and group members did not need to have effective interactions with one another for further coordination. In contrast, complex tasks would necessitate groups to work collaboratively throughout the process in order to reach a consensus on their project focus, maintain the shared understanding and coordinate their individual efforts.

Accordingly, analysing the comments of participants in this particular sample demonstrated that those who were assigned a group project consisting of pre-selected subtopics divided the sub-tasks

among themselves without doing any background research. In these cases, division of labour was performed spontaneously usually without discussing the members' expertise, knowledge or skills. Some of the research participants pointed out that they were randomly assigned to sub-tasks by writing their names alphabetically next to the subtopics:

Participant 34; 9th Focus Group: [...] so our teacher like gave us a handout with all different tasks and was like writing our names next to it and that person would do that task so we decided that and the way we approached that was literally just like writing the names down in order so it was just you got what were given [...] the reason was because it was not a very difficult task and also the assignment was about culture that none of us really knew anything about it so we did not find anybody had like significant weaknesses or strengths to be like yes you should definitely do this part or you should not [...] it was very like kind of spoon-fed, I felt you know it was very clear what to do.

On the other hand, those participants who were given a general subject reported that the planning stage was challenging and emphasised the important role that brainstorming ideas could play at this phase to help them gain a shared understanding of the task. So they did some initial research and exchanged ideas due to insufficient background knowledge which enabled them to collaboratively make sense of the topic and build the structure of the task:

Participant 26; 7th Focus Group: When we start the assignment, we do not know what we have to do. Everyone is like oh what should I do, where should I start. We all have this kind of problem when tackling the group assignment. The thing that I like is that we all here and everyone comes with a little bit of an idea and then put that together and we get started this is a good thing about the group work it helps me a lot it gets me started it gets me to head to the right direction where this assignment is heading and then along the way my thoughts are becoming clearer I know where I am heading where to focus and what to deliver.

Findings showed that some groups searched for information together and considered one another's suggestions concurrently over the initial meetings to come up with their research topic, while some groups conducted search activities individually, and then share their findings over the group meetings:

Participant 33; 9th Focus Group: During the group meetings for the first part of the assignment we had to select what industry we were going to target. We were just trying to pick what industry and what size firm within that industry and I felt everyone kind of contributed towards picking

the industry. We were kind of you know were researching some stuff at group meetings, I do not think anyone really did much research at home at that point in the process of selecting the industry. It was more like as a group sitting behind our laptops searching out some stuff and talking about it.

Participant 29; 8th Focus Group: The assignment was on Nano technology, it was kind of a broad theme [...] we decided to each go off and research the separate aspect of Nano technology and find things that might particularly interest us because it is a science which is utilised in many fields, in agriculture in medicine in computer science [...] we ended up researching agriculture as a group. We just decided to do that as a whole.

Findings of this research also revealed when students worked together to make sense of the assignment and its requirements, they were able to jointly address the group's strengths and weaknesses which enabled them to assign group members roles or sub-tasks based on their assumed knowledge and experience:

Participant 30; 8th Focus Group: We would all be researching you know initially what the topic we were interested in doing and then we had decided on our topic. Then the other students found a very good reference which mentioned sort of five key areas that Gough Whitlam had been influential in so from that we broke it down. One was international affairs and international students decided to do that and Aboriginal Indigenous studies area there was an Aboriginal lady who decided to do that and the arts there was a WAAPA student so she did that one and I did education and I found that interesting.

According to prior research, students usually experience difficulty in scoping and focusing the topic depending on the complexity of a group task (Hyldegård, 2006; Lee, 2013; Ndumbaro, 2016; Shah & Leeder, 2016; Tao & Tombros, 2017; Wu et al., 2018). In this regard, analysing the participants' comments indicated that students in this particular sample applied specific criteria when they were given a broad subject to narrow it down and come up with their own project topic. *Feasibility of the project* and *access to information* were two main deciding factors for the majority of research participant when they explained how they arrived at collective decision on their assignment topic. Some of the participants mentioned that they received help from their instructor in confirming the feasibility of conducting the chosen project and some had to remarkably change the focus after initial information

seeking when they found out that they would not have access to sufficient and credible information to complete their project:

Participant 19; 5th Focus Group: My group assignment was about a research problem in Sports Science [...] during the first weeks we mainly looked into the literature, finding out research problems in Sport Science, physiological aspect so we looked up general articles, came up with different ideas, what we had interest in and its feasibility to conduct an experiment in the lab [...] we quickly talked about what we had looked up and if there is anything that we could agree on, any topic that we could agree on [...] the tutor also helped us whether the topic is easy to do the experiment and whether it could be done within the timeframe that we had.

Participant 6; 2nd Focus Group: We had to choose a project and we came up with all different projects so we discussed each project and then we came up with a final one which we believed that it would be easy for us to find information about it and it could be easy to proceed with the project and the assignment. [The first] project it was kind of construction and train station by Department of Transport and it was difficult to get information about that project. We also sent emails to the department but we did not get any reply so we had another meeting to change the project so we moved to another project which was non-governmental and it was easy to work on.

Furthermore, some of the participants put particular emphasis on *group's collective interest* as a factor to choose their topic as different perspectives could easily bring them into conflict over deciding on a topic:

Participant 27; 7th Focus Group: We were very similar, we were close in age, we thought very similarly about things, we were both interested in the same things; we had a lot of common interests. The topic was actually to choose like a business and do a ten minute presentation about the company and their sustainability efforts and we both were interested in the same thing so we were able to choose the company we both agreed on [...] so for us it was relatively easy to narrow that down.

Participant 21; 6th Focus Group: The girl and I decided what topic we are going to do for consumer behaviour [unit] we selected gambling she felt that it would be a lot easier to do. Personally I wanted to do something more challenging. I personally would rather get less mark and do something challenging than a high mark and do something easy but she wanted to do something easy because she works and she did not want to spend a lot of time on it.

With regard to formulating the information need during the initial phase of completing a group project, clarifying and agreeing on the focus and scope of the project can be challenging and

complicated depending on the nature and structure of the assigned task. Moreover, the perceived degree of understanding the focus differs between group members due to potential disparity in their work task knowledge, experiences and approaches. This further highlights the necessity of being collectively active in terms of sharing ideas and thoughts in regard to interpretation of task requirements to ensure developing and maintaining a clear and shared understanding of the project focus.

4-2-2. Students' Information Seeking Behaviour in Collaborative Settings

In order to conduct the group project, students would use different information sources to gain more knowledge to complete their assigned sub-tasks. Considering the complexity of the group task, they might consult and seek information from fellow students, instructors or subject experts to enhance the quality of their work which has been mentioned in similar studies (e.g., Ndumbaro, 2016; Toze, 2014). Consistent with previous research results, the findings of this study also showed that students in this particular sample frequently sought information by consulting and talking to people within and outside their groups:

> *Participant 6; 2nd Focus Group: One of our teammates was directly involved in the actual project [Robotic competition in Sydney], so it was very easy for us to get the required information because he had all the information about the project and if we need anything for our specific part, we could ask him.*

> *Participant 8; 2nd Focus Group: I also consulted some experts in accounting domain […] and the learning consultant to get some feedback […] I spoke with them and they gave me more ideas to implement in the project so I went back and discussed it with them [group members].*

Another significant source of information for completing a group assignment is the information students would learn by attending lectures which was mentioned by the majority of research participants. They emphasised the importance of attending lectures and tutorials to gain new knowledge and information related to the subject of their task:

> *Participant 39; 10th Focus Group: We used the textbook from the class and the information we learned in class. We had to use that information as part of the assignment because it was related to concepts, definitions and meanings of certain topics discussed in class.*

However, some of the participants argued that they needed to make sense of the given information in lectures along with other members to identify how those pieces of information would help them to improve the quality of the assignment. They were of the view that each group member would have unique insight about the information given in classes, thus they needed to achieve a shared understanding of it to be able to use the information effectively. They characterised this behaviour as a valuable group contribution to the project:

Participant 9; 3rd Focus Group: We met once a week after each lecture. We met in order to go through the information that we learned that day, how it could apply to the project and then helping the person who was supposed to use that information. We assisted to make them understand.

Participant 23; 6th Focus Group: We were trying to meet before the lecture then go to the lecture together specially when the lecture was related to a certain part of that assignment so we could all see how we interpreted the information then come and meet for an hour after the lecture.

Searching for information and retrieving relevant and credible information is one of the main activities to fulfil and complete different parts of the project, which can be done as a group or individually. Data revealed that during the initial stage when students had to brainstorm ideas to come up with creative thoughts, they engaged in targeted collaborative searches during the group meetings. They searched the internet or the library databases together and discussed the results collaboratively to reach a joint decision, which was part of formulating a collective information need as discussed in the previous section.

Based on research participants' explanations, during the mid-point stage when subtopics had been clearly identified and divided between group members, they concentrated on their sub-task and searched for information separately. In this regard, the data further showed that they might help one another in retrieving information by advising on how to find academic sources specifically in groups including undergraduate first year students who did not have experience of conducting group assignments in university:

Participant 29; 8th Focus Group: There was also a bit of feedback because the people I have worked had not been in university before so they were very confused about referencing and how to find academic sources. It was just advice on how to reference and how to find information

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because they were essentially using Wikipedia which is not appropriate for academic assignment in university. So I actually helped them when they messaged me personally outside of the group asking 'how do I reference, can you help me find information' and things like that.

Among all the participants who attended focus group sessions, only one participant explicitly mentioned that her group searched for information collaboratively during the time given by the lecturer in class to work on their group assignments. She mentioned that she and her partner had access to computers in class, so they searched relevant papers together at the same time, chose the pertinent pieces of information from the papers and incorporated them into their assignment simultaneously. The reasonable explanation for this specific case might be working as a pair which would make this process easier and more efficient than groups including four or five people.

Participant 39; 10th Focus Group: When we were in class, we search together as well but not a lot. We sat next to each other in class and the lecturer gave us about 10 to 15 minutes to talk about our assignment that was when we searched together. We had computers in front of us in class and we would use that computers and would have a look at each other's articles. Sometimes, we were just looking at one computer at the same time. Then one of us would have the Word document and then we would task that information, typed it in out assignment, paraphrased it and referenced it and things like that

4-2-2-1. Searching for Information Individually

According to the data, some of the participants asserted that when they were together to search and find relevant information for their assignment collaboratively, they became easily distracted by discussing other topics, although their group was small including less than five people:

Participant 8; 2nd Focus Group: [...] we started looking for information and they were concentrating on that but eventually there were some distractions like there was upcoming cricket match and they started talking about it and their interest went out of the project [...] that distraction eventually annoyed me and then I decided to come back home.

In this regard, in an experimental study comparing users' collaborative search performance with different conditions, Shah and González-Ibáñez (2011) found out when participants used different computers either co-located or remotely, retrieved information resources which were more unique and useful in comparison to those who used a single computer. Nonetheless, those who worked remotely and used only chat messages to communicate with one another were able to generate and formulate a wide range of search queries because they were not easily distracted by their fellow group members.

Furthermore, findings of the present study showed that participants were of the view that collaborative searching with other group members would be time-consuming and considering the submission deadlines for assignment, the easiest strategy for collaboration would be searching individually and then discussing the retrieved information in group meetings:

Participant 38; 10th Focus Group: You know like sitting and searching it is not really ... much of it does not need group participation to just search for an article like we can do that on our own and coming back and compare, that was the idea [...] looking at the time it will take a lot for both of us to go through so many articles together. It makes more sense to search individually come up with an article that we found interesting and relevant to our topic.

This finding is in line with previous research studies reporting that in collaborative settings, people usually search for information independently but they need to collaborate with one another for interpretation and making sense of the retrieved information to create a shared understanding (Hertzum, 2008; Spence, Reddy, & Hall, 2005). Findings of similar research conducted in academic settings also indicated that collaborative search is not a common activity in student groups and they usually decide to search information individually but they would share the results and critically evaluate the

accumulated information together (Hardy, 2011; Tao & Tombros, 2017; Toze, 2014). However, this process does not always take place in groups. The findings of the current study demonstrated three different scenarios:

4.2.2.1.1 Scenario one: going solo

Some of the participants reported that they individually searched for and retrieved information related to their sub-task and did not have any contact or communication with other group members during this process. They explicitly stated that their group work strategy was to go away, research individually and send it to the leader for compiling and final editing. Their main concern was completing the section that they were assigned to, not the whole assignment. In terms of searching, finding and retrieving relevant information, they asserted that they used online databases accessible via the university library website. They continued that they did not have any difficulty searching and retrieving information from the databases and they were unaware of how other group members went through this process due to lack of efficient communication during this stage. They maintained that they just provided references at the end of the assignment and they did not share any information on how they found the resources. They did not discuss what resources they found, and they did not actually question the credibility and relevancy of information resources found by other group members because their main aim was '*getting the assignment done*'. Thus, they did not review and evaluate each other's parts to provide constructive feedback to enhance the quality of the whole project. They usually were of the mindset that the only responsibility they had was accomplishing their sub-task and the rest would be the leader's responsibility. This can be one of the main reasons that students usually avoid taking a leadership position when they involve in conducting a group project:

> *Participant 2; 1st focus group: I am not sure whether the others experience any difficulties with searching database looking for the review materials. I did not experience because that was Clinical Science, everything seemed to be clear and due to the structure as well. It just took a few days to finish my task […] I did not communicate with anybody on how to search the databases […] actually everybody was just doing their own things and the leader checked everything and made sure that everything is fine.*

The above quote also demonstrates that the participant believed in her capabilities to search and retrieve relevant information owing to having prior experience (familiarity with databases) and background knowledge of the topic, however evaluating the retrieved information is an important process at this stage. Students might be able to find information without seeking help from others but information evaluation within group context needs collective cognitive effort (Harrison, 2009; Rieh et al., 2013). As previously discussed, individuals do not always collaborate explicitly in seeking information but they are required to compare their search results to validate the value of information with others which would increase group awareness and could lead to developing a common understanding of the whole project among group members. However, not all students hold this belief which is considered as a major obstacle to effective and successful collaborative work as it can be seen in the following quote:

> *Participant 28; 8th Focus Group: We shared our references. We both checked our references when we were together, we would say 'it is a great article for my part, it might be helpful for yours also'. However, I was not really focusing on his part, I was focusing on mine and he was focusing on his. For the group assignment you did not really have to understand the whole you just needed to understand your part you are presenting about, just your topic you did not really need to know the background of their [other group members'] information.*

As mentioned earlier, in these types of groups members concentrated on performing their assigned sub-tasks and did not pay considerable attention to other parts of the project. According to the explanations provided by participants who had this type of group work experience, the group leaders were responsible for combining the different sections, finalising the shared representation and circulating the document within the group to make sure that everyone was happy with it before submission. However, the members only focused on reviewing their own parts stating that they '*did not obviously know too much about what others had put into the document*' (Participant 34; 9th Focus Group) and '*the others' tasks whether the content was good or not, have no idea, did not spend time checking others' content, no time to look at it*' (Participant 2; 1st Focus Group). These participants specifically mentioned that they did not feel like they needed to provide feedback on each other's work as they assumed that it would be the leaders' responsibility. The following quote provides more elaboration:

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Participant 34; 9th Focus Group: We all just researched our component of the presentation and then we had meet-up before the presentation. So we met up in the library about a week before the presentation and one of the team members she did not turn up and she did not actually do her parts so the leader actually had to do her part before the presentation [...] it was kind of last minute, it was kind of a shock for her and she had to do all that at the last minute [...] the team leader did want to get a good mark and everyone else seemed to be more cruisy specially me and the other exchange student because it did not matter what marks we got we just needed a pass because that did not affect us.

4.2.2.1.2 *Scenario two: the collaborators*

The second scenario belongs to participants who asserted that they also divided the task between group members and searched for information separately to complete their sub-tasks but they had frequent communication with their group members by organising regular meetings and using online communication technologies during this stage. They found relevant information to their sub-tasks and complete the initial draft of their works; they then would discuss and go through each other's parts during the meetings or would upload them to the Blackboard discussion board to be accessible by all the group members. The majority of participants also used shared platforms such as Google Docs, which enabled them to have access to one another's parts and to monitor the project's progress and maintain awareness. It was also easier for them to pass brief comments and edit the text as well. Although they searched and retrieved information individually, they shared the resources they had found and used for completing their parts, then other group members could check the resources in terms of their relevance and credibility and they could also use those for their sub-sections. In addition, they went over each member's part and tried to give feedback and suggestions to correct and improve one another's work which led to producing a better result at the completion stage. These participants believed that asking for feedback during the final stage before submission would be a fairly pointless exercise as group members usually do not bother themselves to review the whole document and they might just take a look at their own parts; while they would circulate the final document between team members to make sure that everything is included. Research participants also reported it was not always possible to provide constructive feedback to each other due to the nature of the project such as creative group task which is included music and art portions. However, they had regular communication with one another

and the members who were responsible for creative part of the project would send the rest of the groups the photos or the sound recordings that they were working on to maintain awareness of the progress of group project within the team:

Participant 4; 1st Focus Group: We had meetings once a week from the beginning till the end we were making sure that we took care of each other making sure that everyone's section was good, neat and the information was there so you know at the end of the day one person would edit the presentation or the report sent it to others and everyone knew what sort of information is going to be in it and what to expect. Honestly we had ten edits read it again and again and again to make sure that everything is perfect and spot on then we would just submit the assignment at the end.

Participant 5; 2nd Focus Group: In the meetings, we would say you are going to do this; you are going to do that. Then, we went away, did the research for our specific parts, we wrote the first draft and uploaded it to the discussion board […] We gave each other feedback in face to face meetings as well as discussion board. If it was not good we would say 'it needs improvement, you need to go and find more information'. If it was good we would tell them what was good about it and gave them more constructive feedback.

Participant 20; 5th Focus Group: With the Google Docs, we would go through our parts on a weekly basis suggesting changes. We had other document which we kept our sources so I could look at our bibliography which was kept in a separate document checking the sources and say hey this is a new source I have not seen before maybe I should check that and use that for my work as well.

Participant 37; 10th Focus Group: We would go over whatever everybody else had brought so if they brought part of a paper, if they found more research because for the report we needed like 40 sources. So we were just talking about what everybody had what everybody still needed to do in kind of like look over each other's parts just to make sure that we were heading in proper direction.

4.2.2.1.3 Scenario three: groupthink

The third scenario is associated with participants who claimed that they made a great effort to do the majority of the work together during the meetings. They maintained that their group members also had different roles, they did research individually and they would add the found information to the shared document they created for their project. However, they would discuss and judge the value and relevancy of the added information together during the meetings. They did not believe in providing

short and brief comments about each other's parts online, as it would not guarantee that the responsible members modify their works based on those suggestions. They were of the idea that it would be more effective to have detailed discussion about different comments and thoughts over the face-to-face meetings, reach an agreement and improve the parts together concurrently. The common attribute among these participants was their emphasis on developing a shared understanding of the whole project and trying to get everyone on the same page during the different stages of completing their task. Owing to active and effective collaboration, group members acquired detailed knowledge about different parts of the assignment even if they had divided the task into separate subtopics amongst themselves. Thus, in the event of unpleasant situations, the rest of group members were reasonably confident of being able to complete the task successfully.

> *Participant 37; 10ᵗʰ Focus Group: That assignment was structured to work as a full group at every point of time because the company could ask anybody a question about why does this happen so we had to know the ins and outs of the entire project [...] on our presentation day, one of the guys came down with cold but we were actually had extra information on his parts that he was supposed to present just by working together every day.*

> *Participant 2; 7ᵗʰ Focus Group: We just had a Facebook Group chat but we met quite often so we did not actually have a lot of information on it… we met at least once a week to go over everything and made sure that everyone knew what was happening, what we were doing, what part we were at, which part each person would be playing in the little role play that we were doing like going through what equipment we needed…no one felt left out doing it, if we wanted to add things it was very inclusive in this group like you just say 'I want to put this here what do you guys think about it' and everyone like 'yes, it is a really good idea'.*

Unlike others, these groups worked collaboratively during the completion stage as well and did not assign someone to put all the sections together and prepare the final document. Instead, they assigned each other specific roles at this stage depending on their skills such as formatting, editing, and proofreading and submitted the assignment together:

> *Participant 1; 1ˢᵗ Focus Group: We figured out each other` strengths and weaknesses and so we could play it out at this stage specially when we had to write a report for example I have quite strong English skills so you know they might write the section but I go through and I proofread for them I do paraphrasing making sure everything makes sense and run smoothly. One of the guys who was very good at graphic design and making PowerPoint look nice and look good*

presentation [...] So we were sitting in the group and I did proofread while one guy made the presentation while the other guy found some fine research so we were still constantly talking to each other we were still offering each other suggestions 'you could change this this this' whatever it might be so it was still very collaborative

4-2-3. Students' Information Sharing Behaviour in Collaborative Settings

Information sharing is recognised as one of the important elements of collaboration that students engage over the course of completing their group project. Students involve in information sharing activities in all phases of their collaborative work including understanding the information problem and more important information searching when they find relevant information to the task. However, the findings of this research suggest that student groups do not always pay serious attention to the beneficial effect of this activity on their better group performance.

During the planning stage, considering the complexity of the group task, students need to realise and fully understand the different aspects of the task. They should work collectively to be able to develop a clear and better understanding of the problem that the group should solve and arrive at a collective decision, they then can move forward and formulate a plan for undertaking their group task. In this regard, some of the research participants claimed that over the first stage of the assignment when they had to carry out some background search to brainstorm ideas, share different thoughts and decide on the topic, just few members came with intellectual input; while, others sat back and listened to the share of ideas. Thus, they had to think of ideas individually without receiving any information from their teammate, initiate the structure and assign them sub-tasks:

> *Participant 4; 1ˢᵗ Focus Group: They [group members] told me to choose the company myself but I did not really want to do that because this is a group assignment, a group effort [...] I wanted everyone work together, choose the company, share the ideas and thoughts and come with solutions.*

In these types of groups, sharing information would not be reciprocated throughout the assignment. According to the participants' comments, after dividing the task they were the only ones who were actively involved in sharing relevant information. They maintained that when they usually found important pieces of information relevant to other group members' parts while searching for information to complete their own tasks, they would share the links or the retrieved documents via the

online communication technologies, which they agreed. They noticed that group members opened the message and it had been seen, but nobody acknowledged it or made an even brief comment about it to discuss it further:

Participant 2; 1st Focus Group: I was the only one who for example shared a link to help other students with their tasks. When I read an article relevant to our presentation, I opened it, I read it and then I shared it via the Facebook group we had [...] I did not see they found any related information to my task.

In contrast to previous discussion and consistent with prior research results (e.g., Zajac, 2017), findings of this study also showed that group members who are confident in their ability of conducting the task individually would rather not to collaborate with the rest of the group effectively:

Participant 20; 5th Focus Group: I finished my part completely by halfway through week seven and it was due on the last day of week eight so I finished everything and I was ready it was all there in the assignment for her and she had done probably %80 of hers but it was still messy and we needed to clean it up in order to make it ready to present [...] halfway through week eight I became a little bit stressed because I did not see any new results on it I did not see any responses to my email and I thought ok there is a communication breakdown... so I sent her an email with my phone number and I said you know if you need to contact me contact me tell me what is going on and she sent back a quite rude email to me to say I will get it done and it will be done by the day so then I was sitting there stressing there was nothing else that I could really do and at 5:00 pm exactly or I think it would may have been 4:59 pm when the assignment was due she submitted the assignment without having sent me a copy to see first [...] well her writing ability is better than mine and I can %100 understand why she did not want to give me the assignment before she handed in.

Data analysis further revealed that the majority of student groups that were engaged in mutual information sharing activities did not perceive the importance of 'information elaboration' in this process. *Information elaboration* is defined as "individual-level processing of the information and perspectives, the process of feeding back the results of this individual-level processing into the group, and discussion and integration of its implications" (Van Knippenberg, De Dreu, & Homan, 2004, p. 1011). Information elaboration can help students to develop a shared understanding of the exchanged information, ideas and thoughts. Participants pointed out that all group members were usually involved in sharing useful information for one another's parts. They shared information online via the Facebook

messenger or discussion board on Blackboard along with a short comment. However, they could not make sure that those pieces of information would be applied to enhance the quality of the project:

Participant 16; 4th Focus Group: We did try to keep in contact and help each other with our parts. We were just mostly posting links to websites commenting 'this is relevant for your section and I did use that for my section as well'. I was trying to summarise the links and put dot points you know because people won't read these links, they were only read things that they usually find.

Participant 19; 5th Focus Group: Maybe just making sure that everyone had seen the resource that had been shared but I cannot say for certain if they had clicked on the link to look at the resource.

They also indicated that they found the information and assessed it individually, then shared it with the group but due to lack of group discussion on shared information; they could not make sure of incorporating those pieces of information into the work. Some of the participants also reported that the discussion about the exchanged information was limited to the person who shared the information and the one who needed that piece of information for their parts and the other group members did not contribute to the discussion as they were more focused on their own research

Contrary to those experiences, others were totally satisfied with their group members' performance in regard to sharing information, ideas and elaborating the exchanged information. They specifically mentioned that their group members' active participation in checking the shared materials and commenting on how they could actually use the information for one another's part was particularly helpful as they did not need to search for more information and they acquired most of the required information for completing their parts through group's information sharing practices:

Participant 4; 1st Focus Group: Anytime someone found a link to something very useful for any of us whether it was for themselves or us they would post it and it was not the process being ignored everyone would you know check the link to see what it says and contribute more on that link. So in that sense everyone was doing very well with just sharing their thoughts and ideas and helping other people so it was not just you got your section and do it and submit it before the deadline [...] it was also very easy for me to access the information. I did not honestly spend too much time researching myself; I just got my information from their links.

Participant 9; 3rd Focus Group: We gave each other tasks and the research aspect was individual but what happens is you should find the information that is relevant to the other participants. So that they could look at and they see if they can include it. Generally, you gain understanding of the entire project so we shared if we came across information that was relevant to the other partner. Then also when we meet it was like to see how that information could coordinate and join to what we aimed to do.

In this regard, those research participants who were actively involved in sharing information and elaborating the exchanged information reported that they shared information online but they discussed it further over face-to-face meetings. They continued that having face-to-face meetings helped them with developing a shared understanding of the retrieved information as this process would be difficult and time-consuming through digital collaboration tools:

Participant 28; 8th Focus Group: I found it [social media] useful for sharing references, passing on articles to each other but we went through the actual content in person.

Participant 37; 10th Focus Group: We put our articles available on discussion board and we communicated via Facebook and then anything that we had based on research and stuff like that was discussed face to face.

4-3. Communication in Student Groups

To respond to the fourth supporting research question of this study 'What role does communication technologies play on students' collaborative information behaviour?', research participants were asked to describe the methods they used to communicate with their group members over the course of completion of their group assignment. Data analysis revealed that students used both face-to-face communication and different communication technologies to maintain communication. In the following, detailed description of these two types of communication methods in student groups emerged from data analysis is provided.

4-3-1. Face-to-Face Communication

Researchers are of the view that face-to-face communication promotes participation and contribution to a group task among students as they support, encourage and praise one another's efforts to carry out their collective work Johnson and Johnson (1999). Findings of prior research highlighted the importance of face-to-face communication with regard to sharing information, giving/receiving feedback and elaborating on the exchanged information which enable the teams to develop and deepen a full and shared understanding of it. This practice is in particular followed by industry teams when they are assigned a group project. In industry, information is circulated to team members with the expectation that it will be read and then during face-to-face meetings, it is actioned and the project moves forward. As previously discussed in Chapter 2, the findings of research studies conducted by Bruce et al. (2003), Fidel et al. (2004) and Poltrock et al. (2003) that examined the collaborative information behaviour of engineers who were working at Microsoft and Boeing showed that information sharing and providing feedback were performed over face-to-face meetings and it was defined as the essential and integral part of the teamwork process. According to the findings of the current study as outlined in section 4.2.3, student groups tend to find information and share it in a '*fire-and-forget'* modality where they did not follow up with others if the shared information was useful, did they use it, and if so, where. Face-to-face meetings for student groups tend to be focused around convenience and proximity rather than as a dedicated mechanism for moving the project forward.

In this regard, findings of this research indicated that many of research participants reported that organising planned group meetings was one of the first activities they performed after forming their groups. Some of the participants asserted that they had been also allocated specific time during the lecture to work on their group project which was helpful because they would receive help and support from their lecturer if they needed and all the group members would usually attend the lectures, then they were available for the group meetings:

Participant 37; 10th Focus Group: The lecturer gave us an hour at the end of the class so that was kind of like our face to face meeting to talk with each other about like what we needed to do during the next week [...] we read the case studies that each had brought in and then our lecturer would come around and like talk to us about what case studies we were looking at what companies we were looking at why we were looking at those companies and that kind of stuff

However, it does not always happen in student groups as some of the participants clearly stated that attending the lectures was beneficial for their project, but it was usually ignored by the group members which was discussed in section 4.2.2. More importantly, allocating specific time during the lecture does not always lead to working with each other on the group project. Some of the participants mentioned that they used the allocated time effectively and worked with their group members to make satisfactory progress in their assignment, while others asserted that everyone in the group worked on their delegated tasks without having any group discussion about the assignment during the time scheduled by the lecturer:

Participant 39; 10th Focus Group: The lecturer gave us time, we were given time about 10 or 15 minutes to talk about our assignment and research and that is when we got some articles and we searched that together [...] If we did not do anything the lecture would not have said anything. We could have just stared at our computers and do nothing we could just read articles and just reading and reading and reading and not getting anywhere and that would have been still fine but we decided to work on the assignment instead of just reading and staring at the screens.

Participant 30; 8th Focus Group: Our tutor set aside time during the class, that was specifically allocated to work on our group assignment so we would often go to the library, there would be all of us there but we would all be researching you know initially what the topic we were interested in doing and then during the mid-point stage it was basically just us focusing on our research, yeah mainly focusing on our own area really.

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With regard to frequency of face-to-face communication, some of the participants asserted that they scheduled weekly meetings over the course of the group work:

Participant 15; 4th Focus Group: [...] when we put together, one of the group members decided to book us a room in the library for all the successive weeks until the presentation was due for two hours so we met regularly every single week directly after our lectures.

While some mentioned that their short meetings during the lecture would be sufficient and they did not need to have more face-to-face meetings:

Participant 21; 6th Focus Group: We saw each other in the lecture and we always got a printout of what we have done but generally because there was just two of us doing the work and there was so little that needed to be fixed from our work, we did not need to have long conversation or meet up and neither of us did want to. Whereas with the guy there was more work to do but we still did not need to have face to face, MORE face to face meetings than just being in the lecture and saying ok this is what we have done.

Participant 17; 4th Focus Group: With the first assignment because we were friends, we were in the same classes together so we did not really need to meet up because we did have a whole semester to complete this assignment and it was just sort of like, we just kind of quickly discuss it every week.

And some of the participants stated that they did not give it a serious attention:

Participant 16; 4th Focus Group: [...] we did not really set any plans throughout the semester to meet up much except in class so we all kind of left it to the last minute [...]

In this regard, participants held different opinions about having regular face-to-face meetings. According to the comments, some of the participants pointed out that they came up with creative ideas and arrived at collective decisions while they got together. They also mentioned that face-to-face communication would be more useful and effective in comparison to online communication as they gained a clear understanding of discussions and achieved rapid progress in their project. They could make the required changes and incorporate the feedback received from other group members easily and quickly while they worked together on their group task in person which is consistent with previous research results demonstrating that face-to-face communication provides an opportunity for group

members to quickly communicate content and express meanings both verbally and non-verbally (González-Ibáñez, Haseki, & Shah, 2013):

Participant 29; 8th Focus Group: I find it difficult to share what I really want to say on a messenger because you can read a messages in different ways and in person it is so much faster to just say change that, improve that and if all the group members were there in a group it can be done so much quicker. I am also not too fond of group to constantly want to meet up when it was not necessary because I have that experience in different ones; I think there should be a balance between the online and then also meeting in person.

Participant 8; 2nd Focus Group: I always felt that when we were talking face to face we had better understanding of the things you know with the technology it is good to share concepts and ideas but coming to the conclusion I think face to face could have more impact.

Participant 24; 7th Focus Group: Face to face was the best, I reckon when we met up we could see where everyone was at, how we were doing, how we were feeling. We had hard copies of things, printed out and we could see them and what we were going to do.

Furthermore, some of the participants believed that having regular face-to-face meetings is helpful as they would feel motivated to do the work and it would also exert pressure on them to participate and help out one another to complete the task:

Participant 25; 7th Focus Group: I think it instils a sense of responsibility like you are accountable like if you meet face to face then you have to have had some information otherwise you would be embarrassed because everyone else is here sitting with some work and you just twiddle your thumbs.

Contrary to the above discussion, some of the participants would rather have less group meetings owing to ineffective use of time. They reported that most of the time the group discussions were not related to the topic and some of the group members would just attend the meetings to show face without making useful contributions:

Participant 20; 5th Focus Group: […] face to face meetings to me do not seem very productive because people get distracted very easily and start talking about 'I want to see this movie, I want to do that' and you have to kind of trying and keeping them back on track back on track back on track. […] it allows them to make a lot of excuses about not having their work with them and that can become quite frustrating because you go into face to face meetings looking to achieve

something the only thing we achieved was just acknowledging the problem and we did not actually solve anything.

This could be the most reasonable explanation for sharing expectations and agreeing on the type of information the group should discuss in face-to-face meetings which would likely lead to higher quality group discussions as participant 19 from 5th focus group maintained that '*face to face meetings only work well if everyone comes prepared and have agenda of they want to accomplish in the meeting*'. In this regard, some of the participants maintained that they created a group contract to formalise the expectations of group members and keep one another on track and accountable and one of the participants mentioned that their group contract was legally binding and showing up to meetings was one of its clauses. However, according to his comment '*it did not say the direction which you had to be at the meeting*' (Participant 13; 3rd Focus Group); therefore some of the group members just attended the meetings without making useful contributions.

Another participant also indicated that lengthy group meetings could also be useless if no one took the responsibility of incorporating the shared ideas and discussions into the final document.

<u>Participant 26, 7th Focus Group</u>: Face to face meeting is very nice because everyone is here around the table. There is commitment. Sometimes we sat around the computer, copy paste whatever they have on a single document or just writing down the ideas and what have you done, talk about your part and the downfall about his one but it takes too much time in groups of four five. For a big assignment you have to subdivide it in many parts and then that meeting you schedule it for one hour at most it takes about two hours then you are tired and then by the time you finish you go home who is taking over all those ideas and it is like you were there you worked but then there is no follow up. I mean you cannot put those ideas to paper you cannot put them on paper or what has been said has not been fully captured, it is not reflected that much in the document.

Overall, the above comments clearly indicate that students need detailed and practical guidance of how to run group meetings over the duration of accomplishing a group project. Their performance within group meetings was undisciplined and unproductive as they could not achieve their aims without having agenda beforehand and taking meetings' minutes to make members responsible for the jobs that they need to do before the next meeting. It seems that if this process has not been defined as part of the assessment regime, it does not take place consistently across student groups.

In addition to ineffective use of face-to-face meetings which caused disinterest among students, participants' comments indicated that they did not intend to develop social and personal relationship as their focus was heavily on the task. Therefore, they were of the mindset that they usually can complete the group projects using different online platforms and there is no need to meet group members in person:

Participant 20; 5th Focus Group: I think face to face meetings is good if you want to get to know them [group members] as people and I think it may have been slightly more important when I was doing an oral presentation but if you are not interested in getting to know them as people if you would just focus on the task I do not think that face to face meetings really help that much at all. I think that if you do it in 5 minutes that you have got in the tutorials at the end of the class that would be enough […] technological platforms like Google Docs do work reasonably effective in allowing you to edit documents and then show other people how you edited it so like track changes functions, so you can show them ok this is what we have got, this is what I suggest to change, things that you can accept or not accept.

Some of the participants pointed out that their choice of communication method would largely depend on the nature of the task. They maintained that for some of the assignments they had to sit with their group members and go through every part of it with one another; while for some they could easily pick the sub-task they were interested in, they could go away and complete it individually, then they would come back together to assemble the various parts of the assignment into a collective product. This is similar to the findings reported by González-Ibáñez et al. (2013) and Shah (2010a) that non-dividable tasks are better performed in face-to-face meetings, whereas easily dividable ones benefit more from collaborators working independently.

Participant 21; 6th Focus Group: I did the accounting economics and Finance unit. We were given a company to research and come up with all sorts of different things and spread sheets and balance sheets and I think on that occasion you probably would have had to be with your group members and go through parts of that assignment. But the ones that I have done in marketing assignments you could just choose the bits of the assignment that you want to do, go away, do it and then collate it together. You do not need to meet up.

4-3-2. Digital Collaboration

With the advent of the Internet, digital communication platforms have been one of the most widely adopted modes of communication employed in educational settings. Communication technological tool including both asynchronous and synchronous ones are in particular utilised for group work activities in higher education due to due to their unique features in terms of facilitating and maintaining interactive communication among group members when they are not able to have face-to-face meetings.

The findings of the current research study demonstrated that students use a variety of technological platforms to maintain communication with their group members over the course of completion their task. The results further showed that in some groups there was not a collective agreement on selecting the platforms for online communication and more importantly while some participants firmly believed that the majority of the process of fulfilling a group task can be performed with the help of digital tools, others were of the idea that communication technology is advantageous for sharing resources and ideas but the work should be completed over face-to-face meetings. In the following, different technological platforms that were used by participants are discussed in detail which can be categorised as '*digital touchpoints*' defined as online interactions across several devices and various channels including Facebook, WhatsApp and Email, '*just-in-time integration*' tools which allow students to work together remotely on their document at the same time including Google Docs and '*academic platforms*' which are advised to be used for facilitating online communication for group work process by higher education institutions including discussion board within the learning management systems.

4-3-2-1. Digital Touchpoints

Facebook

A majority of research participants asserted that they created a Facebook group for their project during the initial meeting to get in touch with their group members and have discussion about their assignment when they could not have face-to-face meetings. According to the participants comments, using this technology provided them with an opportunity to update each other and check one another's

progress with the assignment, asking questions and seeking clarification, providing brief comments and feedback as well as sharing relevant information to the project:

> *Participant 17; 4ᵗʰ Focus Group: We had a group chat Facebook messenger and if we found something interesting and we thought might help someone else would send it and just letting each other know where we up to and whether we are ready for the meeting like weekly meetings and double check that everybody was coming*

> *Participant 11; 3ʳᵈ Focus Group: […] messenger for us was a great way just to check in rather than discussing the big element of the assignment to see how people were going because our group spread all across Perth, so it was a good way to if you had an idea or if you forgot to ask a question the other day and communicated that way.*

Some of the group participants also compared Facebook with text messaging and highlighted the aspect of group awareness of this platform:

> *Participant 6, 2ⁿᵈ Focus Group: In the first year of my course we were just using text message we were just communicating with just one each other so there was like non complete communication so for example we were five group members and I was talking to one but the other guys did not know what we were talking about […] so there was not a group communication we learned from our mistakes and this semester we made a messenger group on Facebook so we could all communicate with each other and every teammates knew that what was happening in the project and they could check the progress of the assignment […] all the points we discussed were on the messenger and the person who was absent could see and read them and if had some questions he could come and ask us.*

While, some of the participants believed that using Facebook for the group work was the easiest and the most convenient way to communicate with their group members, some of them were of the mindset that it will have distractions. More importantly, some of the participants reported that they did not have Facebook account and they will not have one in the future and that created a problem for them to have effective communication with their group members:

> *Participant 20; 5ᵗʰ Focus Group: As a general rule I do not add my university colleagues on Facebook. If you do use Facebook to communicate university related things then your own personal political views on your profile might have impact on their ability to work with you and I think it is also quite a distracting way to work because if you open your messenger on the Facebook you may have five other messages that you might also read which might be distract you from what you intended to do.*

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Participant 32; 9th Focus Group: So that [communication] would be the part I found the hardest. The group specifically requested that we communicate via Facebook which I do not have and will not have and so I requested that we find an alternative way of communicating and that never happened so communication was a big issue [...] the person I was closest with, in the group was the messenger between Facebook and myself.

However, some participants reported that because they were not willing to use Facebook for the purpose of group assignment, their group made a decision to use WhatsApp instead. However, they emphasised that social media can be extremely helpful when group members are quite willing to use and make contributions to the task through these platforms:

Participant 26; 7th Focus Group: WhatsApp is very nice, you can see who is online I do not like Facebook because it will have distractions So WhatsApp is there just on your phone and then at any point in time people can catch up and can share some documents and everything so that was why we used it [...] I used to share some ideas on WhatsApp when something happened and I did not have time to put it in a document. I just wrote a few lines and shared with the group 'what do you think of that'. It is a means of communicating and sharing your ideas, inputting your contributions to the group assignment but mostly it was useful for setting up meetings because it depends on the group when I put an idea some people would react, would comment, would suggest, would amend and sometimes if you are in a bad group nothing happens.

Likewise, a number of participants asserted that the major setback for their group communication was group members' negligence. They reported that when they sent a message to the group via Facebook messenger, they realised that their message had been seen but no one bothered replying. This situation would get worse for the groups that their main channel of communication was Facebook. These groups usually discussed the assignment briefly during the first meeting; assigned each other's specific tasks, and then they went off to do research individually and decided to keep in contact via Facebook:

Participant 25; 7th Focus Group: [...] we went off to research and we created our group chat so we could keep in contact with each other and I would message asking them 'can we meet up for research' because we had a shared Google doc so we could all put our research on there and I would constantly ask them 'can you just upload some research, we need to start getting our PowerPoint ready', they would not reply to messages, they opened them looked at them no reply [...] and the thing about that was I could see that these girls were online but they did not reply

to messages, they did not want to be part of the group [...]this gave me reassurance that they were not going to do the work.

Participant 3; 1ˢᵗ Focus Group: [...] our main communication was via Facebook only and our assignment was due in 2 weeks and we had not actually done anything so I kind of assigned myself to a role of the leader by prompting and telling other students actually you know we should start doing something and that was on Facebook. Regarding meetings, it only occurred once and it was after the class which was not very pleasant because we managed to discuss few things and then it was another one just before our presentation.

Participant 23; 6ᵗʰ Focus Group: They were like 'yeah we are working on it' or they ignore you and specially with Facebook messenger you can see that they have seen it and no response so the next day 'hey guys just wondering how you are going on' again seen and no response this time I did text message 'oh it seems your Facebook is not working'.

With regard to reading messages and not replying, some of the participants specifically mentioned that although group members did not provide immediate and appropriate response to the content discussed through their choice of social media platform, it showed that they had seen the messages so they were not able to make excuses as they were informed of the group decisions:

Participant 19; 5ᵗʰ Focus Group: With Facebook when you read a message it shows that you read it so you cannot skip it and saying that you did not read the message on Facebook so we knew that everyone has read this message so they could not avoid the situation and say 'oh I did not know this happened' or 'I did not know that the meeting is at this time' because we can see that everyone had seen the message.

Some of the participants also reported that this feature of Facebook allowed them to recognise how well their group members would perform at the very early stage of the assignment:

Participant 17, 4ᵗʰ Focus Group: Facebook messenger I really like it because you can see when people have seen your message and you can see if they are online and that kind of thing so if they are online and you send something and they have not looked at it, you can pick up the dodgy person

Participant 13 from the 3ʳᵈ focus group discussed the positive aspect of this situation and maintained that lack of response to the ideas shared on the Facebook would make him sure that he can incorporate the idea to the work without being concerned of duplication:

Participant 13; 3rd Focus Group: We used Facebook just to be able to communicate at any point informally which was incredibly useful if something needed to be done you can just message to the chat and if they reply that would be useful even when they did not reply you know that they are not doing it you know that you can do it without the work being double up so it helps you know not having repeated data.

Email

According to the participants' comments, email is another convenient tool for students to communicate with each other. Data analysis showed that generally groups including two people and the ones that consisted of mature students preferred to use email for sharing information and related documents. Participants maintained that they would rather use email to attach documents and sending their individual contributions to each other, and they preferred to discuss and share important information during face-to-face meeting:

Participant 15; 4th Focus Group: Because of the age gap I guess the generation difference two of them were mature and they much preferred the email [...] but with the actual sharing of the information we mostly did that in person because it is quite difficult to try and explain the precedents by email and it was just too difficult to try to read and to understand like the nuance in someone's conversation or the speaking if you are just reading what they are saying so we would usually meet in person

Some of the participants also believed that using email would keep people accountable as they would attach the minutes of their group meeting and send them out to members as well as listing peoples' sub-tasks which should be done for the next meeting; while another participant maintained that she had to send several emails to her group members with the subject '*did you check your email*?':

Participant 7; 2nd Focus Group: So my group used mostly emails which it was not that good. There were two guys who had a tendency to read the emails and not responding so we did not know whether they've read them or not so in that sense not so great but if we were using like Facebook messenger I could tell they've seen it read it and you knew no one slipped out of the loop but for this assignment two of them did not have messenger which made it a little bit harder so it had to be purely email.

Participant 26; 7th Focus Group: For one group assignment we had email, basic email we had at university to circulate the latest copy of everyone's additions to the submission. Sometimes it got lost because everyone kept reply, reply, reply and then you had the long list of emails you did

not know which one to click, which one was the latest one and people did not change the name of the document.

Analysing the participants' comments also demonstrated that while they would like to use Facebook messenger for online chat and asking quick questions, they preferred to use email for sharing resources related to their group project which is consistent with Shah and Leeder (2016) research findings. They found that email is regularly used as a way of contributing to group task by "'*sharing awareness of resources*', '*individual research*', '*waiting on a missing contribution*', and '*integrating contributions and individual idea*'" (p. 617).

> *Participant 18; 4th Focus Group: Facebook messenger, it is instant and you can see when people sent messages and if they are online and things like that but I do not like to use it for like more formal things and like sending documents and things like that so I prefer to use discussion board or email*

4-3-2-2. Just-In-Time Integration Tools

Google Docs

This tool was one of the most popular communication technologies that were used by the research participants as a collaborative writing tool. The research participants indicated that they used Google Docs as a shared platform to prepare their assignment which enabled them to have access to each other's sections and made it easier for them to provide brief and helpful comments and edit the content. However, some of the participants added to their explanations that Google Docs as a shared writing platform is beneficial for the group assignment but using it still could not guarantee that group members write their parts before the due date or consider the suggestions made by other group members, incorporate the comments and make the required changes:

> *Participant 16; 4th Focus Group: Google Docs I thought that was like an upgraded version of emailing because you all see the same assignment, little chat on the side. You can have a live chat with each other, you can see people updating things and you can, like, tag each other for what each person had to do for each section, so it is pretty clear. You know if anyone has done anything and you could also see the history of the document. You can see if there is editing details, you could also edit other people's work and say, you know maybe in chat, where they go wrong. You can highlight things and maybe they could change it or reference it. You can edit references.*

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Participant 24; 7th Focus Group: We allocated the task under each person's name on the Google Docs if I was finding something interesting that was not part of my information but related to another group member's part I would still put that information on the Google Docs under their names [...] so if they had any idea or previous knowledge or found something while they were doing their own research related to someone else's then we did pass that along and everyone kind of still contributed.

Participant 33, 9th Focus Group: We also had Google Docs where we put all the information. You can add comments for someone to do something or fix this and that. The helpful guy [one of the group members] would also kind of do that as well, he would be the main one who addressed a lot of my comments because other people would not get to them and also for instance he commented for the other guy's part do this, do this, do this but he never kind of fixed it so I ended up doing it.

Some of the participants were also of the mindset that with using Google Docs, there would be no need to have face-to-face meetings.

Participant 12, 3rd Focus Group: Google Docs made it easier because we do not really have to see each other because everything is in real time we can see when someone type in. When I discovered these I say ha-ha I do not have to meet you guys I do not have to use a lot of time emailing files and pictures just put my part uploaded it made life much easier.

Nonetheless, the important point that was mentioned by some of the participants is that 'technological tools would be very useful if people use them' (Participant 17; 4th Focus Group):

Participant 19; 5th Focus Group: I do not think Google Docs would have helped because my group member was not really doing his work anyway

4-3-2-3. Academic Platforms

Discussion Board within the Learning Management System

A small number of participants mentioned that they used Discussion Board on Blackboard for generally sharing resources relevant to their task. They also maintained that their lecturer created a space on Discussion Board for them with different folders including resources, individual contributions, and meeting minutes. In this regard, some of the participants asserted that their group activities were monitored by their lecturers which had an impact on group members' frequent use of discussion board and being active; while some stated that they were the only one who used this feature suggested by their teachers and the other group members ignored it.

> *Participant 5; 2ⁿᵈ Focus Group: We also used the discussion board. Our teacher set up the discussion board specifically for the groups and we had to set up different threads so we had research thread, collaboration thread and we discussed through that when we put journal articles and we replied to that whether it was good or not […] we uploaded the meetings' agenda, the minutes. We had content drafts so when we had written the draft for our part we uploaded it there to get feedback from our teammates and then the teacher was able to track everything we were writing as well and he would come and had a chat with us during our group meetings and asked if we were happy and we work.*

> *Participant 3; 4ᵗʰ Focus Group: […] I focused more on the researching and just putting dot points on to the discussion board to try and help everyone understand what we were doing but it seemed like no one wanted to do the research until a few weeks before or the last week it was due.*

The research findings demonstrated that students usually would like to use the easiest and the most convenient method for communication and sharing information with their peers. If they were forced to utilise Blackboard discussion board as part of their group work, they would use that; otherwise they prefer to use email for sharing documents and Facebook for instant messaging to be in contact with one another. Nevertheless, they believed that the substantial benefit of discussion board was the availability of all the resources and information shared by group members in one place:

> *Participant 37; 10ᵗʰ Focus Group: We created a Facebook group and we were all on that and talked to each other through that and our lecturer created discussion board for us on blackboard so we were able to use the discussion board to exchange information it was the easiest way to exchange the articles and information that we had found so we used the discussion board for that*

but everything else was through the messenger [...] after our presentation was over the discussion group kind of faded out because we were messaging and communicating through the Facebook just the easiest way and via email.

Some of the participants also reported that over the initial stage of completion the group assignment they used Discussion Board on Blackboard but over time the group switched its communication to Facebook:

Participant 2; 1ˢᵗ Focus Group: We discussed things firstly on the Blackboard in the very first weeks then it extended to Facebook. Not everybody used Facebook actually I do not use Facebook all the time but sometimes to communicate you have to do that.

These comments demonstrate that although academics make an effort to encourage students to use the official platform for online communication for academic purposes, using social media such as Facebook is increasingly becoming popular in educational setting which might lead to communication breakdown among group members as previously noted. Accordingly, academics need to take serious steps in terms of monitoring students' use of the official platform and mark their activities so as to persuade them.

Overall, the findings showed that students are still struggling with keeping balance between face-to-face meetings and efficient use of digital collaborative tools for accomplishing their group tasks effectively as the below comment indicates:

Participant 20; 5ᵗʰ Focus Group: I think communication is a very very very big issue in group work and communicating about what you expect from them telling that what they can expect from you and being able to maintain that communication throughout the duration of the group work assignment because it is very easy to communicate in week one and then stop communicating or whatever so you have to set up a sustainable way of being able to communicate and to communicate well with your group members.

The findings further showed that the majority of participants were of the belief that they are capable of fulfilling a group task with the use of technological tools and face-to-face meetings are unnecessary:

Participant 21; 6ᵗʰ Focus Group: It was just like go away write the piece of work and email it then the other two people would put their thoughts on that and they would email that back again

and then you might had to go back and rewrite it or get some more information and put it in your piece [...] we did not need to sit with each other and like chat chat chat we just said this is what we are going to do, go away and then send your work to me.

While some participants emphasised the importance of holding regular group meetings and their use of communication technologies was limited to sharing resources:

<u>Participant 33, 9th Focus Group</u>: Face to face was like the core of it [communication] that is where we kind of you know came up with ideas and discussed everything. Online communication was just for making meetings and confirming the times.

<u>Participant 32; 9th Focus Group</u>: We had face to face meetings every Monday and a couple of Fridays and the online communication was for sharing information and these sort of things. It was used for sharing helpful things for other people [...] because we had enough face to face time we did not actually need to communicate online that much other than sharing documents. The majority of actually deciding and sharing information was done face to face.

It demonstrates the impact of the assessment task in terms of complexity and exploratory features which can create a necessity of having face-to-face meetings as well as lack of instruction from academics with regard to teaching students of what and how to communicate. Accordingly, students would involve in conflict with one another over the mode of communication, the choice of digital collaboration tools and the regularity of communication among group members which in turn would lead to sense of dissatisfaction with group work in educational settings.

5. DISCUSSION

This chapter outlines the synthesis and integrative analysis of the emerged categories which was presented in Chapter 4 with the aim of exploring the relationships among emerged concepts (axial coding) to address the thesis supporting research questions. Chapter 6 will summarise the discussion in the context of the primary research question and the core category will be identified that integrated other themes (selective coding). An integrative model of collaborative information behaviour and group cohesion is presented in Chapter 6 as this thesis's contribution to the field of collaborative information behaviour.

5-1. Supporting Research Question 1: What Role Does Group Task Cohesion Play in Students' Collaborative Information Behaviour?

The first supporting research question of this study aimed at understanding the influence that task cohesion can have on the way students gather, exchange and use information collaboratively to complete their group assignment. According to the analysis of data collected from focus group participants discussed in Chapter 4, three contributing factors in emerging task cohesion were identified in student groups: *leadership*, *nature of the assessment task* and *conflicting aspirations*. In this section, the impact of each of these factors on students' individual and collaborative information practices during the three phases of task completion will be discussed which highlights the role of task cohesion in this process.

5-1-1. Leadership: in the context of Collaborative Information Activities

Leadership is seen as a crucial element in evolving task cohesion in groups (Burke et al., 2006; Grossman, Rosch, Mazer, & Salas, 2015; Morgeson, DeRue, & Karam, 2010) and given the evidence in prior research, shared leadership exerts an indirect influence on positive group performance by enhancing team cohesion (Bergman et al., 2012; Mathieu et al., 2015; Serban & Roberts, 2016). The results of some research studies on student group work identified a 'lack of formal leadership' as a challenge for collaborative work (e.g., Hassanien, 2006; McGraw & Tidwell, 2001), whereas findings of several studies demonstrate that a leadership role in learning groups should be assumed by all

members and everyone should have the same sense of accountability and responsibility towards completing the task (Croy & Eva, 2018; Hernández Pérez, 2015). Han, Lee, Beyerlein, and Kolb's (2018) research results, in particular, demonstrated that shared leadership in student groups can lead to knowledge sharing, goal commitment and being effectively involved in coordinating activities which enhance members' collaborative performance. Hardy's (2011) research findings also indicated that students are looking for working with members who are actively involved in sharing ideas, making suggestions, respecting others' contributions and making an effort to share their ideas, not ordering others around and assuming self-imposed power over others. Similarly, Xu's (2018) research participants were of the view that hierarchal relationship in student groups, in particular 'unauthorised leadership' would lead to unhealthy relationship in groups and each group member should be able to voice their opinion freely. Thus, it is crucial to groups to actively engage and participate in group activities, share the responsibility among each other and be conscientious about the group task they are assigned.

Findings of the present research supports the position that groups that took a shared leadership approach were more involved in collaborative information practices comparing to the ones that used a leader-follower approach to lead and direct their group activities. Figure 5-1 shows a summary of students' collaborative information practices at different stages of completion a group task under the influence of these two distinct leadership styles:

Group Task Stages

	Planning Stage	Mid-Point Stage	Completion Stage
Shared Leadership	Group brainstorming ↓ Shared understanding of the focus	Seeking information individually ↕ Cooperative cognitive process	Collaborative information synthesis ↓ Group Consensus ↓ Submission
	→	→	
	Synchronous communication ←——————→		
Leader-Follower	Initiating structure (Leader) ↓ Dividing the subtasks spontaneously	Seeking information individually ↓ Working independently	Integrating separate parts (Leader) ↓ Submission
	→	→	
	Asynchronous communication ←——————→		

Leadership Style in Student Groups (vertical axis label on left)

Figure 5-1. Leadership Style and Students' Collaborative Information Behaviour

Planning Stage

During the planning stage, students should collaborate to make sense of the task and determine how they would accomplish what they needed to do. Gaining a shared understanding of the task and the goals that they should achieve is of great significance at this stage as it helps members to head in the right direction. Accordingly, group brainstorming in the shared leadership model was the first collaborative activity that groups including students who were all keen and motivated towards their group work took part. At this stage, they worked together to clarify the requirements of the assignment, discuss the options and create a plan. They also discussed each other's particular expertise, various skills and prior experience to assign roles or allocate sub-tasks effectively. At this phase of the group work, the group set objectives and clearly identified what they needed to do, how they should do it and what the outcome would look like. Towards this end, group members decided to carry out an exploratory research to attain background knowledge about the concept of the task. They then shared their findings and understanding within group meetings to formulate the information need collaboratively. After making sense of the group task and its requirements as well as defining and

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determining the scope of the project, they shared the workload based on a collective decision considering the group members' experience, knowledge and set of skills.

In a leader-follower approach to group work, two different patterns emerged from the data: Some groups included dominant students who established themselves as the leader without formal discussion; while some were formed of passive students who preferred to be led by others instead of being actively involved in group activities, so one of the members had to initiate most discussions of important group tasks. As indicate in Figure 5-1, during the planning phase, the leaders including the ones who were forced into a leadership position and the ones who took charge of the group without mutual agreement developed ideas individually, formulated a plan for the group task and assigned other members to specific roles. These results are in accord with recent studies indicating the importance of reaching a mutual understanding of the task at this stage of completing the group assignment which usually cannot be achieved in groups adopting leader-follower approach. For instance, Mabley et al.'s (2018) research findings showed that in some student groups, structuring the assignment is done by only one or two students who tried to instigate the conversation and prompting the group but they received no uptake from team and they were unresponsive to their prompts continuing their off-topic conversation. These behaviours made them to be more direct, establish a decision for the problem definition and assign roles, while other group members neither affiliate nor disagree with their decisions and remained neutral instead which showed an indication of lack of collaboration in making sense of the topic.

Mid-Point Stage

During the mid-point stage, second phase of the group project, group members each had specific tasks to do, thus they searched for relevant information individually to complete their assigned tasks. A great disparity between these two types of student groups with different styles of leadership at this stage was strong and active communication in regard to sharing information, information elaboration to develop a shared understanding of the exchanged information, reviewing individual contributions, making comments and providing constructive feedback to enhance the quality of each other's parts. Students who took a shared leadership approach to coordinate their group activities behaved responsibly towards the assignment as a whole, as they were of the idea that at the end of the group work, they

should all have the same understanding of the project. This viewpoint is also corroborated by Rafferty's (2011) research findings that each group member should have the ability to address every part of the group assignment, so students need to be critical of the manner which they synthesis the projects as well as critique the work of other team members. Furthermore, monitoring the progress towards their common goal is another activity at this phase that all the group members were frequently engaged in to make sure what had been done and what had been left to complete the task. Thus, they would update their knowledge of what other members had done to build a shared task awareness which had been done usually through informal interaction, spontaneous connections or even formal group meetings. The student groups that assigned one of the members as a leader (being forced into this position or being taken dominantly) did not always develop effective communication at this stage, thus they did not become aware of each other's progress with their sub-tasks which was a cause of constant worry for the group leaders as they were not sure whether the assignment would be completed before the due date. The group leaders were the ones who chased up other members to hand in their parts and they were also the only ones who made an effort to provide feedback and make constructive comments about other members' works. In these types of groups, the only thing that mattered most was '*equal share of work*' which was frequently mentioned by the participants who experienced the leader-follower style of leadership in their groups unlike the groups with a shared leadership approach that emphasised on '*working together*' rather than '*working equally*'.

Completion Stage

During the last phase of the group project, group members who frequently had communication with each other and worked collaboratively were able to complete their sub-tasks before the deadline they set. Being able to manage time efficiently was one of the defining characteristics of these types of groups. As they worked efficiently with each other during the mid-point stage in terms of evaluating one another's sections for relevance and consistency, they did not express particular concerns about completing their assignment and submitting it before the due date.

They still maintained their active communication at this stage to collaboratively integrate different parts to prepare a coherent report or presentation. Some of these groups preferred to assign specific roles to members at this stage considering their specific skills and expertise for tasks such as

editing, proofreading, formatting and checking citations. Then, they would share the final draft to gain everyone's opinion on that and to make sure that everyone was happy with the final outcome. Group members might provide some brief comments at this stage which would not lead to major changes and they were fully involved in working together over the previous stages. In contrast, groups that the leaders were the most conscientious members comparing to the other ones were responsible for receiving the group members' works to integrate and put them together and prepare the report or PowerPoint slides on their own. At this stage, they had to pursue those group members who had not yet handed in their part. They were responsible for collating, formatting, checking references and submitting the assignment. A complex issue raised here was when groups had to do a presentation. The leaders complained that group members did not show up to rehearsal meetings, thus they were not able to practice their presentation and if they turned up, they did not pay attention and listen attentively to the tips discussed to make a better presentation which led to losing mark. It seems clear from the data that students in these types of groups rely on one person (leader) to do the majority of the work, thus they prefer not to have too much communication with each other. Therefore, they are not informed of each other's progress, they do not evaluate and review one another's parts before the last stage to make comments and improve the content. In the end, they themselves can easily identify that their work does not seem cohesive, coherent and there is no flow between different sections. It is one thing to allocate different components to team members, such as written content, but presentations require integration, clarity, rehearsal and knowledge of everyone's contribution in order to add value to the project or project outcome.

Given the data collected in this research, those participants who experienced a shared leadership approach in their group were totally satisfied with the process of conducting their group assignment and the final outcome comparing to the ones who joined the groups with leader-follower approach. The findings of some research (e.g., Hyldegård, 2006) conducted in collaborative information behaviour area were also in line with the results of this study showing that dominating behaviour or possessing the 'mother' role would lead to a sense of frustration and dissatisfaction among group members. Nonetheless, the results of other research (e.g., Wu et al., 2018) confirmed that it is necessary to have a member to take a leader role in academic group task to sort out ideas, perform task division and control

the overall situation. In this regard, findings of Hardy's (2011) research indicated that these types of student groups might work in harmony and be satisfied with the final outcome but there would not be high degree of collaboration among all the members. He maintained that taking charge of the group is due to dealing with the prospect of an unequal effort and, in part, driven by previous negative group work experiences. His findings were consistent with the current research study results that in these types of groups, the leaders are the ones who continuously communicate with group members, seek input, check in on them individually to find out how they are progressing with their sub-tasks and make sure that everyone is on the same page, while other members usually work independently and seek confirmation from their group leaders on what their next tasks should be. Thus, it is not to say that a shared leadership model will always guarantee a successful project outcome but working collaboratively would be a certain attribute of the groups that adopt this type of leadership.

5-1-2. Nature of the Assessment Task: in the context of Collaborative Information Activities

It has been widely discussed in the literature that semi-structured or semi-defined tasks are the most suitable type of tasks for group projects in educational settings as they are usually characterised as highly complex cognitive tasks which provide a capacity for collaboration (Allchin, 2013; Kirschner, Paas, & Kirschner, 2011; Le et al., 2018; Scager, Boonstra, Peeters, Vulperhorst, & Wiegant, 2016). According to Rafferty (2011), faculty members should make sure that the "given assignment is conductive to group work" (p. 172) as some group assignments are more suitable to be completed individually and forced collaboration is more of a hindrance than a help in cultivating teamwork skills among students. Incorporating group work should further the learning of a particular discipline requiring students to work on real-world problems directly correlated to their professional careers which was emphasised by participants in the current research study and relevant research (e.g., Calhoun, 2014; Rafferty, 2011). With regard to collaborative information activities, research shows that the collective approach inherent in the task design has a major impact on the amount of brainstorming (Shah et al., 2012; Shah & Leeder, 2016; Toze, 2014), setting specific criteria for dividing up the work (Bremner et al., 2014) and collaborative sensemaking (Saleh, 2012; Wildemuth & Freund, 2012). Findings of the present research study also demonstrated that students who were allocated semi-assigned tasks were

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more engaged in collaborative information practices comparing to the ones whose group assignment were categorised as fully-assigned ones. Based on Bilal (2002) definition, *semi-assigned* tasks are the ones that "have only the main topic imposed on the user and the user can choose an aspect of the topic that interests him or her to pursue", while *fully-assigned* tasks are "those that have both the main topic and aspects of the topic imposed on the user" (p. 1171).

Figure 5-2 depicts students' collaborative information practices under the influence of a task type:

Semi-assigned tasks

Planning Stage	**Mid-Point Stage**	**Completion Stage**
Seeking background information ↓ Detailed group discussion ↓ Pinpoint a focus and define the problem collaboratively	Collaborative sense-making *Questioning, Clarifying, Prioritising, Judging relevance*	Group consensus ↓ Submission ↓ Creating new knowledge

Frequent Communication (group shared awareness)

Fully-assigned tasks

Planning Stage	**Mid-Point Stage**	**Completion Stage**
Brief and general group discussion ↓ Analyse the components of the task ↓ Labour division	Working individually & independently	Integrating discrete task components ↓ Submission

Informal leadership role might develop

Figure 5-2. Task Type and Students' Collaborative Information Behaviour

Planning Stage

The marked difference during the planning stage between the groups who were given fully-assigned and semi-assigned tasks was searching for background information to gain more knowledge about the main subject to come up with creative ideas and subsequently choose a specific topic. Participants who were assigned a set of sub-topics to work on did not need to explore the area of research and they divided up the sub-tasks among themselves without discussing them deeply during the initial meeting. On the contrary, those participants who had the experience of working on self-generated tasks spent much of their time on brainstorming ideas and they gradually achieved a collective consensus on

their selected topic and subtopics. They could not divide the sub-tasks among each other spontaneously as the task was considered more complex and less structured, therefore they needed to discuss one another's specific skills and expertise to assign each other a sub-task and complete the assignment successfully.

Mid-Point Stage

Unlike imposed tasks which consist of separate sections, self-generated tasks are usually composed of interrelated components which produced a substantial effect on participants' collaborative information activities over the mid-point phase of the assignment. The results revealed that students were not willing to have frequent communication with other group members as each had been assigned a distinct element of the task which was not closely related to other sub-sections, whereas students who themselves selected the topic of their research developed and maintained strong communication at this stage as indicate in Figure 5-2. Given the nature of their group inquiry, they specially would rather have face-to-face meetings to decide what pieces of information were more important than the others as they were engaged in many information seeking and search activities which were conducted individually and resulted in a large amount of retrieved information. Each group member had their own understanding of the usefulness of the found information in regard to the task objectives, so they were required to engage in a detailed discussion about the task relevancy of information until reaching a collective understanding and discarding the information pieces which were not seen to be useful. By contrast, participants who worked independently on their own sections usually were not able to question the credibility of information sources used by other participants for their parts due to lack of effective communication at this stage and they were not also actively involved in sharing information.

Completion Stage

Building connection between different pieces of information was the main important activity during the completion stage when students had to collate distinctive parts together and prepare a coherent and cohesive document addressing specific objectives of the assignment. Participants who worked on interdependent components monitored each other's contributions consistently, were engaged in processing the credibility, relevancy and currency of information and were able to integrate different parts of the task easily at this stage while it was a big challenge for those who worked individually on

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their sub-tasks. They failed to have effective communication and critically evaluate other group members' submission, then they were not able to produce a coherent joint-report or presentation which is similar to the findings of several research studies on student groups (e.g., Chang & Brickman, 2018; Xu, 2018).

The main distinguishing feature of these participants was their capability of explaining different parts of the assignment comprehensively which reflected their thorough understanding of the task unlike the other ones who worked independently on their assigned sub-sections. These participants explicitly stated that they could not clearly remember what other group members' subsections were about while they submitted their assignment few days before attending this research's focus group session. Thus, gaining a shared understanding of the whole project, not only their assigned sub-task which can lead to creating new knowledge would be a distinctive characteristic of self-generated tasks comparing to imposed ones which stimulates working independently and poor communication among group members given their low interdependence. In this regard, researchers are of the opinion that co-construction of knowledge and achievement of correct and deep understanding of the group task would be an ultimate goal of group work to enhance learning which is acquired through a process of negotiation, providing feedback and consensus building (Boese et al., 2008; Chang & Brickman, 2018; Pham & Hong, 2013).

Previous research exploring students' group work experiences also yielded similar results in regard to the nature of the group assignment and students' positive feeling of collaboration. For instance, Boese et al. (2008) found that the types of problems students are asked to solve have an influence on their collaboration behaviour. The research participants noted the difference between the discussion problems and calculation-based problems. They indicated that for technical problems which needed working with numbers and equations, someone might provide the response immediately and the rest of the group would copy it down without figuring out how to do it, while discussion problems (open-ended) encouraged them to collaborate as they could not tackle them without each other's help and feedback. Rafferty's (2011) research results also described the experiences of students who simply took the group project, split it up amongst themselves and put the separate parts together at the end maintaining that they never had to meet, not even once comparing to ones who had positive group work experience explaining that although their group project had separate parts but it always required them

to meet and come together to think, plan and discuss their sections with other teammates. Similarly, Hardy's (2011) research study showed that participants were assigned a semi-assigned group task that required groups to select their own research topic which prompted them to be actively involved during the planning session in terms of clarifying the project requirements, making suggestions and contributing ideas while searching for information independently. Distributing the workload equitably was also a shared activity among his study groups but participants were generally of the view that group members should be active, focused and organised, participate in joint decision making and achieve a consensus, offer help to others, comment on the content that others have found and provide feedback on others' contributions. His findings also revealed that some groups were more involved in collaborative activities, while some required more coordination in terms of leading the discussions, moving the group forward and keeping everyone on the same page.

Nonetheless, lecturers play a prominent role not only by designing a task encouraging collaboration but also stimulating students to adopt the best approach to conduct their group task as well as their criteria for task assessment. Some of the participants maintained that it seemed appropriate from their lecturers' point of view that everyone works separately and comes back together to assemble various parts into a collective product. They were of the idea that their final product would be assessed not their collaboration and high-achieving group members usually took the lead to complete the assignment in their own way not to lose mark. The participants also believed that a major issue came up when the group assignment included oral presentation which was going to be assessed and graded individually, then group members' main goal was gaining a full understanding of their specific parts. In contrast, some of the interviewees asserted that during their presentation each of the group members should have had thorough knowledge of the whole project as the lecturer should ask anybody a question about the content of the group assignment.

5-1-3. Students' Conflicting Aspirations and Capability: in the context of Collaborative Information Activities

Group composition (size, gender, ability) is recognised as a factor that can considerably influence students' collaborative behaviour within a group context as it seems to be a "determining precondition for students' positive or negative experiences of group work" (Chiriac & Granström, 2012, p. 351). In this regard, findings of the present research highlight the role of two important factors: *aspiration* and *capability*.

Findings of a number of research studies in this area as well as the current study demonstrated that students can receive tangible benefits from engaging with group members with different academic capabilities (e.g., Carter, Jones, & Rua, 2003; Cen et al., 2016; Chang, 2012; Chang & Brickman, 2018; Cheng, Lam, & Chan, 2008; Chiriac & Granström, 2012; Gillies & Boyle, 2010; Webb, Nemer, & Chizhik, 1998). High-capability students can advance their knowledge and learn more by providing instructions to low-capability group members. Low-capability students also feel more comfortable with receiving help from their fellow group members and would comprehend the concepts in a language that they are familiar with. This sort of interaction among group members is characterised as "student-teacher relationships" (Cen et al., 2016, p. 222) that encourage students to engage more in knowledge sharing and reflecting on one another's contributions and learning in group context. Some researchers (e.g., Le et al., 2018; Pham & Hong, 2013) also argued that in some cases, high-achieving students tend to underestimate the intellectual capacity of low-capability team members and demonstrate uncooperative behaviours as they cannot easily trust low-capability group members' contributions and rely on them for their grade. In return, low-achieving students are not encouraged to ask for more explanations or receiving instructions from their high-achieving peers. In addition, they assume that their ideas are not valuable, so they prefer to attend groups and listen passively without involving in group discussions.

As a result, forming cross-functional groups composing of students with varied professional experiences, cultural background, variety of skills and discipline expertise has been suggested instead of self-selected groups or those that are randomly assigned by the teacher (Edwards, 2010; Rafferty, 2011). However, a collection of students with complementary skills cannot achieve the group goals

successfully if they do not exercise collective responsibility toward the group's success (Hsieh, 2010) which was also reported by participants of the current research study. They reported that despite making an effort to form a group with fellow classmates who had special expertise and different background knowledge, they did not have an enjoyable and successful group work experience due to lack of sense of ownership and dedication. Thus, the distinguishing factor is an equal level of motivation, ambition or aspiration of group members to contribute to the group task and the extent to which they strive to do a good job and get the highest grade (Forslund Frykedal & Samuelsson, 2016; Rafferty, 2011; Xu, 2018).

Findings of the current research also showed that some student groups faced the issue of dealing with peers who did not have the same performance aspirations which led to major challenges in terms of collaborative information activities which is demonstrated in Figure 5-3.
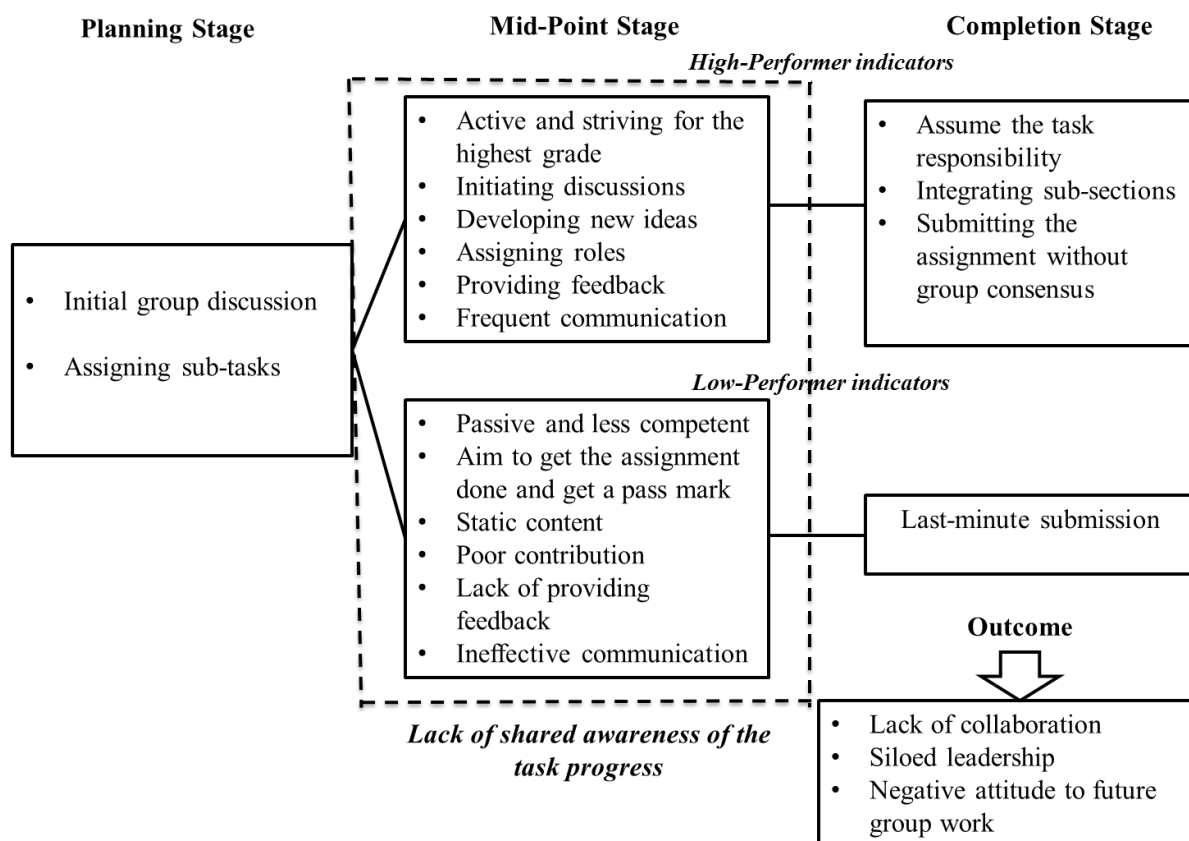
Figure 5-3. Group Composition and Students' Collaborative Information Behaviour (high-performing vs. low-performing students)

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Figure 5-3 tries to capture both the discrete stages of a typical group project as experienced by the participants in this study alongside the characteristics of 'High-Performer' and 'Low-Performer' students. It should be noted that in the literature, researchers use different terms to differentiate between students who perform well and make conscious effort to get high grades and those who do not apart from age, race, gender such as high/low-ability students (e.g., Koh, Tan, Wang, Ee, & Liu, 2007) , high/low capability students (Nurdyani, Slamet, & Sujadi, 2018) , high/low achieving students (e.g., Pham & Hong, 2013) and high/low performing students (e.g., Giuliodori, Lujan, & DiCarlo, 2008). For the current research, as indicated in Figure 5-3, the researcher would rather using 'High-Performer' and 'Low-Performer' students than the other terms considering the main aim of the research which was exploring students' behaviour and performance in groups.

Given the data collected, during the planning stage of a group task completion all the group members were usually involved in group discussions, depending on the complexity of the assignment. As they did not have prior knowledge about one another's performance in groups, they were quite satisfied with their group members' cooperation during the initial group meetings as everyone agreed with what had been discussed and their assigned roles or sub-tasks. Problems typically arose after the planning phase due to group members' inconsistent behaviours as indicated in Figure 5-3. For instance, when some of the group members stopped showing up to group meetings or lectures and not responding to emails or text messages, after which communication slowly began to break down. Being involved in such circumstances caused anxiety among group members as they were not able to maintain awareness of the task progress as an important attribute of the second stage of task completion. This lead to group members being unsure as to whether their team members were working on their parts or they decided to drop out of the unit or they just did not respond to messages and would show up one week before submission with work of questionable quality. In turn this meant that they had to start searching for information related to other assigned sub-topics as well as working on their own parts. Moreover, data analysis revealed that some group members had an experience of dealing with peers who attended group meetings and lectures regularly but who were not actively involved in group discussions and providing constructive feedback to others. More importantly, they did not make conscious efforts to enhance their work and incorporate the comments they received from other members to improve the quality of their

work. Their contributions to the task did not have the desired attributes such as equity, quality and relevance which lead to a sense of dissatisfaction and frustration among high-achieving students despite their effort to help them improving their work. High-performing students felt obliged to take on extra work in order to achieve the goals of the group assignment as they believed that it would be easier for them to perform and finish the assignment themselves instead of tutoring and making an effort to help others understand what they should do. In particular, they (High-Performers) were of the mindset that these (Low-Performers) people did not want to do their job and they just pretended that they were working. This view was echoed by the following high performing participant comment which can serve as a classic example of the concept of student-teacher relationship between high-performer and low-performers in practice. It demonstrates that this student made an effort several times to teach her group member before essentially giving up and doing the work herself:

> *Participant 21; 6th focus group: I went through [his part] and saying this does not make sense where did you get this information, we are talking about interstate customers. I do not know why you are talking about Asians coming into the country; it is not our topic […] so ok he maybe did not understand it the first time, then the second time he did not understand it, I do not see he would understand it the third time and the fourth time, it is not that you have to go and do a research paper […] I also needed to correct a lot of her [the other group member] work but she had the content so when you had the content, it is very easy to take your red pen to it […] It was not a hard task and he knew exactly what he had to do he had already done undergraduate in Marketing […] He was lazy and he did not want to do it and he knew that if he just kept putting off I would write it for him… and in the end I wrote it myself because after four times of sending it back I was just too stressed and I wrote it myself […] I just sat and spent ten hours straight and wrote out his part for both assignments and presentation and then sent it to girl and I said this is it the whole paper have a look and tell me what you think she sent it back yeah it's fine and then we submitted it and he did not even know that we submitted both assignments… I would never work with him again obviously because I am not prepared to do my work and his work.*

Considering these group situations, high-performing students tend to enter into subsequent groupwork experiences with the assumption that they will be involved in a group with at least one non-contributing group member which has an adverse impact on their collaborative behaviour and will nurture their individualistic attitude and dominance over the members. It has been also cited in previous research (e.g., Anstrom, 2010; Hardy, 2011) that repeated experiences such as these produce students

who are less than enthusiastic with the concept of groupwork and can be the basis for negative attitudes for future group experiences.

5-2. Supporting Research Question 2: What Role Does Group Social Cohesion Play in Students' Collaborative Information Behaviour?

The second supporting research question of this study aimed at understanding the influence that social cohesion can have on the way students gather, exchange and use information collaboratively to complete their group assignment. According to the analysis of data collected from focus group participants discussed in Chapter 4, two contributing factors in emerging social cohesion were identified in student groups: *familiarity* and a*ge diversity*. In this section, the impact of each of these factors on students' individual and collaborative information practices during the three phases of task completion will be discussed which highlights the role of social cohesion in this process.

5-2-1.   Familiarity: in the context of Collaborative Information Activities

Familiarity has been examined in several research studies as a variable driving the composition of groups, an indicator of interpersonal cohesion as well as a factor which has an impact on members' interactions and activities. For instance, Hinds, Carley, Krackhardt, and Wholey (2000) research results suggest that when people form groups, factors such as race, competency in subject domains relevant to the task and prior working relationship impact on their members' selection. They also argued that familiarity alone cannot be a strong element for establishing and developing a productive working relationship, although familiarity plays a major role as people usually prefer to choose a 'sure thing' for their future work groups. With regard to the relationship between group members' familiarity and group performance, some research findings showed positive outcomes, while other studies reported negative of familiarity on students' collaborative activities. Scholars are of the view that familiarity has been operationalised in different ways which can be the possible explanation for the mixed research results. For instance, some research studies have equated familiarity with friendship concluding that it can lead to decreased group performance (e.g., Hood, Cruz, & Bachrach, 2017; Le et al., 2018) indicating that friendship relationships inhibit members from being critical of each other's performance due to fear of

hurting their friends' feelings as well as involving in off-task behaviours which can lead to task disruption. Forming groups based on this type of familiarity seems tempting due to similar communication styles, higher level of trust and reduced uncertainty but if group members do not have the same level of motivation and aspiration towards their common goal, they cannot have successful collaboration. This is in contrast with professional friendship which develops from prior positive working experience where group members feel comfortable with sharing their honest opinion and providing constructive feedback to their fellow teammates to enhance the quality of the group project (Hyldegård, 2006). In addition, results of some research studies found no relationship between familiarity and group performance suggesting that non-familiar groups including total strangers can also work well together which could lead to developing professional familiarity and friendship and will act as a strong predictor of selecting members for future team projects (e.g., Hanham & McCormick, 2018; Wetmore III, Summers, & Greenstein, 2010).

Findings of the current research study also support the results of prior research demonstrating that familiarity can exert either positive or negative influence on students' collaborative behaviour. Data analysis also showed that groups with zero-acquaintance could also work successfully together which led to building professional familiarity and satisfaction with the group work process encouraging them to work with each other on future group projects. The summary of the findings is depicted in Figure 5-4.

	Planning Stage	Mid-Point Stage	Completion Stage
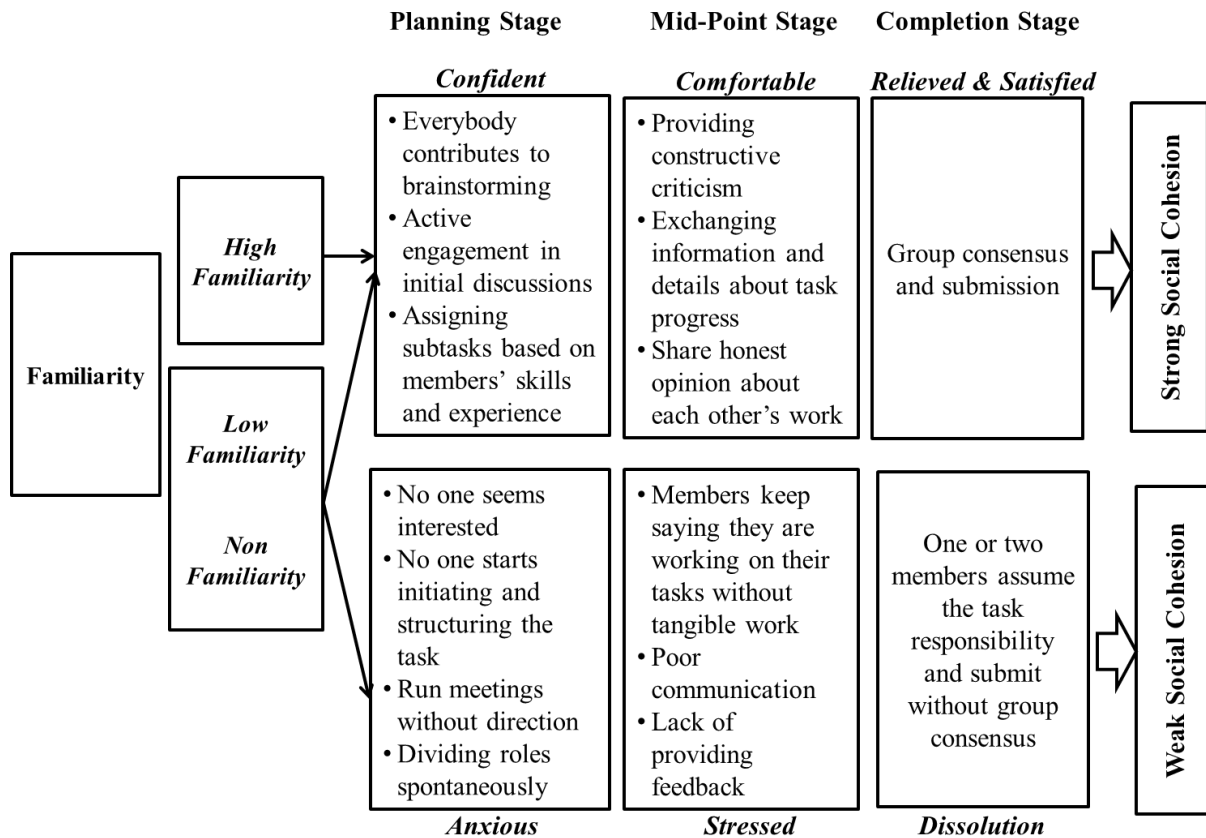
Figure 5-4. Students' Level of Familiarity, Collaborative Information Behaviour and the Shift in Their Feelings

Figure 5-4 captures the discrete stages of a typical group project as experienced by the participants in this study alongside changes in their feelings towards their group considering the level of familiarity they had with their group members as well as group activities. According to participants' experiences of their group work, their level of familiarity was classified into three main categories including high familiar, low familiar and non-familiar groups. Groups with high familiarity were identified as those with favourable past experience including members who were informed of one another's skills, expertise, work style and work ethics. The interpersonal relationship and positive feelings towards each other among these group members were fairly established and maintained throughout the assignment unlike the group members who were totally strangers and those with low level of familiarity. Low level of familiarity was associated with proximal familiarity (forming a group with those who knew each other from previous classes), performance familiarity (forming a group with those who gained a reputation as high-achieving students) and cultural familiarity (forming a group with those who had same cultural background – same nationality) which led to start of the group work

with more positive rapport in comparison to groups with zero-acquaintance. However, this level of familiarity (low-familiarity) was determined based on an affective component of familiarity which is not a strong predictor for people's performance in groups. Therefore, the prevalent feature among the members of groups identified as low familiar and non-familiar ones was lack of knowledge about one another's performance in groups.

- Collaborative information behaviour in high familiarity groups

Findings of the current research showed that strong social cohesion had already formed in high familiar groups which was built and enhanced over time due to positive and successful past experiences of working on different group projects. Their definition of social cohesion was not a sense of closeness, bonding, interpersonal attraction or friendly relationship outside the university; instead they highlighted feeling comfortable with group members and a climate of friendliness and respect. Members of high familiarity groups were required to put less effort into coordinating their actions as they were already aware of each other's capabilities and specific skills which helped them to assign roles and start working on the group project quickly without wasting time. The results of previous research also demonstrate that prior familiarity can help group members jump into the norming and performing stage of group project because they do not need to spend time on getting to know each other and they are almost certain about their role in the group (Hyldegård, 2006; Janssen, Erkens, Kirschner, & Kanselaar, 2009; Vazquez, 2019). Findings of this study imply that members of high familiarity groups start their group work with high degree of confidence in one another's capability in regard to the task requirements; feel more comfortable with engaging in critical and exploratory discussions during the mid-point stage of completing the project and express general satisfaction with the group process and outcome in the end. Thus diagram 5-4 illustrates, participants who work in highly familiar groups tend not to experience anxiety, stress or dissolution in the way that low or non-familiar groups might.

- Collaborative information behaviour in low-familiarity and non-familiarity groups

Non-familiarity and low-familiarity groups could end up developing either strong social cohesion or weak social cohesion considering the members' work-task activities. As stated earlier, members of low familiar groups formed their groups based on affective component of familiarity which could be associated with feeling of safety and security. Nonetheless, they were also unfamiliar with other group members professionally similar to groups including strangers which caused uncertainty about their group work experience before and during the early stage of group formation. According to participants' comments and explanations of their experiences, members' contribution to sharing ideas and brainstorming, being actively involved in discussions and making joint decisions about how to tackle the group project could lead to a shift from a sense of doubt about the group to feeling confident and optimistic about their group as the members got the impression that all group members were making an effort towards their common goal and they would have an enjoyable group work experience. Participants could not perceive their feeling as a sense of closeness or bonding with their group members at this stage maintaining that *'they do not know each other well'* and more importantly *'they are not here to make friends'.* On the other hand, some participants reported that during the first meetings they realised that their group members did not seem to be working seriously towards accomplishing the task. They maintained that the first couple of meetings were a 'waste of time' as the members got together trying to get to know each other without any progress in understanding the task, allocating roles and starting to work on the assigned project. As a result, they started to feel worried and concerned about the group and how they should proceed with the project.

During the mid-point stage, some participants mentioned that due to frequent and effective interaction, they felt more comfortable with their relationships with their fellow teammates. They maintained that group members checked up on each other consistently throughout this stage while each had their own sub-task making sure that everyone is on the right track. They specifically reported that they felt more comfortable with their group members at this stage which led to sharing their honest opinion about the group project and providing constructive feedback on their teammates' parts. Feeling comfortable seemed to be the consequence of positive affect of getting more familiar with members' activities and their motivation to do well. As such, they easily expressed disagreement and did not

hesitate to question one another's idea and discuss alternative opinions. Despite feeling comfortable at this stage, participants still believed that they could not develop friendly relationship with their group members as they did not have so much in common with their group members and they were of the mindset that they did not necessarily need to be friends and develop a sense of closeness to be able to work well together.

Groups that experienced anxiety during the planning stage due to their non-cooperative group members, reported feeling stressed because of poor and ineffective group communication. They pointed out that they had to chase group members to make sure they were working on their parts and were able to finish by the agreed deadline. They usually could not get hold of their group members at this stage as the members did not attend lectures, group meetings and they also did not respond to text messages or emails. They also reported that some group members sent messages insisting that they were working on their part and they would hand it in before the deadline but it could not reduce the groups' stress at this stage and exerted more pressure on the rest of group members as they could not make sure whether they were able to complete and finish the assignment.

Over the completion stage, the groups either low-familiarity or non-familiarity ones that worked effectively together during the entire process of the group project developed strong social cohesion based on efficient working relationship expressing their satisfaction not only with the outcome but the group process as well, unlike groups that experienced anxiety and stress over the course of the group assignment which led to forming poor opinion about the educational benefits of group projects. If their first experience of group work is one of weak social cohesion which then leads to less than ideal project outcomes or a disproportionate amount of work, this can then taint a student's perception of all future groupwork to come. They usually have the assumption that they might end up with a group including non-contributing students who do not pull their weight which in fact exacerbate their negative viewpoint towards group work in academic settings and their sense of dread in the formation and early stage of group work.

In regard to familiarity, results of this study revealed that groups exhibiting a lack of familiarity are also able to work well together, can have a successful and enjoyable group work experience and can also develop strong social cohesion given their substantial and useful contributions to the group task.

In addition, findings also showed that groups with limited familiarity which was formed due to having shared classes; shared cultural background or individual performance cannot always have successful group work experience. These findings are somewhat at odds with other research results in which unfamiliarity with team members would exert negative influence on team performance (e.g., Fang & Chang, 2014) or those concluding that getting more familiar would lead to increased collaboration (e.g., Lee, 2013) which contributes to the mixed results of the role of familiarity in groups and highlights the need for detailed operationalisations of familiarity. As previous sections of this thesis discussed, the role of group assessment tasks can have a major impact on collaborative information behaviour and it may be that the tasks undertaken by the participants in this study had a moderating impact on their social cohesion outcomes.

5-2-2. Age Diversity: in the context of Collaborative Information Activities

According to the literature, age variation in groups may result in advantages and disadvantages for group performance. Some scholars believe that it leads to cognitive conflicts and will consequently result in lower group effectiveness, for instance the results of Shaw's (2004) research demonstrated that a age diversity in student groups might contribute to the inability of group members to have productive communication and establish proper norms to effectively with one another. On the other hand, some research found that age diversity might lead to more quality outcomes due to distinct level of knowledge, experience and expertise. In this regard, Hansen, Owan, and Pan (2015) argued that when age diversity is interpreted as diversity in knowledge level, it facilitates 'knowledge spillover' (p. 255) from the group to its individual members. Wegge et al. (2012) also reported that highly complex group tasks and realising the usefulness of working in mixed-age groups can help group members to have effective collaboration. The findings of some studies also put emphasis on the satisfaction factor. They reported that if group members are pleased with one another's performance, age diversity would not have negative impact on their collaboration and effective teamwork (e.g., Schrand & Just, 2019; Vanderheyden & De Baets, 2015).

Findings of the current research study also add to the mixed results of the impact of age diversity on students' interactions and group performance. Data analysis showed that mature students were of

the mindset that school leavers are not as dedicated and committed to the task as they are and due to this perception, they usually took charge of the group and behaved in a dominant way to be able to have control over the assignment. They enforced their experience and knowledge in selecting the topic or the way things 'should' be done and did not believe in shared leadership which was also rooted in their negative past group work experiences working with younger students. Such situations led to the creation of uncomfortable environments for collaboration and other group members adopted consensus norms as they felt the social pressure to agree with mature members.

Results of this study also revealed that mature students were generally organised, conscientious and more committed to the group task. They understood the time pressure due to their out of university commitments which led to working more efficiently during group meetings with less time wasting. In terms of developing social cohesion, mature students were of the opinion that there was no need to get to know each other on a personal level as they got together to work on a group task for a limited time and get the job done. They also maintained that that they did not have a lot in common with younger students which had an adverse impact on forming friendly relationships among group members. Thus, the atmosphere of student groups including mixed-aged members is more formal and professional rather than comfortable and friendly.

According to the participants' comments and explanations, age diversity was identified as a factor which inhibited developing social cohesion in groups. Thus, these groups started working on their group project with weak social cohesion with an underlying assumption from both mature and young students that they could not build friendly relationship. Getting straight down to work was a characteristic of mature students who started discussing the project requirements without delay during the first meetings. In some cases, mature students took the lead dominantly, ordering other group members what to do and setting deadlines for handing in their works. Sometimes, they seemed to work more collaboratively, however they were the ones who made the major decisions about the task, scheduled the meetings and more importantly avoided involving in off-task discussions.

This type of behaviour during the planning stage caused a sense of unease and discomfort among group members specifically in groups that mature students adopted bossy attitude which led to lack of effective communication, information exchange and working efficiently together. Group members

usually did their assigned sub-tasks individually including searching for information and using the retrieved information to complete their work without discussing it with other group members. Moreover, mature students were identified as those who constantly pushed everyone to do their job, monitored the task progress and made sure of getting the assignment done. They usually took the responsibility of group project submission, then they were the ones who did the final touches including integrating the separate parts to prepare a coherent document as well as checking the relevancy and credibility of references which usually led to submission without group consensus.

As previously stated, there is a deeply-held belief that younger students including school leavers do not always act conscientiously towards group assignments causing a sense of anxiety and stress among mature students when they end up working with these students. They usually cannot rely on young fellow students as they are not sure whether they have the same level of motivation and aspiration to do a good job and get a high grade. Essentially, while mixed-age groups tended to result in an academically solid task outcome, the social cohesion of the group tended to be quite low. It should perhaps also be noted that in terms of the participant data that led to this analysis was a combination of mature age participants complaining about the performance traits of younger students as well as younger participants complaining about the domineering tendencies of more mature students.

5-3. Supporting Research Question 3: What Role Does Group Perceived Cohesion Play in Students' Collaborative Information Behaviour?

The third supporting research question of this study aimed at understanding the influence that perceived cohesion can have on the way students identify their shared information need, search for information, share information and use information collaboratively to fulfil their group assignment. Based on the definition provided by Bollen and Hoyle (1990), this aspect of group cohesion can be defined by its two prominent aspects including a 'sense of belonging' and 'feeling of morale' related with group membership. According to the analysis of data collected from focus group participants discussed in Chapter 4, findings indicated that students in this particular sample did not have a sense of belonging towards the group that they were assigned to group and they did not intend to develop such a feeling and attachment to the group. They were of the belief that group work in university context is short-term as students get together with the aim of accomplishing a group task which is a requirement for their course and once it is done the group would be disbanded. Accordingly, they did not see any potential benefit of developing such a feeling towards group work in this context which in turn would have any impact on their collaborative or individual information-related activities.

In terms of 'feelings of morale', findings showed that students might develop such a feeling at the completion of their group work if they were satisfied with the process and outcome. Findings indicated that participants were not able to confirm whether they were happy that they were part of that specific group or not because they did not know their group members in terms of how well they would perform. Those participants who had successful group work reported that they felt happy that they were part of that specific group and they prefer to work with those people again on future group assignment. This shows that this dimension of perceived cohesion can develop in student groups that had enjoyable and successful group work and might have a positive impact on their collaborative information practices during the next group assignment if they formed a group with the same people who had already collaborated well.

5-4. Supporting Research Question 4: What Role Does Communication Technology Play in Students' Collaborative Information Behaviour?

Communication is a process of exchanging information and is considered as one of the most significant elements of collaboration. In this regard, communication technologies can play a key role in facilitating group work activities in terms of promoting and supporting information sharing, maintaining awareness of group members' activities and monitoring group task progress (Boese et al., 2008; McAliney, 2013; Shah, 2008). A number of research studies have been carried out with the aim of comparing students' satisfaction and performance using face-to-face communication and communication digital tools. Their findings indicated that while the outcomes of group work are quite the same in terms of quality, students are particularly pleased with face-to-face meetings because their group discussions and members' interactions are more productive in contrast to online meetings (Ocker & Yaverbaum, 1999; Smith et al., 2011; Whitman et al., 2005). Some studies also examined the supporting role of social media and communication technologies in enhancing students face-to-face group meetings resulting in students' preference for combination of the two methods to complete their group project effectively (Medina & Srivastava, 2016).

Findings of the present study also showed that students in this particular sample used both face-to-face meetings and various communication channels to enhance their collaboration. Based on participants' comments and explanations, Facebook was their main channel of communication. They used Facebook for sharing information and documents, organising time and location of meetings, checking up on each other, asking questions and seeking clarification. They believed that everyone has a Facebook account so it would be the most convenient and easiest way of communication during the time that they could not have face-to-face meetings. They were also of the mindset that its synchronous features allowed the group members to have more effective communication as compared to email. Email was generally used for sharing documents including resources and meeting minutes, for the most part by groups including mature students who were not comfortable working with Facebook for educational purposes. According to the findings, utilisation of the learning management system for communicating group project details was not the participants' preference and they primarily used it when instructed to

by the lecturer. The inability to have 'live' communication with group members through the learning management system was raised by participants as a drawback of the platform, and as such, they just it for uploading documents and sharing resources. Google Docs and Dropbox were the other tools that were used by a small number of participants to collaborate on creating their group project deliverables. Dropbox was used for sharing individual contributions with an emphasis of its feature to show the exact date and time that documents had been created. However, Google Docs was deemed more efficient based on the participants' experiences as they had access to one another's contributions in one 'live' document allowing them to edit the content, make comments and track individual contributions. Nonetheless, research results also revealed that technology cannot support collaboration if group members do not commit to working together collaboratively. Research participants asserted they could have benefited more from communication technologies if all the group members exercised shared responsibility for participating actively in group discussions, elaborating on shared information and providing timely responses to questions. This finding is consistent with prior research results indicating that the presence of social media and computer-mediated technologies to support collaboration do not ensure that groups will employ them to have productive collaboration (Leeder & Shah, 2016a; Leeder & Shah, 2016c; McAliney, 2013; Shah & Leeder, 2016).

As such, some research participants were inclined towards having more face-to-face meetings due to its greater efficiency of brainstorming ideas, reaching collective decisions and incorporating feedback which enabled rapid progress in their task. However, the difficulty and complexity of the task emerged as a determining factor according to the participants' explanations considering that for completing simple group tasks they did not need to have frequent meetings and '*less is better because then it is easier to complete everything*'. Thus, there is a shift between using communication technologies and face-to-face meetings which is heavily dependent on the nature of the assessment task during different stages of a group project completion.

During the planning stage students relied heavily on face-to-face meetings to become familiar with one another in terms strengths, skills and experience as well as the components of the group task. Through face-to-face communication, they were able to establish group norms, gain a shared understanding of the task, formulating the information need and dividing the task among each other.

The duration of planning stage varied from one to several meetings dependent on the complexity of the task. Some groups were able to comprehend the task requirements and assign roles over a single session while other groups had to go away, search for background knowledge and participate in brainstorming ideas several times to achieve consensus on their topic and sub-tasks. These groups used communication technologies, mainly Facebook and email at this stage to share their ideas and make suggestions to define the project scope and develop a focus. This finding corroborated previous research results (e.g., Hyldegård, 2006; Toze, 2014) indicating that students do not usually use technological tools during the initial stages to identify the information need as it would be discussed and resolved through conversation and interaction.

The impact of task complexity on group members' communication intensity was particularly noticeable during the mid-point stage as some research participants indicated that they agreed on researching individually and sharing their contributions before submission, while some insisted on maintaining online communication and arranging group meetings if a need arose and some scheduled weekly meetings and using communication technologies that they agreed on between meetings if they had any questions, needed clarification and mainly for sharing relevant information and resources to the task. As previously mentioned, group members' sense of commitment and being actively involved in online communication had an impact on members' satisfaction and task progress. According to the participants' explanations, sharing links and information without providing elaboration on how they can be useful for the assignment was not a real contribution which is also reflected in the literature. For example, Xu's (2018) research participants indicated that some group members shared an article or a link without providing more details about how it could be incorporated to the group project and when they were asked about the relevancy and usefulness of those resources in group meetings they could not provide an answer, demonstrating their lack of deep understanding of it. On the other hand, Tao and Tombros's (2013b) research findings showed that group members usually avoid commenting on shared information and links as they found this process distracting, difficult and time-consuming when they were busy with preforming their own sub-task. Using Google Docs as a collaborative writing tool at this stage was mentioned by some of the participants. Google Docs provides an opportunity for group members to write together in a shared document and collaboratively edit the shared representation

during the task. Participants maintained that they searched for information individually at this stage, added content to their shared document and they went through the work together during the group meetings at this stage. However, some participants argued that creating a shared document in Google Docs did not have an impact on group members who were not committed to pull their weight.

During the completion stage, the format of the group project (i.e., report or presentation) had an impact on a groups' type of communication. The general pattern for those who were required to hand in a report was using an online document such as Google Docs or sending individual contributions to one group member for editing, integrating and submission. Such group members were usually those deemed to have a high level of English proficiency. The groups usually did not need to have regular face-to-face meetings at this stage, and they achieved consensus before submission through using communication technology. On the other hand, the groups that had to give a group presentation usually went through the same process for preparing their presentation, however they needed to get together for rehearsal of their presentation followed by group consensus.

A body of literature discusses the digital literacy of students and their ability to gain benefit from the effective use of ICT tools as part of their university group work. This did not specially ask participants about the issue of digital literacy and it seems from participants' response that the primary area of concern was not with being able to use digital communication tools but rather the willingness to do so. The ever-present concern for participants, even when discussing digital communication tools was that of the students who were not contributing, who were largely absent or providing work of a low quality.

In this chapter, the key findings of this study with regard to how different dimensions of cohesion could shape students' collaborative information behaviour were interpreted and discussed. Next chapter will respond to the primary research question and an integrative model of group cohesion and collaborative information behaviour is proposed and described.

6. CONCLUSION

Academic institutions put great emphasis on improving students' collaborative skills by incorporating group projects into courses as it is recognised as one of the professional competencies that newly-hired graduates are expected to bring to their employment. Several studies have been conducted to explore students' collaborative information behaviour in this context. Some examined the suitability and applicability of solitary information behaviour models in educational group context (e.g., Hyldegård, 2006; Kußmann et al., 2013; Lee, 2013; Ndumbaro & Mutula, 2019; Shah & González-Ibáñez, 2010); some directed their effort on how student groups collaborative search for information with the aim of investigating the efficiency of collaborative search systems (e.g., González-Ibáñez et al., 2013; Leeder & Shah, 2016c; Wu et al., 2018) and few studies focused on exploring the influence of specific factors on students' collaborative information behaviour over the course of completing their group assignment (e.g., Saleh, 2012). Nonetheless, there is a paucity of studies on identifying the contributing factors and exploring the role they can play in shaping collaborative information behaviour activities in academic settings to develop a more thorough understanding of this phenomenon.

Group cohesion is recognised as a key and influential attribute of successful group performance, therefore this research focused on exploring how different dimensions of group cohesion including task cohesion, social cohesion and perceived cohesion formed over the course of completing a group project and in what ways those aspects exerted effects on students' individual and collaborative information activities. Research findings were analysed in Chapter 4 according to the main concepts provided a foundation for the discussion chapter (Chapter 5) which the thesis's supporting research questions were addressed. The primary research question will be responded in this chapter by suggesting an integrative model of collaborative information behaviour and group cohesion. Limitations of the study as well as practical implications based on research findings will be outlined and it ends with concluding remarks.

6-1. Group Cohesion in Student Teams

Identifying and distinguishing between the salient aspects of cohesion in groups was the purpose of several research studies to provide essential insights into the role and function of cohesion in group outcomes (Beal et al., 2003; Casey-Campbell & Martens, 2009; Grossman et al., 2015; McClurg, Chen, Petruzzelli, & Thayer, 2017; Mullen & Copper, 1994; Salas et al., 2015; Severt & Strada, 2015; Zaccaro et al., 1995). In this regard, emerging, developing and the impact of group cohesion in short-term contexts such as student project groups is of particular interest as they are required to work in groups including either familiar or non-familiar members within a limited amount of time. Researchers reported that task cohesion is likely the earliest aspect of group cohesion to emerge in these temporary workgroups and can be observable in the form of reported cooperation and motivation to complete a specific task. They also concluded that in these type of groups, task cohesion is more likely to matter because team members can benefit more from focusing on the task at hand and the tendency is to simply get the job done (Aubé et al., 2018; Chiocchio & Essiembre, 2009; Croy & Eva, 2018; Dellinger, 2019; Forrester & Tashchian, 2006).

Consistent with previous research results, findings of this study also indicated that in the current sample and context, task cohesion exerted more meaningful impact on group processes and outcomes in comparison with other aspects of cohesion. Results of this study revealed that students' perception of task-related group cohesion formed upon adopting shared leadership approach; group project characteristics (complexity and interdependency); and group members' composition (similarity in performance and aspirations). It was found that those research participants who experienced shared leadership could easily perceive the mutual commitment among the group members as they all contributed collectively to accomplish their shared goal. According to the findings, shared leadership provided the opportunity for all the group members to feel free to share their ideas and encouraged them to fully cooperate on project goals. They made a collective decision in regard to defining the project problem, agreeing on the problem statement and assigning roles based on their specific skills and capabilities. Furthermore, shared leadership cultivated a group attitude among members that completing the group project was their common goal which encouraged a sense of collective responsibility.

Exhibiting these types of behaviours led to a reasonable assumption among students in this particular sample that their group members were committed to perform well. This finding is in line with previous research results suggesting that shared leadership can help with avoiding potential conflict, stronger consensus and higher group cohesion which in turn facilitates group performance (e.g., Bergman et al., 2012; Han et al., 2018; Mathieu et al., 2015).

It has been found, as presented in Chapter 4, that the nature of the assessment task also had an impact on students' conception of group members' motivation and dedication to work together to complete the group project. Students in this particular sample who had experience of working on highly interdependent tasks reported that more coordination of activities, frequent communication, regular information sharing and collaborative effort were the main attributes of their teamwork throughout the duration of the task which yielded more favourable perceptions of group unity and commitment towards the task. On the other hand, those participants whose assigned task was highly-structured could easily break it down into sub-tasks and divide it among each other. They worked individually within the group context displaying less intention to have communication, cooperation and coordinating their activities as everyone focused on their assigned sub-tasks. In these cases where the task interdependence was lower, there was a notable shift from team responsibility towards the shared goal to individual responsibility in comparison to groups with high interdependent tasks which resulted in implicit assumptions that group members were not united in making collaborative effort to reach the group goals.

Group members' shared aspiration for group performance was also found to be an influential factor in developing perceptions of group task cohesion. Findings of the current research indicated that groups, including students whose goal was getting a pass instead of high grades, did not put conscious and determined effort into working effectively with other members to achieve the group shared goals. These types of behaviour gave high-performers an indication that their group members were not committed to complete the group project successfully leading them to take charge of the assignment and most of the time they had to do the majority of the work to get their desired grade. Group members' capability in terms of domain-specific knowledge and special expertise required to complete the group task was also mentioned by several research participants in regard to forming group task cohesion.

Findings demonstrated that some of the research participants were satisfied with their group performance as they noticed motivation and dedication in those who need more help to progress with their assigned sub-tasks. However, other participants were of the mindset that forming a group with students who were not at the same level in terms of skills and capability should be avoided. They reported that their group members were committed and work consistently but their contributions were not reliable and they could not depend on them to get the highest mark that they were looking for. In this regard, they were of the mindset that the problem arises from focusing on outcomes instead of collaboration and the group work aspect in universities. Participant perceptions were that low-performing students would get higher marks than they deserved which in turn might give them false expectations that in the workforce they can also ride on somebody's coattails and be successful in their careers.

Results of the present study also showed that participants' perceptions of task cohesion led to forming social cohesion in student groups so it can be seen as an antecedent of social cohesion. With regard to developing social cohesion, familiarity was identified as a factor which had important immediate impact on students' initial perceptions of social cohesion and their interpersonal relationship with group members which did not persist over time. Those participants who formed their group based on factors such as nationality or having few chats in class started working on their project with unspoken assumption towards their group members that they could work well together. Nonetheless, group members' dedication towards accomplishing the group task and their substantial contributions had profound impact on changing this early individual perception and feeling. On the other hand, those who had never met their group members started to work on the group project with some hesitation because they did not know one another. During the mid-point stage when they became more familiar with group members' personality and found out that everyone is committed to do a good job, their initial feeling of hesitation changed to feeling comfortable and they exhibited an increased tendency to work together on future group assignments. Thus, we can conclude that for accomplishing a group task successfully, task cohesion should be present necessarily, but it has the potential to develop into social cohesion over time. The results also revealed that students' interpretation of developing social cohesion over the course of the group assignment was experiencing feeling comfortable with their group members instead

of developing a collective feeling of closeness and friendship. As previously discussed in Chapter 4, feeling comfortable within the group helped students to share their ideas and to provide constructive comments to each other without hurting one another's feelings as students usually avoid confrontation. This led to a friendly atmosphere within the group and developing collaboration, while friendship was identified as more of a hindrance than a help towards collaborative efforts. Accordingly, students in this particular sample were of the view that people's sense of commitment to what they want to achieve matters, so there would be no difference between working with friends or strangers.

Perceived cohesion was another aspect of group cohesion which was examined in this present study in terms of how it could be formed and how it could impact on students' group performance. According to its definition, this aspect of group cohesion consists of two dimensions including a 'sense of belonging' and 'feelings of morale' related to group membership (Bollen & Hoyle, 1990). According to the results of the present study, students might develop feelings of morale at the completion stage of their group work if they are satisfied with the process and outcome as research participants reported that they were happy to be part of their group and they would work with the same people again. In terms of sense of belonging, findings suggest that students do not intend to develop such a feeling and attachment to the group that they are part of. Students in this particular sample were of the mindset that in university context, they get together to perform a specific task and once it is done, the groups would be disbanded so there is no potential benefit of developing such a feeling towards group work in this context which run over a limited timeframe. Similarly, the research results of Dellinger (2019) and Grossman et al. (2015) demonstrate a positive relationship between task cohesion and students' performance in groups, while weaker and less-consistent relationships between perceived cohesion and group performance have been found.

6-2. Group Cohesion and Students' Collaborative Information Behaviour

Collaborative information behaviour, the primary phenomenon investigated in this research, is defined to be the totality of people' behaviour when they need to work together to resolve a shared problem in terms of unified understanding of the problem, searching information and use the retrieved information. Students' collaborative information behaviour was found to be of a dynamic nature that encompassed both individual and collaborative information-related activities and it has been clearly found that these activities and interactions are getting shaped by their perceptions of group task cohesion developed by leadership style, task interdependence and group composition.

At the early stages of the group project, the level of collaboration for identification of needed information to create a shared focus and define the project's problem statement was heavily dependent upon the nature of the assessment task and its perceived complexity. As presented earlier in Chapter 4, some group tasks consisted of sets of subtopics which made it easy for students to divide it among themselves, while for other types of group projects brainstorming and sharing ideas became essential. However, some tasks were more complex and the level of their ambiguity was higher which did not allow group members to formulate the project topic during the initial meeting and they had to do some exploratory searching on an individual basis and discuss their ideas during the follow-up meetings. Another contributing factor in determining the level of collaboration at this phase of performing a group project was group members' same goal orientation and aspiration towards the group shared goal. Some group members took on a passive follower role and did not care about progress towards accomplishing the task successfully, so they did not make useful suggestions or share ideas to initiate the task structure and to assign roles.

Individual information searching was a common characteristic among all the research participants in this study including those whose task was highly interdependent as well as those who each had distinct sub-task to complete. Although group members searched for information individually, the structure of the assessment task determined the level of collaboration among members in regard to sharing information and evaluating the retrieved information in terms of relevancy and credibility. The evaluation and use of information sources to fulfil task requirements was seen to be collaborative

activity in similar research studies (e.g., Saleh, 2012; Tao & Tombros, 2013a; Toze, 2014) but the findings of this study showed that groups assigned to highly structured tasks did not feel a need to have regular communication and discuss their findings with one another because their sub-tasks were not so much related to each other. They shared their references with one another and sometimes shared links to information relevant to other members' parts, but they had limited ability to assess whether the shared information has been used by their team members or not. Shared leadership also played a role at this stage for cultivating mutual collaboration among all group members not only between the leader and individual members. By adopting a shared leadership approach, everyone in the group felt responsible for the outcome of the group so they continuously checked up on each other to make sure that everyone is on the same page and consistently monitored the task progress. Social cohesion started to develop at this phase of completing a group task due to more interaction and communication among group members as well as noticing their sense of commitment and dedication towards their goal. As previously stated, social cohesion in student groups was developed in the form of feeling comfortable with one another which helped group members to provide constructive comments and share their honest ideas to enhance each other's work.

Integrating different parts of the task and preparing the final group outcome in the form of presentation or report was an important activity over the completion stage of the task. Those groups who worked collaboratively with one another during the previous phases were aware of the information provided by each group member, so they just went through every part of the assignment together to make sure that task requirements were met. While for those groups that did not communicate effectively with each other over the lifespan of the group task, one member usually the leaders or those who called themselves '*finishers*' took responsibility for putting different parts together and preparing the report or presentation. Sometimes they had to make significant editorial or content changes to some sections at this stage because the quality of other members' contributions was not based on what they had discussed, agreed on and expected from each other and submit the assignment without reaching consensus.

6-3. Integrative Model of Group Cohesion and Collaborative Information Behaviour

The main purpose of conducting grounded theory research is to formulate a theory. Corbin and Strauss (2015) advise researchers not to begin their research with an established theoretical or conceptual framework as it would be in conflict with the aim of this methodology. They maintain that it makes sense for researchers to compare their findings (theories) with established theories once data analysis has been completed to explore similarities and differences and to demonstrate the contributions of the study to the relevant field of knowledge. Accordingly, the Input Mediator Output Input model (Ilgen, Hollenbeck, Johnson, & Jundt, 2005) of team performance is used as an organising conceptual framework to summarise the findings of this research which is depicted in Figure 6-1. This model brings together the main identified aspects detailed in previous chapters in a holistic representation of the phenomenon investigated in this dissertation.

The Input Mediator Output Input model was proposed by Ilgen et al. (2005) as a refined version of the prevailing I-P-O (Input-Process-Output) model which was originally posited by McGrath (1964). The I-P-O framework has formed the foundation for several research studies examining team effectiveness over the past decades; however it comes under strong criticism that "many of the meditational factors that intervene and transmit the influence of inputs to outcomes are not processes" (Ilgen et al., 2005, p. 520). Indeed, not only group processes but also factors which are perceived as emergent cognitive, motivational and affective states that develop over the duration of team functioning would influence the group performance outputs (Marks, Mathieu, & Zaccaro, 2001). Moreover, the I-P-O model presents a linear development from input to outputs, while the IMOI model put emphasis on the dynamic characteristic of team interactions that change over time by including the idea of a 'feedback loop' which demonstrates the impact of performance outputs on initial inputs. According to this model, the relationships between inputs and outputs occur in a cyclical process influenced by team processes and emergent states called mediators in addition to outputs which have the potential to act as inputs for future team process.
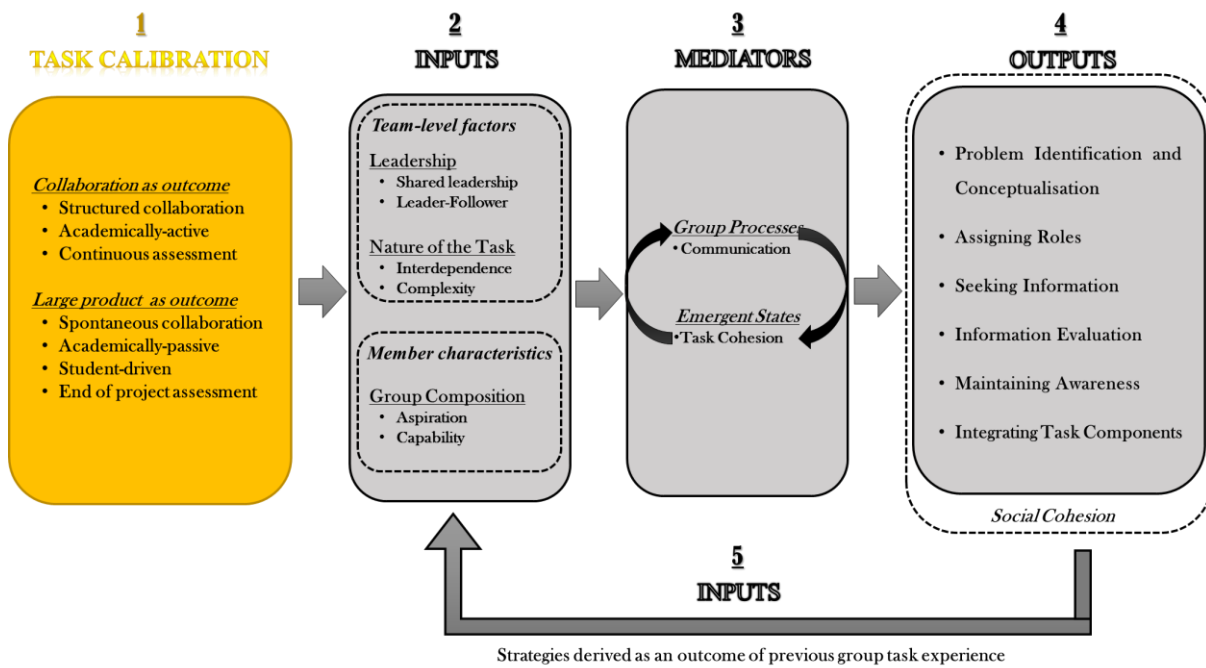
Figure 6-1. Integrative Model of Group Cohesion and Collaborative Information Behaviour in Academic Settings

Figure 6-1 tries to capture the impact of salient factors emerged from analysing focus group data on students' collaborative information behaviour in academic settings through developing task cohesion and teamwork behaviours including communication. According to the model, INPUTS are the antecedents of task cohesion (MEDIATORS) that lead to developing this dimension of group cohesion which in turn will affect students' collaborative information practices presenting as OUPUTS in this model. The important aspect in this process is TASK CALIBRATION including two approaches towards the group task design which plays a significant role in defining collaboration or individual work within a group context.

INPUTS: This element of the IMOI model is conceptualised as antecedents that create, facilitate or hinder the functioning of a team and can be classified into different categories including "individual team member characteristics, team-level factors, and organisational and contextual factors" (Mathieu, Maynard, Rapp, & Gilson, 2008, p. 412). Findings of this research suggest that leadership, nature of the assessment task and group composition including aspiration and capability would inform students whether the group is united around task goals and objectives or not, which in turn would have an impact

on their collaborative practices. Accordingly, they are considered as inputs in the proposed integrated model.

MEDIATORS: The next element of the existing model (mediators) includes both group processes and emergent states which are influenced by inputs and would transmit the impact of inputs to outputs. As previously stated, group processes are shaped by members' interactions encompassing task-related activities and emergent states defined as "cognitive, motivational and affective states of teams that are dynamic in nature and vary as function of team context, input, processes and outcomes" (Marks et al., 2001, p. 357). Three factors identified in this research as inputs can play a leading role in predicting perceptions of task cohesion which is recognised as an emergent state in the literature (e.g., Kozlowski & Ilgen, 2006; Marks et al., 2001; Mathieu et al., 2008). The results of the current research also showed how different leadership approaches, level of the task interdependence and members' characteristics influence student groups' level of communication. It has been found that groups with a shared leadership approach develop mutual and effective communication throughout the process, while it is more of a one-way exchange of information in leader-follower groups and also team members themselves do not communicate with one another effectively. Furthermore, student groups are required to coordinate their efforts and have frequent communication when they have been assigned a complex and highly-interdependent task. Conversely, participants who were assigned well-structured tasks explicitly stated that they did not need to have regular communication with their teammates, maintaining that one meeting at the initial stage for division of labour and one meeting towards the end for compiling different parts and putting them together would be sufficient. The findings also revealed a lack of proper communication in groups composing of low-performing and high-performing students. High-performing students always aim to get the highest grade which motivates them to put considerable effort into accomplishing the group task, even if that means assuming a lion's share of the workload and project coordination. The behaviour of low-performing students, including delay in responding to messages, poor-quality contributions and lack of providing feedback would lead to poor and ineffective communication and consequently high-performers tend to finish the project individually.

Figure 6-1 also indicates the relationship between task cohesion and communication. Indeed, one of the important implications of the IMOI model is that mediators can be influenced by other mediators

not just traditional inputs (Ilgen et al., 2005). Research has shown that cohesion which is generally considered as a mediator can be impacted by and also impact other team mediators such as communication (Aubke, Woeber, Scott, & Baggio, 2014; Buchan & Taylor, 2016; Bulgaru, 2015; Grossman, 2014; Grossman et al., 2015). Findings of this study also support prior research suggesting that effective and strong communication among team members contributes to the emergence of cohesion, particularly task cohesion by enabling members to demonstrate their level of commitment to the team through their actions and by creating a collaborative atmosphere.

OUTPUTS: This element includes both group performance and team member affect such as sense of satisfaction and intention to remain together. Results of the present study suggest that cohesive groups are usually composed of students who share similar aspirations and learning goals which lead them to adopting a collective leadership approach as they are of the mindset that it would not be fair to hold one person accountable for the whole assignment. Therefore, they collaboratively formulate the information need and conceptualise the task requirements and would assign each other roles based on their skills, knowledge and abilities. Although they search for information individually, they are actively engaged in exchanging information, assessing the relevancy and credibility of retrieved information and elaborating the shared information over the group meetings. They lay particular emphasis on monitoring each group member's activities to maintain awareness of the task progress as it would play a central role in avoiding problems such as procrastination and plagiarism. Furthermore, findings of the current research also demonstrated that student groups identified as low-task cohesive units would take leader-follower approach to direct their activities either by dominant students or high-performers who realise that they have to take charge of the group due to non-cooperating group members. Poor communication is the main attribute of these type of groups as they search for information individually, work independently and usually the group leader has to chase other team members for their contributions. The quality of the deliverable produced by these groups does not represent a joint effort as in many cases it would be written or prepared by the group leader. Therefore, not only those who take control of the group are dissatisfied with their group work experience, the rest of group members would also feel excluded, blocked and unable to make their voice heard so they cannot contribute as they would

like through group discussions. It also creates an assumption among low-performing students that by making the least amount of effort, they can achieve the maximum result that they aspire to.

INPUTS: The IMOI model indicates that team functions happen in cycle by presenting a 'feedback loop'. The results of this current study revealed that students with unsatisfactory group work experience will form a low opinion of value and usefulness of working as part of a group to accomplish their assignments and they wish that they had the opportunity to perform group projects individually as for many of them; group work is assumed as a source of anxiety. This negative attitude towards group work as an output of the first experience of accomplishing group projects in higher education would lead students to devising their own strategies of surviving their future collaborative assignments and defining of what constitutes collaboration in academic group-based settings which act as an input for the future group project according to the IMOI model. In this regard, the results of this study showed that high-performing students who were blindsided by non-contributing members took domineering approach to be able to cope with the perceived difficulty of their next group assignments. Some of them also decided to adopt an individual strategy as they perceived it to be more beneficial for getting a high grade that they desired to. These participants clearly stated that group work aspect is not graded in academic settings and educators emphasise on the final outcome which would encourage students to work separately within a group context. They argued that there is no justification for collaboration because they would not be graded on how well they communicate with one another, how they maintain their communication, whether they are actively engaged in sharing and discussing ideas and running group meetings. Findings of prior research also showed that students do not give group activities considerable attention such as holding group meetings and monitoring the progress of the task which demonstrate that allocating students a group project cannot always result in effective interactions and developing their teamwork skills (e.g., Fathi, Ghobakhloo, & Syberfeldt, 2019; Leeder & Shah, 2016c; Riebe, Girardi, & Whitsed, 2016; Shah & Leeder, 2016; Sormunen et al., 2013).

TASK CALIBRATION: This element is proposed to be incorporated into and thus extend the existing IMOI model. This additional element would become the first element and it assumes the role of mitigating the perceived negative aspects associated with completing group assignments in a higher education setting. Task Calibration inserts the academic convenor into what are student oriented

processes to very deliberately sets the expected learning outcome of the collaborative task to be either one of learning how to collaborate in a very structured way, or how to deliver a large-scale project (i.e., product). The findings from this research suggest that assigning a group a large-scale project and hoping/assuming genuine collaboration will be the end result is wishful thinking in most academic settings. If an academic staff member wishes his or her students to learn how to collaborate, then the task(s) should be structured in a way as to drive and reward such collaboration. This would seem to be especially true in the early stages of a degree where learning to collaborate, communicate and integrate could be seen as fundamental skills. Later in a course the Task Calibration process could see tasks designed to be more centred on creating larger-scale pieces of project work, with the assessment regime more geared towards the final output of the collaboration rather than of the collaboration itself.

Findings of the current research study showed, in part, that participants in this particular sample lack teamwork skills to tackle their group project efficiently and work collaboratively with one another because they did not receive detailed and explicit instructions on how they need to work with one another within a group context. The assessment tasks need to be designed in a way to reflect structured collaboration which requires substantial effort from academics' end, particularly in terms of 'managing' the groups, frequent 'reports' and helping groups resolve issues as they occur rather than at the projects conclusion. In order to develop teamwork skills, assessing group projects should incorporate both process and outcomes to teach students how to actively participate in group activities. However, previous research shows that academics are extremely busy with teaching several units which usually prevent them from taking the process approach into account (e.g., Anstrom, 2010; Calhoun, 2014; Gottschall, 2006; Rafferty, 2011). In these circumstances, a task including multiple elements would explain its justification for an appropriate project to be conducted by a group, then instructors hope for collaboration to happen among team members. Moreover, instructors usually use peer assessment as a strategy to make sure that group members would remain accountable towards group work as well as discouraging social loafing in student groups but the findings of this current research consistent with prior research results (e.g., Chang & Brickman, 2018; Freeman & Greenacre, 2011; Lambert, Carter, & Lightbody, 2014) showed that using peer assessment do not always have deterring impact on students' non-coopering behaviours. Freeman and Greenacre (2011) assert that students usually have

misconceptions about their fellow students' attitudes and abilities which prevent them from distinguishing peers who are deliberately failing to contribute from peers who were struggling academically and contributing to the best of their abilities. Therefore, peer evaluations cannot always be useful for identifying dysfunctional groups; instead academics should get actively involved in monitoring, evaluating and grading the progress of individual members and their contributions to the project. By placing emphasis on collaborative process of fulfilling the task rather completing a large assignment at the early stages of a degree, instructors can instil teamwork skills and enthusiasm towards group work into students.

Findings from the present research also showed that students experience difficulty with maintaining communication over the course of conducting their group tasks. In particular, there was a sharp disagreement in some groups in terms of selecting a proper communication technology to stay in contact with one another when they could not have face-to-face meetings. Results demonstrate that Facebook is one of the most common and widespread means of communication for students in this particular sample and those group members who avoid using Facebook were not able to have effective communication with their teammates. This also underlines the need for academic institutions to establish specific norms for students in terms of arranging regular group meetings as well as employing accepted and sustainable means of communication.

As previously stated, it seems that instructors introduce teamwork into their courses without considering proper curriculum design and defining the expected outcomes. An ad-hoc content analysis of the learning outcomes of roughly 50 courses randomly selected from 10 Australian university websites demonstrates that these universities clearly state 'teamwork skills' or 'work collaboratively in groups' in their list of course learning outcomes of almost all the selected undergraduate courses offered by those universities. Figure 6-2 is a representative sample of the learning outcomes:
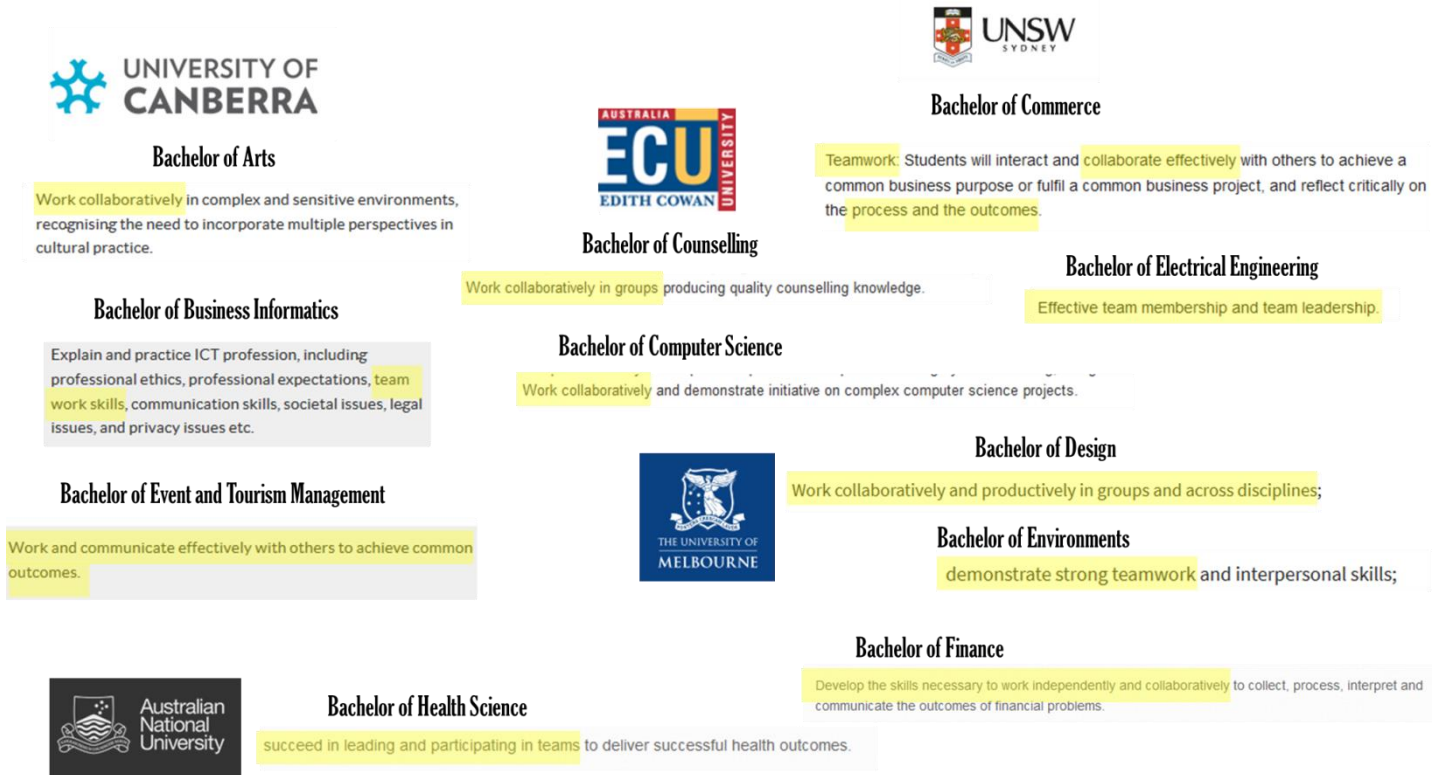
Figure 6-2. Representative Sample of Learning Outcomes for Bachelor Level University Courses across Australia

Nonetheless, findings of this research and similar studies (e.g., Riebe et al., 2016) showed that students still face difficulty in fulfilling their group projects and do not have positive attitude towards group work in academic settings, indicating that 'teamwork' and especially an 'ability to work effectively with others' is not necessarily the learning outcomes students are leaving their degree studies with. This in fact highlights the importance of effective design of curriculums that directly affects the teamwork skill training and attitudes of university graduates towards collaboration. In courses where improving teamwork skills is a specified learning outcome, the units with group projects need to be purposefully designed and structured in a way consisting all the required features and qualities for teaching and learning teamwork skills. Therefore, the course learning outcomes should be clearly and narrowly defined as the first step because they would have lone-term impact on the content, activities and assessment.

Hence, findings of this research suggest that if curriculum is designed effectively to reflect their learning outcomes and academics lay emphasis on both the process and outcome of fulfilling a group task, students' collaborative information behaviour practices in academic settings can lead to the idealised outcome depicted in Figure 6-3.
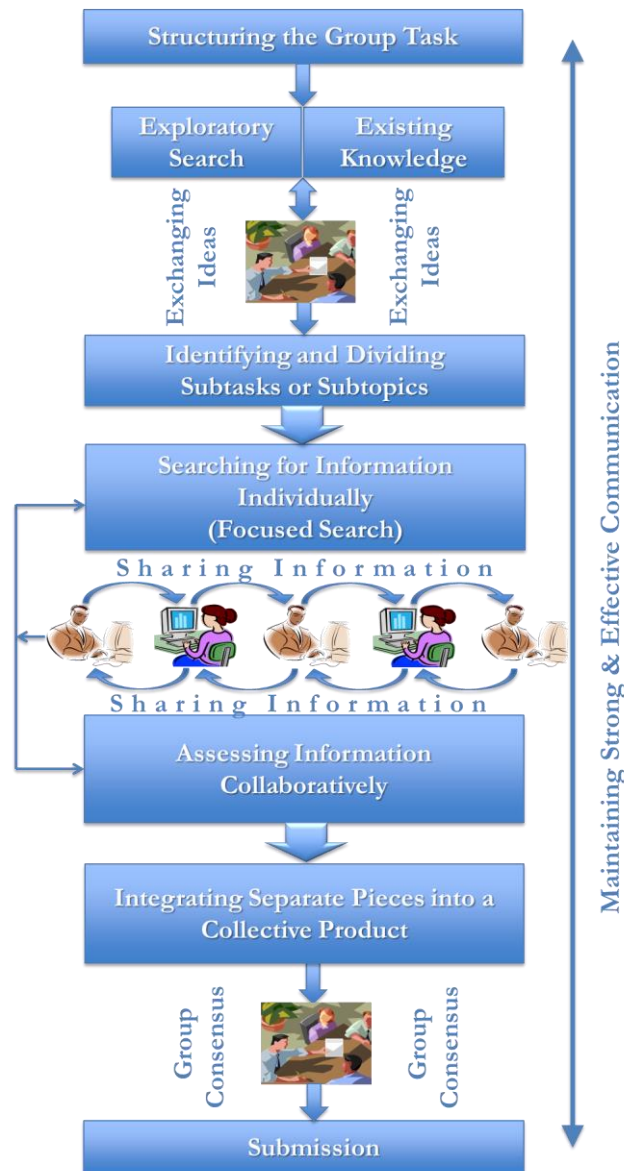
Figure 6-3. An Ideal Model of Collaborative Information Behaviour in Academic Settings

As Figure 6-3 indicates, collaborative information behaviour starts with the aim of constructing the structure of the group task. Students need to identify the problem and conceptualise it similarly to be able to define the group project and its sub-tasks. Level of complexity determines how students initiate structuring the task. They might structure the task based on their existing knowledge (domain-

specific knowledge) or conducting exploratoy search to gain more backgroung knowledge about the topic.

Unified conceptualisation of the assigned task is of great importance as it would assist group members with identifying and developing a shared understanding of the sub-tasks. At this stage, studetns should communicate their perceptions of the task and discuss their ideas freely to make sure that everyone is on the same opinion about the general concept of the topic and develop a shared focus of the identified subtopics. This process would result in dividing sub-tasks based on members' skills, knowledge and expereince.

When sub-tasks have been clearly identified, group members need to conduct focused search to retrieve specific information and accomplish their sub-tasks. Maintaining awareness of group activities and developing a shared understating of the acquired information are identified as two necessary elements of the mid-point stage of performing a group task because search activities are usually performed individually. Prioritising, judging the relevance and credibility of the found information as well as building connections between different sections of the group project can be done collaboratively at this stage by having frequent communication in particular face-to-face communication as it would enable students to accomplish collaborative synthesis activities more effectively. As a result of regular meetings and group discussions, all the members would be involved in making sense of the information sources retrieved by others as well as providing feedback with respect to a need to re-find information. The arrows between the two elements in the proposed model, namely 'searching information individually' and 'assessing information collaboratively' reflects the cyclical nature of group activities during the mid-point stage of conducting a group task. This indicates that while students might work independently within a group context, they can feel that they are still part of the group activities by maintaining effective communication over the duration of completing their group assignment.

Accordingly, during the final stage, students can easily integrate different parts of the assignment and prepare a cohesive product, as they are all aware of and satisfied with the quality of one another's sections.

6-4. Study Contributions

This research has contributed to the collaborative information behaviour area of research by following a grounded theory approach which led to providing rich description of the role of group attributes over this process. It was not clear how cohesion, which is recognised as one of the most important group constructs, could have an impact on group members' tendency to engage in collaborative activities or work individually within a group context.

Findings from this research has expanded the conceptual understanding of collaborative information behaviour by providing detailed insights into the characteristics of cohesion in student groups and their role in shaping members' interactions with regard to information activities. It has been revealed that shared commitment to achieving the team's objectives has more influential power in shaping group member's motivation to take part in collaborative practices in educational settings. Results demonstrated that developing social relationships among members in student groups is heavily dependent upon members' behaviour and performance. This finding provides valuable insights into how student groups can be formed indicating that familiarity and friendship without having prior experience of carrying out joint activities would not suffice for forming groups.

Furthermore, this research suggests an addition to the Input, Mediator, Output, Input (IMOI) model that includes a Task Calibration step by academic staff, to define the primary outcome of any given assessment task as either learning how to collaborate in a very structured way, or how to deliver a large-scale project. This model provides useful insights into how to re-orient group assignments to enhance the academic collaborative environment by highlighting the focus in designing a group task and the factors that would lead to emerging and developing group task cohesion which in turn would influence students' willingness to collaborate with others.

Most empirical studies have confirmed that groups need to be cohesive to be effective but how they can be cohesive is still unexplored. Accordingly, findings of this research have also advanced cohesion literature in terms of identifying the antecedents of this construct in student groups and demonstrating that task cohesion should be developed given its impact on students' collaborative behaviour in academic group environments.

6-5. Limitations of the Study

This study was carried out at one university (Edith Cowan University) in one country (Australia) which would make the research results somewhat limited to that specific context. Given that participants for this research were recruited across a broad range disciplines, findings of the study would provide academic institutions with useful insights with regard to how and why students will get actively involved in collaborative information practices.

Although the researcher aspired to recruit students who were in the same project group, she was not successful in fulfilling it. It would have given the researcher more insight into different perspectives of students' experience from students undertaking the same task within a single group. Thus, the findings presented in this research demonstrated indications rather than absolute measures of students' collaborative information behaviour.

The researcher aimed to use longitudinal research design and employ mixed-research methodology to collect data of a reactive nature instead of a reflective nature. It was meant to record participants' information behaviour and measure the dynamic nature of cohesion at different stages of a group task completion. Nonetheless, participants' reflections on what they had done provided meaningful data and rich description of how group cohesion developed in student groups and in what ways it shaped students' collaborative information behaviour. In hindsight, perhaps the most obvious limitation of this research is that the researcher did not ask participants for a copy of their respective assessment tasks for inclusion in the analysis. In the earlier stages of the research, the role of the 'task' was not obvious, and as previously discussed in Chapter 2, was not evident in the research literature. Had the assessment tasks for each participant been made available the researcher feels that the concluding chapters and their respective analysis would provide a richer understanding of exactly why the tasks was so impactful of the participant's collaborative behaviour. Some efforts were made to ask participants for their assessment tasks after the fact, however by this time many of the participants were unresponsive, had graduated or no longer had copies of their work available or locatable.

6-6. Recommendations for Future Research

Findings from this research provided rich data on the factors that can inform students whether their group is cohesive or not and how these influential factors could shape their collaborative information-related practices when carrying out a group project.

The analysis of the focus group data indicated that task cohesion is the most contributing and crucial dimension of group cohesion that can have profound impact on students' collaboration and sense of satisfaction with group work. Results of this research have also contributed to this field of research in terms exploring and identifying the antecedents that could predict task cohesion in student groups. These factors can be examined further in future research studies to develop a greater understanding of their role in shaping students' collaborative information behaviour. In addition, the influence of these factors can also be validated statistically in future research.

In this relation, the proposed model with an extension named 'task calibration' may serve as a conceptual framework in longitudinal research studies for identifying the impact of the task focus designed for collaborative projects.

Cohesion is a dynamic emergent state as it develops over time and can be changed based on the performance and interactions between group members. It is worthwhile for future research to employ suitable designs to examine the rate of change for cohesion at different stages of a group task, to identify the factors that affect this change and to explore the impact of this change on collaboration over time.

In this research, cohesion was explored in educational settings where groups are commonly recognised as newly-formed ones. As noted above, findings of this research revealed that task cohesion play a more powerful role in academic groups in terms of enhancing collaboration, while social cohesion dose not exert such an influence. Hence, it would be worthwhile to explore this concept in other settings, in particular, among organisational teams where team members have already known one another in terms of knowledge, skills and capabilities to discover which aspect of cohesion has more impact on group collaboration.

6-7. Concluding Remarks

This thesis has been completed at the time of Coronavirus outbreak which has forced people to reconsider their interactions and collaboration due to the practice of 'social distancing'. It has highlighted the importance of employing communication technologies and collaboration tools, in particular, in higher education institutions as almost all universities around the world have moved their courses to a fully online delivery. This dramatic shift would have a huge impact on the way students collaborate as they will not have the opportunity to engage in face-to-face interactions with their peers and their lecturers. More importantly, as the finding of this research showed, students are still struggling with the effective use of contemporary digital communication tools to communicate and collaborate with their peers and academic supervisors. The results of the current study indicated that the majority of participants did not use the official platforms prescribed by their institutions for accomplishing their group task as their preference was maintaining group communication through the platforms that they were more comfortable with such as Facebook. The results further showed that they usually shared ideas and information resources via digital tools but they were not engaged in deep discussion and information elaboration to make sure that the exchanged information was incorporated to the project and everyone gained a clear understanding of it. This underlines the fact that students were still required to be instructed in terms of selecting digital collaboration tools, how to communicate and perform group assignments through exclusively digital tools to be prepared for these types of inevitable situations.

In addition, it seems that the majority of universities have decided to recast group tasks as individual ones so as to reinforce the message of 'social distancing' which in turn could further increase the gap between the collaboration skills expected by employers and the skills seen in the future cohorts of university graduates.

7. REFERENCES

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8. APPENDICES

8-1. Appendix A: Information Letter to Participants

Information Letter to Participants

Researcher
Parisa Khatamian Far
PhD candidate
School of Science, Edith Cowan University
Email: p.khatamianfar@ecu.edu.au

School of Science
Edith Cowan University
270 Joondalup Drive, Building 18
JOONDALUP WA 6027

Principal Research Supervisor
Assoc Prof Justin Brown
Associate Dean (Teaching and Learning)
School of Science, Edith Cowan University
Phone: (08) 6304 6174
Email: J.brown@ecu.edu.au

Greetings,

I would like to invite you to participate in a research project that will form the data collection stage of my studies towards a PhD in Information Science. This study aims to explore how students complete their group assignment collaboratively, examining the role of group cohesion in this process. I am looking for interested individuals to volunteer to be a part of this study. Your participation is very valuable because the results of the research will help future student groups meet their potential to work effectively and create novel solutions.

Your participation will involve attending one focus group session. This session will be run after you complete and submit your assignment and the discussed topics will include your experience of working in groups, your views towards groupwork in academic environments, your general reflection of group assignment, your collaborative information behaviour practices and use of collaborative technological tools, as well as emerging aspects of group cohesion over the duration of completing the group assignment task. This session will last no more than two hours and will be run on Joondalup or Mount Lawley campuses. The focus group session will be audio recorded and you will be informed of the date, time, and place of running sessions by email, and refreshments will be provided.

As focus group session is limited to a particular time frame, interested participants will also have the opportunity to volunteer for a further one-on-one interview to give more information about their experience if they would like to. The individual interview session will last no more than one hour and it will be audio recorded. The follow-up interview session will be run on Joondalup or Mount Lawley campuses and the participants will be informed of the date, time, and place of running the session by email.

Your participation in this study is entirely voluntary and you can withdraw your consent at any time, without giving a reason. The collected data will be destroyed immediately once you withdraw from the research. Although the responses can be identified by the researcher, it will be coded as soon as possible and no identifying information will be provided to other parties or included in the final thesis. Moreover, collected data will be used solely for academic purposes, and personal identity information will not be released.

Participants will be reimbursed with a **$40 Coles/Myer voucher** to compensate their time.

If you have any questions or require any further information about the research project, please feel free to contact myself or my research supervisor on the above details. If you have any concerns or complaints about the research project and wish to talk to an independent person, you may contact:

Research Ethics Officer
Edith Cowan University
JOONDALUP WA 6027
Phone: (08) 6304 2170
Email: research.ethics@ecu.edu.au

The research project has been approved by the ECU Human Research Ethics Committee.
I look forward to working with you on this project.
Yours truly,
Parisa Khatamian Far

8-2. Appendix B: Informed Consent Document

School of Science
Edith Cowan University
270 Joondalup Drive, Building 18
JOONDALUP WA 6027

Informed Consent Document

Title of Research: Group Cohesion and Collaborative Information Behaviour: An Exploration of Student Experiences of University Group Work

Researcher: Parisa Khatamian Far, PhD student, School of Science

Email: p.khatamianfar@ecu.edu.au

Principal Research Supervisor: Assoc Prof Justin Brown, Associate Dean (Teaching and Learning), School of Science

Email: j.brown@ecu.edu.au Phone: (08) 6304 6174

Purpose of the Study: This study aims to explore students` collaborative information behaviour during a group assignment examining the role of group cohesion which can play in this process. Your data, along with the data from other individuals will be analysed to identify and better understand group members` collaborative information -related activities, and use of technologies. It is hoped that the results of this study can help future student groups meet their potential to work more effectively towards creating novel solutions and generating new knowledge.

Research Participants` Rights:

1. I have been provided with a copy of the information letter, explaining the research study.
2. I have read and understood the information provided.
3. I have been given the opportunity to ask questions and has had any questions answered to my satisfaction.
4. I am aware that if I have any additional questions I can contact the research team.
5. I understand that participation in this research project will involve:
    a. Participating in a one-off focus group session
6. I understand that I may volunteer for a further one-on-one interview to give more information about my experience if I would like to.
7. I understand that the information provided will be **de-identified** and the identity of participants **will not be disclosed**.
8. I am aware of the topics to be discussed in the focus groups.
9. I am aware that the focus group session **will be audio recorded**.
10. I understand that the information provided will only be used for the purposes of this research project.
11. I understand that I am free to withdraw from further participation at any time without explanation or penalty.
12. I understand that if I miss scheduled sessions without giving prior notice, I can be removed from the study.

I have read the above statements and freely consent to participate in this research:

Participant`s Full Name: --

Participant`s Email: --

Signature: -- Date: -------------------------------

8-3. Appendix C: Examples of Email Communication to Arrange Focus Group Sessions

Parisa KHATAMIAN FAR
Tue 03/10/2017 10:17

Hi ▮▮▮▮▮▮

Thank you for your email. I am deeply appreciative of your interest in taking part in this research.

I would be grateful if you could provide me with more information about the units (e.g. unit codes) that you are working on their group assignments.

I will inform you of the date, time, and place of running focus group sessions by email.

Your participation in this research is very valuable and I would like to thank you again for your interest in this project.

Best luck with your studies.

Kind regards,
Parisa

Parisa Khatamian Far
PhD Candidate - SOAR Ambassador (Joondalup Campus - Fridays)
School of Science, Edith Cowan University, Joondalup Campus, WA 6027, Australia
p.khatamianfar@ecu.edu.au

Parisa KHATAMIAN FAR
Wed 04/10/2017 07:47

📄 Information Letter & Conse...
61 KB

Hi ▮▮▮▮▮▮

Thank you for your email and providing details about the group assignments that you have completed or currently working on. I do appreciate it.

In attachment, please find the Information Letter and Consent Form. I appreciate it if you could fill out the consent form and send it back to me.

There is no need to sign it now, I will ask you to sign the Consent Form when you attend the session.

Regarding the time, date, and place of running focus group session, I will send you another email within the next few days.

Best luck with your studies.

Kind regards,
Parisa

Parisa Khatamian Far
PhD Candidate - SOAR Ambassador (Joondalup Campus - Fridays)
School of Science, Edith Cowan University, Joondalup Campus, WA 6027, Australia
p.khatamianfar@ecu.edu.au

Parisa KHATAMIAN FAR
Thu 05/10/2017 07:57

Hi ███████████

Thank you for filling out the consent form.

Would you please let me know of your availability to attend a focus group session on any of the following dates:

Friday 13th October 2017

Tuesday 17th October 2017

Friday 20th October 2017

Thursday 26th October 2017

Friday 27th October 2017

Many thanks,
Parisa

Parisa Khatamian Far
PhD Candidate - SOAR Ambassador (Joondalup Campus - Fridays)
School of Science, Edith Cowan University, Joondalup Campus, WA 6027, Australia
p.khatamianfar@ecu.edu.au

Invitation to attend a Focus Group Session – Group Assignment Research

Parisa Khatamian Far
Mon 09/10/2017 12:50

███████████

📅 Invitation to attend a Focus Group Session - Group Assignment Research

🕐 Fri 13/10/2017 10:00 - 12:00

📍 JO 31.316

No conflicts

Hi ███████████

Once again, I would like to thank you for your interest in taking part in Group Assignment Research.

I would be grateful if you could accept the invitation for attending the Focus Group session which is going to be held on Friday 13th October at Joondalup campus B31.316.
It has been scheduled based on your availability.

Regarding the refreshments, if you have any dietary requirement please send me an email.

Looking forward to meeting you.

Kind regards,
Parisa

Parisa Khatamian Far
PhD Candidate - SOAR Ambassador (Joondalup Campus - Fridays)
School of Science, Edith Cowan University, Joondalup Campus, WA 6027, Australia

Reminder: Focus Group Session tomorrow at 10:00 am JO 31.316 (Library)

Parisa Khatamian Far
Thu 12/10/2017 18:49

████████████████████████

📄 Focus Group - Room Locati...
142 KB

Hi ████████████
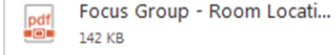
This is just a reminder that Focus Group session is at 10:00 am tomorrow in Building 31 (Library), room 316.

Please see attached the room location map.

I am looking forward to meeting you.

Kind regards,
Parisa

Parisa Khatamian Far
PhD Candidate - SOAR Ambassador (Joondalup Campus - Fridays)
School of Science, Edith Cowan University, Joondalup Campus, WA 6027, Australia
p.khatamianfar@ecu.edu.au

8-4. Appendix D: List of Focus Group Interview Sessions and Participants' Demographic Information Details

Focus Group Session	Focus Group Session Date	Number of Focus Group Participants	Focus group Participants' Details						
				M/F	Age Range	Domestic or International	Degree	School	Course of Study
FG1	13.10.2017	4	P1	M	18-20	Domestic	Bachelor	Arts & Humanities	Media & Communication (2nd Year)
			P2	F	34-36	International	Bachelor	Nursing & Midwifery	Science of Nursing (2nd Year)
			P3	F	21-23	International	Bachelor	Medical & Health Sciences	Occupational Therapy (2nd Year)
			P4	M	18-20	Domestic	Bachelor	Engineering	Technology in Engineering (2nd Year)
FG2	17.10.2017	4		M/F	Age Range	Domestic or International	Degree	School	Course of Study
			P5	F	18-20	Domestic	Bachelor	Business	Event Management – Human Resources (2nd Year)
			P6	M	24-27	International	Bachelor	Engineering	Electrical Power (3rd Year)
			P7	F	21-23	International	Bachelor	Medical & Health Sciences	Exercise & Sports Science (3rd Year)
			P8	M	24-27	International	Master	Business	Information Systems (1st Year)
FG3	20.10.2017	5		M/F	Age Range	Domestic or International	Degree	School	Course of Study
			P9	M	50 and older	International	Bachelor	Business	Project Management (2nd Year)
			P10	F	24-27	International	Master	Business	Professional Accounting (1st Year)
			P11	F	28-30	Domestic	Bachelor	Arts & Humanities	Psychology - Counselling (1st Year)
			P12	M	34-36	International	Master	Business	Marketing & Innovation Management (2nd Year)
			P13	M	18-20	Domestic	Bachelor	Science	Software Engineering (2nd Year)
FG4	26.10.2017	5		M/F	Age Range	Domestic or International	Degree	School	Course of Study
			P14	M	21-23	Domestic	Bachelor	Education	Science – Mathematics (4th Year)
			P15	F	24-27	Domestic	Bachelor	Business	Law (4th Year)
			P16	F	21-23	Domestic	Bachelor	Business	Accounting (3rd Year)
			P17	F	24-27	Domestic	Bachelor	Education	Secondary Education – Visual Arts (3rd Year)
			P18	F	28-30	Domestic	Bachelor	Business	Business (1st Year)

Focus Group Session	Focus Group Session Date	Number of Focus Group Participants		M/F	Age Range	Domestic or International	Degree	School	Course of Study
FG5	27.10.2017	2	P19	M	24-27	International	Bachelor	Medical & Health Sciences	Exercise & Sports Sciences (4th Year)
			P20	F	24-27	Domestic	Master	Medical & Health Sciences	Public Health (1st Year)
				M/F	Age Range	Domestic or International	Degree	School	Course of Study
FG6	3.11.2017	3	P21	F	50 and older	Domestic	Master	Business	Marketing & Innovation Management (1st Year)
			P22	F	31-33	International	Master	Business	Professional Accounting (1st Year)
			P23	F	24-27	International	Bachelor	Business	Accounting (2nd Year)
				M/F	Age Range	Domestic or International	Degree	School	Course of Study
FG7	15.05.2018	4	P24	F	50 and older	Domestic	Bachelor	Business	International Hotels and Resort Management (2nd Year)
			P25	F	18-20	Domestic	Bachelor	Education	Education – Primary (1st Year)
			P26	M	40-49	International	Master	Business	Business Administration (2nd Year)
			P27	F	21-23	Domestic	Bachelor	Science	Sustainability (1st Year)
				M/F	Age Range	Domestic or International	Degree	School	Course of Study
FG8	18.05.2018	4	P28	M	24-27	Domestic	Bachelor	Medical & Health Sciences	Exercise & Sports Science (3rd Year)
			P29	M	21-23	Domestic	Bachelor	Science	Science (1st Year)
			P30	F	34-36	Domestic	Bachelor	Arts & Humanities	Youth Work (2nd Year)
			P31	M	21-23	Domestic	Bachelor	Engineering	Aviation (4th Year)
				M/F	Age Range	Domestic or International	Degree	School	Course of Study
FG9	22.05.2018	3	P32	F	28-30	Domestic	Graduate Diploma	Education	Education (4th Year)
			P33	F	21-23	Domestic	Bachelor	Education	Education (4th Year)
			P34	F	24-27	Domestic	Bachelor	Medical & Health Sciences	Health Science & Exercise (3rd Year)

Focus Group Session	Focus Group Session Date	Number of Focus Group Participants	Focus group Participants' Details						
				M/F	Age Range	Domestic or International	Degree	School	Course of Study
FG10	29.05.2018	5	P35	F	50 and older	Domestic	Bachelor	Arts & Humanities	Psychology - Criminology (3rd Year)
			P36	F	40-49	Domestic	Graduate Diploma	Education	Education (1st Year)
			P37	F	21-23	International	Bachelor	Business	Business (3rd Year)
			P38	F	28-30	International	Master	Business	Marketing & Innovation Management (2nd Year)
			P39	F	24-27	Domestic	Graduate Diploma	Business	Business (1st Year)

8-5. Appendix E: Pilot Study Data Collection – Pre-Project Survey

Demographics and Prior Experience Questionnaire

What is your gender?
☐ Female   ☐ Male   ☐ Prefer not to respond

What is your age group?
☐ 18-20   ☐ 21-23   ☐ 24-27   ☐ 28-30   ☐ 31-33   ☐ 34-36   ☐ 37-39   ☐ 40-49   ☐ 50 or more

What is your course of study? (i.e Bachelor Science Internet Computing)

Group experiences can include a variety of activities from working with peers on academic assignments, producing a document for a business with colleagues, playing on a soccer team, or organizing an event with other student council representatives.

How much experience have you had working in groups?
☐ I work in groups frequently (more than 10 times)
☐ 5 to 10 times
☐ 2 to 4 times
☐ I have only worked in groups once
☐ I have never worked in a group

To what extent, are you satisfied with your prior groupwork experience?
☐ Very Satisfied   ☐ Satisfied   ☐ Neither   ☐ Dissatisfied   ☐ Very Dissatisfied   ☐ N/A

Please specify how your group has been formed for this assignment?
☐ The lecturer decides on the group members with no input from students
☐ Students freely choose their own group members
☐ Students choose their group members within constraints given by the lecturer
☐ Group selection is done through a random process
☐ Other

Please specify the type of your assignment?
☐ Research essay
☐ Literature review
☐ Design and creation of a new product
☐ Case study
☐ Project report
☐ Oral presentation
☐ Critical review
☐ Other

Please specify your choice of group assignment topic:
☐ Group project topic has been assigned by instructor
☐ Group project topic has been chosen by students from among different available topics

Please rate your prior knowledge of the research topic:
☐ Nothing   ☐ A little bit   ☐ Somewhat   ☐ Quite a bit   ☐ A lot

Please rate your interest in assigned group task:
☐ Not at all   ☐ Just a Little   ☐ Somewhat   ☐ Pretty Much   ☐ Very Much

How do you perceive the level of your group task difficulty?
☐ Very Difficult   ☐ Difficult   ☐ Moderate   ☐ Easy   ☐ Very Easy

Have you ever worked with any member of your team prior to participating in this current project?
☐ Yes   ☐ No

Group Cohesion Questionnaire

The following statements are about your feelings toward your team. Please circle a number from 1 to 5 to show how much you agree with each statement.

		Strongly Disagree				Strongly Agree	
1	I think this group is a good place to make friends.	1	2	3	4	5	N/A
2	I think that I can talk about off-the-job interests with my group members.	1	2	3	4	5	N/A
3	I feel that I can invite my teammates to participate in social events.	1	2	3	4	5	N/A
4	I wish I was in a different team.	1	2	3	4	5	N/A
5	I feel that we all have a common understanding of the task.	1	2	3	4	5	N/A
6	I feel that group members are very united to achieve our goal on this project.	1	2	3	4	5	N/A
7	I feel that individuals associated with my team have a desire to perform well.	1	2	3	4	5	N/A
8	I feel that my team is committed to the task.	1	2	3	4	5	N/A
9	I feel a sense of belonging to this group.	1	2	3	4	5	N/A
10	I feel like I fit to this group.	1	2	3	4	5	N/A
11	I feel that I am a member of this group.	1	2	3	4	5	N/A
12	I am enthusiastic about working in this group.	1	2	3	4	5	N/A
13	I am happy to be part of this group	1	2	3	4	5	N/A
14	I feel that my group is one of the best groups in the class	1	2	3	4	5	N/A

Statements 1-4   (Social Cohesion)
Statements 5-8   (Task Cohesion)
Statements 9-14 (Perceived Cohesion)

8-6. Appendix F: Pilot Study Data Collection – Digital Diary (Initiation Stage)

Initiation Stage

Digital Diary

Please check any of the following activities which represent your activities since the beginning of your group project: (Check as many that apply)

Planning
☐ Discussing the topic and defining the project scope;
☐ Exploring general information sources to increase familiarity with the topic;
☐ Reading information found to learn about the topic;
☐ Identifying subtasks or subtopics for the task;
☐ Identifying the goals of group projects and planning to achieve those along with other members;
☐ Discussing each member`s expertise and skills;
☐ Discussing group members` past experience and lessons learned from previous group activities;
☐ Establishing ground rules for your group work;
☐ Defining and assigning the roles;
☐ Setting schedules and milestones to have subtasks completed;
☐ Discussing the group`s preference of communication mode;
☐ Creating a shared digital workspace;
☐ Other ---

Please provide more details

At this time, how well do you understand the topic of your group project?
☐ Not at all   ☐ A little bit   ☐ Somewhat   ☐ Quite a bit   ☐ A lot

At this time, how difficult do you think your group project is?
☐ Very Difficult   ☐ Difficult   ☐ Moderate   ☐ Easy   ☐ Very Easy

If you chose "Very Difficult" or "Difficult" which of the following statements best describes your reason of perceived task difficulty? *(Check as many that apply)*
☐ Ambiguity of the project scope
☐ Lack of domain-specific expertise in the project subject area
☐ Unavailability or insufficiency of information
☐ Other

At this time, how intimate and familiar are you with your group members?
☐ Not at all   ☐ A little bit   ☐ Somewhat   ☐ Quite a bit   ☐ A lot

Please rate the following items from 1 to 5, given your group activities and the interaction you had with group members since the beginning of the project.

	Very Low				Very High
Your team`s bonding and commitment towards the group assignment *Please provide more details*	1	2	3	4	5
Feeling of closeness among your team members *Please provide more details*	1	2	3	4	5
Your sense of belongingness to this group *Please provide more details*	1	2	3	4	5
Your feeling of happiness of being a member of this group *Please provide more details*	1	2	3	4	5

To what extent, do you believe that group activities have been done collaboratively since the beginning of your project?

☐ Very Low ☐ Low ☐Moderate ☐High ☐Very High

Please provide more specific details about your own contributions to the group task since the beginning of the project

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What kind of communication technologies have you used since beginning of group project?

☐ Email ☐ Facebook ☐ Skype ☐ Google Video Conference ☐ Online Chat ☐ Text Messaging
☐ Google document ☐ Google file storage ☐ Dropbox ☐ Other ---

How many face-to-face meetings did you have with your group members? ---------------

How many emails did you send to your group members? ---------------

How many text messages did you exchange with your group members? ------------------

How many times did you use video conference to communicate with your group members? ------------------

Please rate the content of exchanged messages between you and your group members using the communication technologies since beginning of your group project:

Research-related messages *(i.e., Suggesting ideas on the assigned topics; sharing information about what they found; resolving conflicted opinions)*

☐ Very Low ☐ Low ☐Moderate ☐High ☐Very High

Social messages *(i.e., Sharing personal information and feelings; greetings; humor or jokes; encouragement)*

☐ Very Low ☐ Low ☐Moderate ☐High ☐Very High

Procedural messages *(i.e., Arranging and scheduling meetings; dividing jobs among group members; managing deadlines, paper limits, and other problems)*

☐ Very Low ☐ Low ☐Moderate ☐High ☐Very High

How did the technology you used help in working on your group project?

```



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Are there any aspects of technology use which hindered group work?

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What other technologies might have helped you work more efficiently?

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```

What were your biggest challenges this week in terms of working on your assignment so far since the beginning of the project? These could be personal (lack of trust, lack of motivation, lack of leadership, time management issues), technical issues, or even environmental. (i.e., finding space to meet)

```



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8-7. Appendix G: Pilot Study Data Collection – Digital Diary (Mid-Point Stage)

Mid-point Stage

Digital Diary

Please check any of the following activities which represent your activities since filling the last diary: (Check as many that apply)

Searching for & Retrieving Information
☐ Discussing the topic and defining the project scope
☐ Searching for pertinent information individually;
☐ Searching for pertinent information along with other group members;
☐ Discussing and validating the search strategies with other team members;
☐ Discussing the retrieved information and resources with other team members;
☐ Talking to people outside my team to obtain the information I needed;
☐ Sharing or reminding other members of sources that may be useful in their work;
☐ Setting evaluation criteria for retrieved information with the help and consultation of team members;
☐ Discussing the usefulness of the information you have found with other team members in terms of its relevance and quality;
☐ Assessing the value of retrieved information independently based on your own judgment;
☐ Determining whether you have sufficient information with the help of other group members;
☐ Other

> *Please provide more details*

At this time, how well do you understand the topic of your group project?
☐ Nothing   ☐ A little bit   ☐ Somewhat   ☐ Quite a bit   ☐ A lot

At this time, how difficult do you think your group project is?
☐ Very Difficult   ☐ Difficult   ☐ Moderate   ☐ Easy   ☐ Very Easy

If you chose "Very Difficult" or "Difficult" which of the following statements best describes your reason of perceived task difficulty? *(Check as many that apply)*
☐ Ambiguity of the project scope
☐ Lack of domain-specific expertise in the project subject area
☐ Unavailability or insufficiency of information
☐ Other [   ]

At this time, how intimate and familiar are you with your group members?
☐ Nothing   ☐ A little bit   ☐ Somewhat   ☐ Quite a bit   ☐ A lot

Please rate the following items from 1 to 5, given your group activities and the interaction you had with group members since filling the last diary.

	Very Low				Very High
Your team`s bonding and commitment towards the group assignment *Please provide more details*	1	2	3	4	5
Feeling of closeness among your team members *Please provide more details*	1	2	3	4	5
Your sense of belongingness to this group *Please provide more details*	1	2	3	4	5
Your feeling of happiness of being a member of this group *Please provide more details*	1	2	3	4	5

To what extent, do you believe that group activities have been done collaboratively since filling the last diary?

☐ Very Low   ☐ Low   ☐Moderate   ☐High   ☐Very High

Please provide more specific details about your contributions to the group task since filling the last diary:

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What kind of communication technologies have you used since filling the last diary?

☐ Email   ☐ Facebook   ☐ Skype   ☐ Google Video Conference   ☐ Online Chat   ☐ Text Messaging
☐ Google document   ☐ Google file storage   ☐ Dropbox   ☐ Other ---

How many face-to-face meetings did you have with your group members? ---------------

How many emails did you send to your group members? ---------------

How many text messages did you exchange with your group members? ------------------

How many times did you use video conference to communicate with your group members? ------------------

Please rate the content of exchanged messages between you and your group members using the communication technologies since filling the last diary:

<u>Research-related messages</u> (*i.e., Suggesting ideas on the assigned topics; sharing information about what they found; resolving conflicted opinions*)

☐ Very Low   ☐ Low   ☐Moderate   ☐High   ☐Very High

<u>Social messages</u> (*i.e., Sharing personal information and feelings; greetings; humor or jokes; encouragement*)

☐ Very Low   ☐ Low   ☐Moderate   ☐High   ☐Very High

<u>Procedural messages</u> (*i.e., Arranging and scheduling meetings; dividing jobs among group members; managing deadlines, paper limits, and other problems*)

☐ Very Low   ☐ Low   ☐Moderate   ☐High   ☐Very High

How did the technology you used help in working on your group project?

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Are there any aspects of technology use which hindered group work?

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What other technologies might have helped you work more efficiently?

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What were your biggest challenges this week in terms of working on your assignment? These could be personal (lack of trust, lack of motivation, lack of leadership, time management issues), technical issues, or even environmental. (i.e., finding space to meet)

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8-8. Appendix H: Pilot Study Data Collection – Digital Diary (Completion Stage)

Completion Stage

Digital Diary

*Please check any of the following activities which represent your activities **since filling the last diary**: (Check as many that apply)*

Using and Synthesising Information
☐ Brainstorming format, outlining, organising, and revising together;
☐ Reviewing the individual contributions of team members together;
☐ Looking for additional information to fill the gaps;
☐ Double checking the references;
☐ Combining individual representations of subtasks into a shared representation (by one of team members);
☐ Writing together (all team members) in a shared document;
☐ Revising the draft;
☐ Reaching an agreement on the quality of final submission;
☐ Other

> *Please provide more details*

At this time, how well do you understand the topic of your group project?
☐ Nothing   ☐ A little bit   ☐ Somewhat   ☐ Quite a bit   ☐ A lot

At this time, how difficult do you think your group project is?
☐ Very Difficult   ☐ Difficult   ☐ Moderate   ☐ Easy   ☐ Very Easy

If you chose "Very Difficult" or "Difficult" which of the following statements best describes your reason of perceived task difficulty? *(Check as many that apply)*
☐ Ambiguity of the project scope
☐ Lack of domain-specific expertise in the project subject area
☐ Unavailability or insufficiency of information
☐ Other [   ]

At this time, how intimate and familiar are you with your group members?
☐ Nothing   ☐ A little bit   ☐ Somewhat   ☐ Quite a bit   ☐ A lot

Please rate the following items from 1 to 5, given your group activities and the interaction you had with group members since filling the last diary.

	Very Low				Very High
Your team`s bonding and commitment towards the group assignment *Please provide more details*	1	2	3	4	5
Feeling of closeness among your team members *Please provide more details*	1	2	3	4	5
Your sense of belongingness to this group *Please provide more details*	1	2	3	4	5
Your feeling of happiness of being a member of this group *Please provide more details*	1	2	3	4	5

To what extent, do you believe that group activities have been done collaboratively since filling the last diary?

☐ Very Low   ☐ Low   ☐Moderate   ☐High   ☐Very High

Please provide more specific details about your contributions to the group task since filling the last diary:

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What kind of communication technologies have you used since filling the last diary?

☐ Email ☐ Facebook ☐ Skype ☐ Google Video Conference ☐ Online Chat ☐ Text Messaging
☐ Google document   ☐ Google file storage   ☐ Dropbox   ☐ Other --

How many face-to-face meetings did you have with your group members? ---------------

How many emails did you send to your group members? ---------------

How many text messages did you exchange with your group members? ------------------

How many times did you use video conference to communicate with your group members? ------------------

Please rate the content of exchanged messages between you and your group members using the communication technologies since filling the last diary:

Research-related messages (*i.e., Suggesting ideas on the assigned topics; sharing information about what they found; resolving conflicted opinions*)
☐ Very Low   ☐ Low   ☐Moderate   ☐High   ☐Very High

Social messages (*i.e., Sharing personal information and feelings; greetings; humor or jokes; encouragement*)
☐ Very Low   ☐ Low   ☐Moderate   ☐High   ☐Very High

Procedural messages (*i.e., Arranging and scheduling meetings; dividing jobs among group members; managing deadlines, paper limits, and other problems*)
☐ Very Low   ☐ Low   ☐Moderate   ☐High   ☐Very High

How did the technology you used help in working on your group project?

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Are there any aspects of technology use which hindered group work?

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What other technologies might have helped you work more efficiently?

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What were your biggest challenges this week in terms of working on your assignment? These could be personal (lack of trust, lack of motivation, lack of leadership, time management issues), technical issues, or even environmental. (i.e., finding space to meet)

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8-9. Appendix I: Pilot Study Data Collection – Post-Project Survey

Group Cohesion Questionnaire

The following statements ask about your feelings toward your team. Please circle a number from 1 to 5 to show how much you agree with each statement.

		Strongly Disagree				Strongly Agree	
1	This group was a good place to make friends.	1	2	3	4	5	N/A
2	We spent time with one another talking about different off-the-job interests.	1	2	3	4	5	N/A
3	I invited my teammates to do things with me.	1	2	3	4	5	N/A
4	If given the chance, I would choose to leave my team and join another.	1	2	3	4	5	N/A
5	As a team, we were all on the same page.	1	2	3	4	5	N/A
6	My team was united in trying to reach its goals for performance.	1	2	3	4	5	N/A
7	Members of our group were very involved in the work required to complete this class project.	1	2	3	4	5	N/A
8	I was happy with my team`s level of commitment to the task.	1	2	3	4	5	N/A
9	I felt a sense of belonging to this group.	1	2	3	4	5	N/A
10	I felt that I was fin in my group.	1	2	3	4	5	N/A
11	I felt that I was really a member of my team.	1	2	3	4	5	N/A
12	I was excited about working in this group.	1	2	3	4	5	N/A
13	I am happy that I was part of this group.	1	2	3	4	5	N/A
14	My group was one of the best groups in the class	1	2	3	4	5	N/A

Statements 1-4 (Social Cohesion)
Statements 5-8 (Task Cohesion)
Statements 9-14 (Perceived Cohesion)

Collaborative Information Behaviour Questionnaire

The following questions ask about your individual and group information related activities as well as using communication technologies during your group project. Please respond using the following scales.

1. **To what extent do you agree that your team reached a shared understanding of the group project deliverable?**
   ☐ Strongly agree   ☐ Agree   ☐ Somewhat   ☐ Disagree   ☐ Strongly disagree   ☐ N/A

2. **To what extent do you agree that each member of your group had a clear idea of the group`s task?**
   ☐ Strongly agree   ☐ Agree   ☐ Somewhat   ☐ Disagree   ☐ Strongly disagree   ☐ N/A

3. **To what extent do you agree that workload has been divided among team members considering their prior knowledge and expertise?**
   ☐ Strongly agree   ☐ Agree   ☐ Somewhat   ☐ Disagree   ☐ Strongly disagree   ☐ N/A

4. **To what extent do you agree that roles have been assigned equitably among team members?**
   ☐ Strongly agree   ☐ Agree   ☐ Somewhat   ☐ Disagree   ☐ Strongly disagree   ☐ N/A

5. **To what extent do you agree that the tasks were clearly assigned? (i.e., team members knew what they were supposed to do)**
   ☐ Strongly agree   ☐ Agree   ☐ Somewhat   ☐ Disagree   ☐ Strongly disagree   ☐ N/A

6. **To what extent do you agree that schedules were clear? (i.e., your team members knew when they needed to have tasks completed)**
   ☐ Strongly agree   ☐ Agree   ☐ Somewhat   ☐ Disagree   ☐ Strongly disagree   ☐ N/A

7. **To what extent did your team consider the different ideas of group members on how to proceed with the group project?**
   ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

8. **To what extent did your team members communicate and talk about each other`s search approach for finding information?**
   ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

9. **To what extent did your team members consult with each other during search process to seek help and suggestions from others?**
   ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

10. **To what extent did your team members share their search results?**
    ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

11. **To what extent did your team members interact with each other to make sure of the quality of the information they have found?**
    ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

12. **To what extent did you often find yourself duplicating work that other group members had done?**
    ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

13. **To what extent did your group members provide others with information that might help them?**
    ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

Communication Technologies

1. **To what extent did your team members use communication technologies to communicate, interact and share information with each other?**
   ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

2. **To what extent do you think that the chosen communication technologies were suitable and applicable to the practices done during this week?**
   ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

3. **To what extent did your team use communication technologies to exchange detailed and vivid messages?**
   ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

4. **To what extent did your team use communication technologies to reach a shared understanding of the discussed topics?**
   ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

5. **To what extent did your team use communication technologies to provide team members with timely responses and feedback?**
   ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A

6. **To what extent did your team use communication technologies to inform each others of the work they have done to avoid duplicate the work?**
   ☐ A great deal   ☐ Much   ☐ Somewhat   ☐ Little   ☐ Never   ☐ N/A