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The interrelationships between student approaches to learning and group work

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SUMMARY

Background and Aim: As part of the process of nursing students becoming 'work ready' within future health care teams, students need the skills to work collaboratively. In higher education, establishing group work assignments is a teaching method to develop group work skills. Not only is group work an important teaching method to develop effective group work skills but it is also used to activate deep learning. However, to date, there has been a lack of research on the impact of group work on student approaches to learning. This study aimed to examine the interrelationships between students, group work characteristics, and their approaches to learning.
Design and Participants: A survey design was used, before and after a targeted academic skills development intervention, which had a specific focus on the development of group work skills. The sample involved first year undergraduate nursing students undertaking a Bachelor of Nursing programme at a regional university in Australia. A total of 92 students completed the pre-survey, and 102 students completed the post-survey.
Method: Data were collected using quantitative surveys.
Results: Metacognitive awareness was found to best predict a deep approach to learning. Young age and experiencing discomfort in group work were two predictors of a surface approach to learning.
Conclusion: Findings indicate that nurse educators should develop strategies that support students' metacognitive awareness in relation to group work, and also support those students who feel less comfortable in working with others.

Introduction

Developing group work skills amongst students is seen as crucial, not only within university and professional contexts, but also more broadly as part of lifelong learning (Lizzio and Wilson, 2006; Noonan, 2013). Undergraduate nursing students need to develop a range of skills that relate to being an effective group member in the university environment, and as members of health care teams in clinical settings to deliver effective and safe patient and family care (Chapman, 2006; Oldenburg and Hung, 2010; Rossen et al., 2008).

National Competency Standards for Registered Nurses form the foundation for undergraduate nursing programmes to deliver graduates that contribute to quality nursing care through lifelong learning and professional development of themselves and others, and who demonstrate professional practice aligned with the health needs of the population (Nursing and Midwifery Board of Australia, 2013). To contribute to achieving these goals, it is common for nursing educators to use group work, particularly with first-year students, as a means to develop effective group work skills and deep learning from the beginning of their studies.

Supporting the development of these skills early on in a programme of study has the potential for higher student satisfaction and may lead to better group work outcomes (Bonanno et al., 1998; Burdett and Hastie, 2009; Gagnon and Roberge, 2012; Laybourn et al., 2001). The challenge for nursing educators in using group work is firstly how to best facilitate group work within a first-year context so that the process fosters deeper learning, and secondly to ensure a positive learning experience for students. The focus of this paper is to explore what group work characteristics activate deeper approaches to learning.

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Background

Group Work

Group work projects have been described as an assignment of two or more people interacting with each other and interdependently working together to achieve specific objectives (Bormann and Henquinet, 2000). Group work is considered to be an effective learning strategy at university, which requires students to negotiate meaning with their peers, share ideas, collaborate, and reflect and report on learning experiences (Allan, 2011). It also provides practice and preparation for the development of these skills and behaviours which are needed in the workplace (Burdett and Hastie, 2009).

The first year in higher education is acknowledged as not only an academically, but socially challenging time (Palmer et al., 2009). As a practice based discipline, nursing students in particular may experience a range of fears and worries about death, psychomotor examinations, and clinical procedures, including dealing with bodily fluids and invasive procedures. In combination with developing other academic literacies, such as critical thinking skills and academic writing skills for example, these can be very challenging (Andrew et al., 2009; James et al., 2010). In this context, it is not uncommon for nursing educators of first year students to establish group work projects to allow for individual students to work together or participate in group work assignments.

The benefits of group work may be academic and social. Students may develop a greater awareness of group processes and group dynamics, communication and leadership styles, critical thinking, problem solving and social skills, and they may experience personal growth and thereby transition better within their first year of university (Cartney and Rouse, 2006; Kift, 2009; Payne et al., 2006). Moreover, they may 'naturally' develop beneficial peer support networks, without depending on specialised programmes (Huijser et al., 2008). Students working with other students in a group project have been found to develop greater self-autonomy and responsibility, both of which are key elements in developing deep approaches to learning (Bonanno et al., 1998; Bourner et al., 2001; Burdett and Hastie, 2009).

Working collaboratively with others requires the ability to resolve conflicts, solve problems, use effective communication strategies, set goals, manage time and tasks, and be a good observer of team dynamics (Laybourn et al., 2001; McClough and Rogelberg, 2003). It cannot be assumed however, that all students possess the necessary skills to work collaboratively in their first year of university (Burdett and Hastie, 2009; Prichard et al., 2006). Instead, a range of group work skills need to be actively developed and taught to avoid some of the common challenges associated with group work (Glass, 2010; Payne et al., 2006).

Common group work challenges include poor communication, conflict, group members not sharing work and ideas, perceptions of unfair distribution of workload, and non-engaged group members, and even students feeling alienated and oppressed (Chapman, 2006). The growing cultural and demographic diversity of the student population may also be a contributing factor for potential miscommunication and cultural misunderstandings (Burton et al., 2009; Kimmel and Volet, 2010). Furthermore, group work within an online environment can be logistically difficult, particularly when it comes to sharing ideas and establishing relationships (Smith et al., 2011).

For groups to perform successfully, each student needs an understanding of how groups are formed, the elements of successful collaboration, how to prevent and resolve conflict, plan tasks in a coordinated way, and set goals and manage performance (Chen et al., 2004). Beyond knowledge about group processes, students have their own individual ways of learning and knowing, and constructing knowledge. These skills, which are often described as metacognition skills, awareness or reflection, or more simply "thinking about thinking", are necessary in developing self-directed learning skills (Cotterall and Murray, 2009). A study using hierarchical linear modelling found that if university students were in a problem-based learning programme and they employed deep approaches to learning then this had a statistically significant and direct influence on their readiness for self-directed learning (Kek and Huijser, 2011). Being an effective group member often begins with individual processes, which extend towards group processes. When students have the opportunity to contribute towards a group outcome, the skills required to explain and even negotiate their contributions may increase their metacognitive awareness, by creating an awareness of their existing knowledge, and what they may not know in relation to others.

Group processes are acknowledged to involve cognitive, motivational, affective and social dimensions; therefore educational interventions should address both cognitive and affective domains, such as knowledge, skills, and attitudes (Chen et al., 2004; Kimmel and Volet, 2010), as well as motivational and social domains. The literature also suggests that group work task design can greatly impact on how students learn and what approaches they use (Biggs, 1999; Leung et al., 2008). Educators can firstly improve the experiences of students by ensuring that there are clear and explicit learning outcomes. Secondly, clearly communicating the value and process of group work, ensuring fair and equitable distribution of marks, incorporating peer and self-assessment in group work tasks, and providing targeted group skills training are also seen as inherent in good teaching practices (Bonanno et al., 1998; Burdett and Hastie, 2009; Prichard et al., 2006; Noonan, 2013). Using assessment methods such as group oral presentations that encourage understanding, rather than rote learning, may develop deeper approaches to learning (Chin and Overton, 2010; Leung et al., 2008). This is particularly relevant when the course material relies on understanding social contexts.

Approaches to Learning

One of the more strongly theorised areas of research in higher education has been about student approaches to learning (Tight, 2003). Marton and Saljo (1976a, p.10) concluded that "there are qualitative differences in what is learned and that there are functional differences in the process of learning which give rise to the qualitative differences in outcome". The term 'approach to learning' has evolved to refer to two aspects of learning: the predisposition to adopt particular processes and the processes adopted during learning that directly determine the outcome of learning (Biggs, 2001). These are commonly divided into surface and deep approaches to learning. A surface approach to learning focuses on extrinsic motivation, and strategies are used that require the least amount of time and effort to meet the requirements. In contrast, a deep approach to learning focuses on the intention to comprehend, and strategies to maximise conceptual understanding are adopted.

A vast body of research indicates that the differences in students' conceptions of learning (Saljo, 1979; Van Rossum et al., 1985), perceptions of assessments (Marton and Saljo, 1976b; Thomas and Bain, 1984), learning and teaching contexts in different academic departments (Entwistle and Ramsden, 1983; Ramsden, 1979; Ramsden and Entwistle, 1981), and enduring personality characteristics such as gender, age, years of study and faculty differences (Biggs, 1978, 1985, 1987; Watkins and Hattie, 1981), as well as motivation (Laurillard, 1979, 1984) all influence students' approaches to learning.

Research has also consistently shown that learning approaches of students are associated with learning outcomes (Kek et al., 2007; Kek and Huijser, 2011; Trigwell and Prosser, 1991; Van Rossum and Schenk, 1984). Ramsden (1992, p. 59) summed up the powerful relationships between learning approaches and learning outcomes as follows: "surface approaches are usually more strongly linked to poor learning than deep ones are to effective learning, and the connections between grades and learning approaches are less marked than those between measures of learning quality and approaches".

Research has so far indicated that relationships exist between students' individual characteristics, perceptions of learning and teaching contexts, and approaches to learning on the one hand, and learning outcomes on the other. However, the relationship is less clear in a group work context.

Methods

A Conceptual Framework for the Study

This study was guided by Biggs' (2003) 3 Ps Model of Learning. The three aspects of Biggs' model include *presage* (students' learning-related predispositions), *process* (an approach to learning when student and teaching contexts combine), and *product* (desirable learning outcomes). In this model, students' learning is viewed as a product of intertwined relationships between student and teaching factors to produce desirable outcomes. Whilst 'learning' as an end product is important, this study specifically focused on individual characteristics and group work which may influence students' approaches to learning. Many factors that may contribute positively or negatively towards group work have already been identified in the literature, yet none appear to examine group work and approaches to learning. With regard to Biggs' (2003) model, this study focused on the relationships between the presage and process components, which are depicted in Fig. 1. The key research question was: What are the relationships between students' individual characteristics, group work and students' approach to learning?

Teaching Intervention

For this study, group work skills development was embedded into a first-year nursing course curriculum by employing three targeted learning and teaching activities. This included: 1) an online skills package; 2) two experiential face-to-face workshops about group work; and 3) inclusion of student leaders of a peer assisted programme called 'Meet-Up' in the experiential workshops. The overall aim of these interventions was to increase students' knowledge about group work processes, support planning and organisation of group work tasks, provide information about using effective communication strategies, and provide support by peers to foster positive collaborative learning. The intervention was planned prior to the assessment task which was an oral group presentation. Individual students were randomly assigned to a group consisting of 5–6 students in week 5 of the semester. The oral presentation was due between weeks 12 and 13, and was to be delivered on campus.

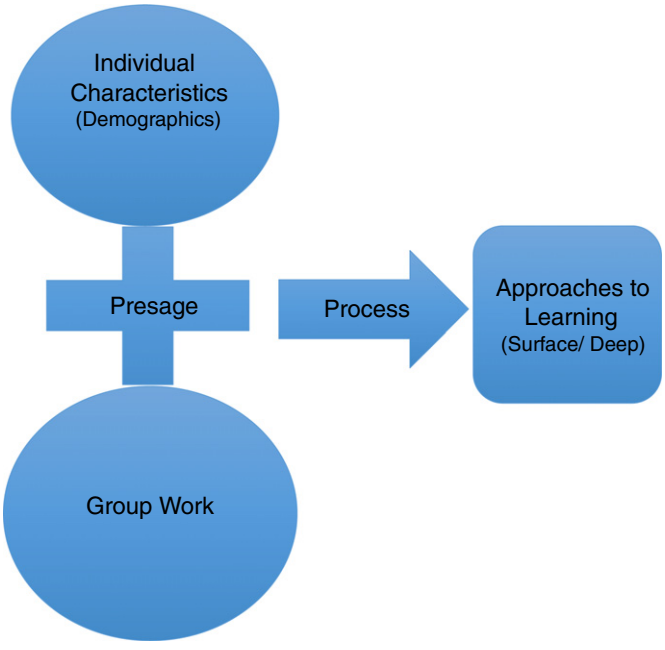

Fig. 1. Presage and process factors (adapted from Biggs' (2003, p. 19) Student Approaches to Learning Theory.

Research Design

This study used a descriptive research design employing a survey with first year nursing students who were undertaking a group work task. Students were surveyed in week 5 of semester one, and again in week 13, three weeks before their exams. The survey consisted of three sets of items asking students about their demographic information, group work, and approaches to learning.

Subjects

A single cohort of 301 first-year nursing students, who were in a course that was delivered at two campuses of a regional university in February/March 2010, was invited to participate. The response rates were 30.5% (n = 92) for the first survey and 33.9% (n = 102) for the second. Subjects gave their informed consent to take part in the study, and ethical approval was obtained from the University Human Research Ethics Committee at the University of Southern Queensland (USQ).

Measurements

Students' approaches to learning were measured using the revised two-factor Study Process Questionnaire (R-SPQ-2F) which is a 20-item instrument, which includes deep and surface approach scales (Biggs et al., 2001).

A 46-item questionnaire was developed to assess students' perceptions of group work. Seventeen of the items measured students' attitudes towards group work. The items were adapted from the 'Feelings towards Group Work' instrument by Cantwell and Andrews (2002), developed for secondary school students. Eleven of the items were newly developed for this study to measure students' confidence working in groups, and seven items were used to measure students' procedural knowledge of group work. The last 11 questions measured students' attitudes towards student–student peer support.

The validation results in Tables 1 and 2 (see Appendix 1) show the final data considered in this study. For Approaches to Learning, the 20 items consisted of the expected surface (10 items) and deep (10 items) approaches to learning. The 17-item Attitudes towards Group Work questionnaire formed a three-factor solution: Values of Group Work (3 items), Preference for Group Learning (7 items) and Discomfort in Group Work (7 items). The 11-item Confidence in Group Work questionnaire formed a two-factor solution: Self-efficacy in Group Work (7 items), and Meta-cognitive Awareness (4 items). The 7 items about Procedure and Knowledge in Group Work formed a factor solution, while the student–student peer support formed another factor solution (11 items).

Data Analysis

The data were analysed using the IBM SPSS Statistics version 19. A hierarchical multiple regression method was used to explore the relationships between individual characteristics, student perceptions of group work and approaches to learning, allowing each predictor variable on the dependent variables to be assessed (Tabachnick and Fidell, 2007). T-tests were conducted to compare the learning approach scores before and after the skills development workshops. Preliminary analyses were conducted to ensure that there was no violation of the assumptions of normality, linearity, multi-collinearity and homoscedasticity.

For this study's regression method, each variable was added in blocks, starting with the most distal (individual characteristics) to the most proximal learning contexts facing the students (group work). The variables and sequence entered were different for the two approaches to learning, and this decision was based on the strengths of their relationships with the two approaches to learning. The sequencing of variables was entered based on the strength of the correlations, with the strongest correlations entered first. As indicated in the correlation analyses in

Table 3 (see Appendix 2), the statistically significant variables were selected.

As this study is about exploring relationships, it is enough to know only something about "the strength of association between variables and not about how or why variables are linked" (Russell, 1997, p. 508). Therefore, for all the hierarchical regression models, R, R^2, adjusted R^2, R^2 change, unstandardised regression coefficients (b), and standardised regression coefficients (β) after the entry of each block of variables are displayed. In the final model, the semi-partial correlations (sr^2), which indicate the unique contribution of a particular variable to the dependent variable, are shown (Tabachnick and Fidell, 2007).

Data/Results

Deep Approaches to Learning

Table 4 (see Appendix 3) displays the regression results indicating the extent to which individual characteristics, metacognitive awareness, procedure and knowledge in group work, student–student peer support, preference for group learning, self-efficacy in group work and values for group work (entered in that sequence)0 are able to predict adoption of deep approaches to learning.

The results in Model 1 show that when individual characteristics were entered, they explained about 9% of variance in deep approaches to learning. Furthermore, the older students adopted deep approaches to learning more so than younger students. The individual characteristics combined to have a small association with differences in deep approaches to learning scores ($R^2 = 8.6\%$, effect size = 0.09). The results in Model 2 show that meta-cognitive awareness had large and significant associations with deep approach to learning scores. Meta-cognitive awareness added a large 23% to the variance in deep approaches to learning. When procedure and knowledge of group work was entered in Model 3, they made a small difference in deep approach scores (1.4%). However, meta-cognitive awareness continued to have a large and significant association with deep approach to learning scores. For Model 3, the individual characteristics, meta-cognitive awareness and procedure and knowledge combined to have a large association with variance in deep approaches to learning ($R^2 = 32.8\%$, effect size = 0.49).

In Models 4, 5, 6 and 7, when student–student peer support, preference for group learning, self-efficacy in group work, and values of group work were entered respectively, they did not result in any significant associations with deep approach to learning scores.

In the final regression equation, the results indicate that only one predictor of deep approaches to learning in a group work environment was meta-cognitive awareness ($\beta = 0.42$). This predictor alone uniquely contributed 10% ($sr^2 = 0.97$) to explain the variance in deep approaches to learning. The final R of 0.61 demonstrated that meta-cognitive awareness alone combined to have a large effect (effect size = 0.60) and significant associations with deep approaches to learning [$F(11,69) = 3.77$, $p = 0.000$].

When individual items in the meta-cognitive scale were regressed, the results indicated that the items that predict deep approaches to learning were about knowing one's own strengths and weaknesses as a group member ($\beta = 0.31$, $p < 0.05$) and about having good time management skills ($\beta = 0.26$, $p < 0.05$). Both items uniquely contributed 4% and 3% respectively to explain the variances in deep approaches to learning.

The t-tests in Table 5 (see Appendix 4) showed a statistically significant increase in deep approach to learning scores before ($M = 32.89$, $SD = 6.47$) and after ($M = 34.87$, $SD = 6.38$) the intervention, with $t(177) = -2.1$, $p = 0.04$, with small effect size (eta-squared 0.2).

Surface Approaches to Learning

Table 6 (see Appendix 5) displays the regression results for surface approaches to learning. The results in Model 1 indicated that younger students had higher surface approaches to learning scores than older students. All the individual characteristics combined to have a small association with differences in surface approaches to learning scores ($R^2 = 16.2\%$, effect size = 0.19). In Model 1, the associations between individual characteristics and surface approaches to learning were significant at [$F(5,71) = 2.75$, $p = 0.02$]. In Model 2, discomfort in group work was significantly associated with surface approaches to learning, with a regression weight of 0.344 at $p < 0.01$. That is, students with high discomfort in group work were more likely to use surface approaches to learning than those students who felt more comfortable with group work. Age continued to be significantly associated with surface approaches to learning with a regression weight of −0.344 at $p < 0.01$. Younger students who felt high discomfort with group work were more likely to adopt surface approaches to learning than both younger and older students who felt more comfortable with group work. These predictors combined to have a large association with differences in surface approach to learning scores ($R^2 = 26.4\%$, effect size = 0.36). In Models 3 and 4, when metacognitive awareness and student–student peer support were entered respectively, they did not result in any significant associations with surface approach to learning scores.

In the final regression, the results revealed that surface approaches to learning were strongly predicted by age ($\beta = -0.30$) and discomfort in group work ($\beta = 0.30$) in a group work environment. Each of these variables uniquely contributed 7% and 8% respectively to the overall R^2. That is, surface approaches to learning were more likely to be adopted by younger students and those students who felt discomfort in group work. Overall, the final R of 0.54 indicated that the predictor variables combined to have a large effect (effect size = 0.42) and significant associations with surface approaches to learning [$F(8, 68) = 3.57$, $p = 0.002$].

Surface approaches to learning t-test results in Table 7 (see Appendix 6) showed a similar picture to deep approaches to learning, where there was a similar statistically significant increase in surface approach to learning scores before the intervention ($M = 20.77$, $SD = 6.59$) and after the intervention ($M = 23.78$, $SD = 7.43$) with $t(146) = -2.4$, $p = 0.02$, also with a small effect size of 0.04.

Discussion

According to Lizzio and Wilson (2006, p. 701), "there is a rich social context and an implicit and often undisguisable web of factors surrounding the choices students face in self-managing their collaborative learning experience". This study has focused on some of these factors to contribute to developing a clearer idea about which group work characteristics in a learning and teaching context may have an impact on learning. Many other factors could be brought into this, such as gender, socio-economic background, ethnicity and educational background, but these are beyond the scope of this particular paper.

In this study a strong relationship between metacognitive awareness and a deep approach to learning was found. Interestingly however, this study also showed a significant increase in deep approaches to learning after the learning and teaching intervention. Whilst direct causality cannot be determined in relation to the intervention resulting in increasing students' metacognitive awareness and thus a deeper approach to learning, the increase in deep learning scores is statistically significant and the importance of metacognitive awareness cannot be ignored.

Metacognitive awareness in this study was related to time management, goal setting, and self-reflection as a group member, including perception of their own strengths and weaknesses. This study largely supports Flavell's (1979) categories of metacognitive knowledge: *person knowledge* (knowledge about themselves and others), *task knowledge* (pre-existing knowledge about information and resources needed to undertake the task), and *strategy knowledge* (strategies most likely to be effective in achieving the goal). In this context, students' ability to reflect on themselves and their learning, their ability to consider learning

within the context of others and their ability to plan effectively were all important individual characteristics which facilitate being an effective group member.

The process of group work demands that students use deep learning strategies to manage the process of working with others such as communicating, organising, researching, writing, and analysing the task. Finally, those with higher metacognitive awareness may have a greater ability to think not for the group but individually (McCarthy and Garavan, 2008). When we focus on surface approaches to learning, the results show that younger students are more likely to adopt surface approaches to learning. The additional interesting impact factor here is discomfort with group work. This creates a potential correlation along the following trajectories: deep approaches to learning/meta-cognitive awareness versus surface approaches to learning/discomfort with group work.

It is suggested that younger students who adopt a surface approach to learning may have difficulty engaging in the complexity of a group work task. This could be due to younger students tending to be recent school leavers, and therefore having more immediate links to more traditional learning environments that demand lower level learning skills such as memorising and recall. This result is consistent with the regression investigation by Vermunt (2005) that showed that the reproduction-directed learning pattern (surface approaches to learning) was prevalent amongst first year students in seven academic disciplines due to these students' lengthy educational experiences within the traditional, didactic learning environments in their secondary schooling before entering university.

It is possible that the group composition may also be a factor. Studies on collaborative learning have shown that learning in groups leads to higher cognitive benefits such as higher level thinking and conceptual learning (Gilles, 2000; Lou et al., 2001). Working and learning in groups provide affordances for social learning and comparison (Solomon et al., 2010) and stimulate achievement motivation and greater self-efficacy (Davies, 2009). Davies (2009) argues that these benefits are only possible if the students in the group differ in their motivational traits and self-efficacy and they bring different types of experiences and expertise to the group. Thus, having all surface learners in a group would only compound the challenges of group work.

There is also another view of group work that argues that having surface learners and deep learners combined in a group, whilst possibly enhancing the learning of surface learners, could also contribute to surface learners feeling inadequate, vulnerable and alienated (Chapman, 2006). Placing diverse students together in a group is also known to have disadvantages such as negative impact on group dynamics and effectiveness (Van Knippenberg and Schippers, 2007) and relationship conflict and social loafing (Curseu and Schruijer, 2010).

However, the interesting comparison results of the increased surface learning scores after the intervention seem to imply that a diverse make-up of group work might be beneficial. In this study, it appears that more groups were less diverse in terms of different motivational traits, experiences and expertise. Not only did this culminate in limiting the potential for students to develop higher level learning, achievement motivation and self-efficacy (Davies, 2009) but it also amplified all the common problems with group work, and students continued to adopt lower level learning strategies as a means of dealing with those problems.

Implications for Nursing Education

If our aim is to increase deep approaches to learning over surface approaches, then the results of this study suggest that we need to look carefully at the way we select individual group members, in order to strike the right balance of stimulation and peer support and at the same time ensure the incorporation of deep learning strategies in group skills development workshops.

Especially when it comes to discomfort with working in groups, other studies have shown that initial discomfort (here associated with surface approaches to learning) may be overcome, which can subsequently lead to enhanced performance in groups (Strauss et al., 2011), and perhaps to an increase in deep approaches to learning. Again, however, this implies that striking the right balance in the make-up of groups for social comparisons and learning is crucial. Using role-playing scenarios in relation to group work and support from peer mentors are two suggested strategies for nurse educators.

The findings of this study also highlight that care needs to be taken when creating student groups for assessment. It may be important to mix not only the ages of students and different learning approaches, but also students who feel comfortable and positive about working with others, with those who do not. The knowledge, skills and attitudes of students towards group work could be established with screening surveys before the formation of groups, so as to guide the final selection of students. Thus, the results indicate that employing a directed selection strategy by educators may be more effective than allowing the students to randomly select their own group members, particularly in a first year teaching context. Moreover, the results indicate that surface learners may be at risk within the group work process. Identifying these students early, supported by strategies which may help with aspects such as critical thinking, time management, problem-solving and communication skills, may enhance their learning and facilitate a more positive group work experience.

Developing skills necessary for group work requires educators to consider interventions that introduce students to the concept of group work, provide strategies in overcoming issues commonly encountered, and help them reflect on their own role as group members. This may be facilitated by encouraging students to reflect on their own strengths and weaknesses, and encouraging them to develop strategies to enhance time management and goal setting, as individuals and as a group. The use of learning contracts may be a useful educational strategy as a group tool for students prior to commencing the task, to help them plan and organise the task as a group.

Conclusion

This study has focused in depth on a small number of factors that have an impact on the relationship between student learning approaches and group work, thereby providing some insights into the links between the two. Adding more detail to these links, by adding more potential impact factors in follow-up studies, will enhance our ability to develop a more effective group work environment, and thus develop deeper approaches to learning. In the meantime, based on this particular study, the preliminary conclusion is that diversity in the selection of group members appears to be good for group work, and potentially encourages deep approaches to learning. Furthermore, designing a group work skills development programme, topics or modules that teach students to reflect on their own strengths and weaknesses, as well as strategies to enhance time management and goal setting, as individuals and as a group, is essential.

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Appendix 1

Table 1
Summary of validation results.

Approaches to learning		
(Two-component solution for Motives with a total of 53.3% variance, two-component solution for Strategy with a total variance of 50.7% variance)		
Items	Deep	Surface
I find that at times studying gives me a feeling of deep personal satisfaction.	0.63	
I feel that virtually any topic can be highly interesting once I get into it.	0.58	
I find that studying academic topics can at times be as exciting as a good novel or movie.	0.78	
I work hard at my studies because I find the material interesting.	0.85	
I come to most tutorial classes with questions in mind that I want answering.	0.68	
I find that I have to do enough work on a topic so that I can form my own conclusion before I am satisfied.	0.60	
I find most new topics interesting and often spend extra time trying to obtain more information about them.	0.73	
I test myself on important topics until I understand them completely.	0.78	
I spend a lot of my free time finding out more about interesting topics which have been discussed in different tutorial classes.	0.74	
I make a point of looking at most of the suggested readings.	0.69	
My aim is to pass the course while doing as little work as possible.		0.74
I do not find my course very interesting so I keep my work to the minimum.		0.72
I find I can get by most assessments by memorising key sections rather than trying to understand them.		0.58
I find it is not helpful to study topics in depth. It confuses and wastes time, when all you need is a passing acquaintance with topics.		0.81
I see no point in learning material which is not likely to be assessed or tested.		0.74
I only study seriously what's given out in tutorials or lectures or in the course outlines.		0.64
I learn some things by memorising, going over and over them until I know them by heart even if I do not understand them.		0.63
I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.		0.73
I believe that tutors shouldn't expect students to spend significant amounts of time studying material everyone knows won't be examined.		0.60
I find the best way to pass examinations is to try to remember answers to likely questions.		0.75

Procedure and knowledge in group work	
(One-component solution with a total of 52% variance)	
Items	
I have an understanding of the different stages of group formation.	0.74
I can identify positive benefits of group work.	0.75
I can identify positive group strategies which can be used at each group stage.	0.81
I know how to give constructive peer feedback to fellow students.	0.64
I understand the difference between peer and self-assessment.	0.67
I know how to use peer feedback in a positive way to assist with my learning in the future.	0.72
I can describe the benefits of shared leadership.	0.69

Attitudes towards group work			
(Three-component solution with a total 47.1% variance)			
Items	Values of group work	Preference for group learning	Discomfort in group work
I think working in a group is important in professional nursing.	0.54		
I like to involve all members of a group regardless of their age, experiences, ethnic background.	0.74		
It is important to avoid assumptions about people in the group.	0.77		
I prefer to work in a group with people the same age to me.		0.65	
I prefer to work in a group with people of the same sex as me.		0.63	
I prefer working in a group with other people from the same cultural/ethnic background as me.		0.54	
I rarely feel relaxed in a group situation.		0.52	
I think that sometimes way in which group work is marked is unfair.		0.57	
Group work doesn't always value each person's contribution.		0.52	
I have had previous negative experiences working in a team.		0.50	
I prefer working within a group than myself.			0.72
I enjoy working within a group.			0.65
I do not like to study within a group.			0.53
I prefer to work on my coursework by myself.			0.66
I feel confident working on a group project.			0.68
I feel like I belong more to the course when I am working in a group.			0.70

Confidence in group work		
(Two-component solution with a total of 48.2% variance)		
Items	Self-efficacy in group work	Meta-cognitive awareness
I believe that I have good communication skills to be able to work in a group.	0.66	
I feel that I have good listening skills.	0.52	
I feel that I have good problem-solving skills.	0.76	
I feel that I have the skills to be a leader in the group.	0.77	
I have good negotiation skills.	0.64	
I feel that I can encourage other students in the group to contribute.	0.42	

(continued on next page)

Table 1 (*continued*)

Confidence in group work		
(Two-component solution with a total of 48.2% variance)		
Items	Self-efficacy in group work	Meta-cognitive awareness
I have good computer skills necessary to communicate online with students.	0.46	
I have good time management skills.		0.48
I have a good ability to set goals and stick to them.		0.50
I self-reflect on my participation as a group member.		0.88
I think about my own strengths and weaknesses as a group member.		0.89

Attitudes of student–student peer support	
(One-component solution with a total of 65.3% variance)	
Items	
The Meet-Up peer leader provided useful study tips about working together as a group.	0.84
The Meet-Up peer leader listened to how our group was going.	0.84
I thought that the Meet-Up peer leader was helpful because they had done the course before.	0.84
The Meet-Up peer leader was able to help with ideas of how our group could work better together.	0.86
The Meet-Up peer leader was able to help our group develop a team learning contract.	0.66
The Meet-Up peer leader was able to help with any problems we were having with our group work.	0.76
The Meet-Up peer leader helped with understanding the assessment task.	0.81
The Meet-Up peer leader helped me to have a positive experience with group work in this course.	0.81
Because of the Meet-Up peer leader support, I am more confident in my ability to work in a group.	0.83
As a result of the Meet-Up peer leader support, I have developed more skills to work in a group.	0.83
Because of the Meet-Up peer leader support, I felt more satisfied with this assessment item.	0.81

Table 2
Summary of reliability results.

Variable	Time period	Factors derived	No. of items	Cronbach's alpha
Approaches to learning	Week 5	Deep approach to learning	10	0.85
		Surface approach to learning	10	0.82
	Week 13	Deep approach to learning	10	0.86
		Surface approach to learning	10	0.86
Group work	Week 5	Procedure and knowledge in group work	7	0.87
		Preference for group learning	7	0.76
		Discomfort in group work	7	0.77
		Values of group work	3	0.63
		Self-efficacy in group work	7	0.86
		Meta-cognitive awareness	4	0.78
	Week 13	Procedure and knowledge in group work	7	0.84
		Preference for group learning	7	0.79
		Discomfort in group work	7	0.67
		Values of group work	3	0.63
		Self-efficacy in group work	7	0.74
		Meta-cognitive awareness	4	0.77
Student–student peer support	Week 13 only	Student–student peer support	11	0.95

Appendix 2

Table 3
Variables used for regression analyses: correlations.

Predictor variables used in regression	Deep approach to learning	Sequence	Surface approach to learning	Sequence
Student–student peer support	**0.26**[a]	3	**−0.29**[b]	**3**
Procedure and knowledge in group work	**0.30**[b]	2	−0.15	Not entered
Self-efficacy in group work	**0.23**[a]	5	−0.14	Not entered
Meta-cognitive awareness	**0.48**[b]	1	**−0.31**[b]	**2**
Preference for group learning	**−0.24**[a]	4	0.17	Not entered
Discomfort with group work	−0.18	Not entered	**0.38**[b]	**1**
Values of group work	**0.23**[a]	6	−0.14	Not entered

[a] Correlation is significant at the 0.05 level (2-tailed).
[b] Correlation is significant at the 0.01 level (2-tailed).

Appendix 3

Table 4
Results of hierarchical multiple regression analyses for deep approach to learning.

Variables	Model 1		Model 2		Model 3		Model 4	
	b	β	*b*	β	*b*	β	*b*	β
Individual characteristics								
Age	0.14	***0.24***[*]	0.06	0.11	0.06	0.10	0.06	0.10
Gender	−3.11	−0.09	−2.16	−0.07	−2.06	−0.06	−1.97	−0.06
International/domestic	3.9	0.15	0.46	0.02	0.23	0.01	0.19	0.01
English language	1.55	0.08	−1.60	−0.08	−1.42	−0.07	−1.37	−0.07
Campus	−0.63	−0.05	−1.46	−0.12	−1.32	−0.10	−1.30	−0.10
Group learning environment								
Metacognitive awareness			1.50	***0.52***[***]	1.3	***0.45***[***]	1.28	***0.45***[**]
Procedure and knowledge in group work					0.26	0.14	0.25	0.14
Student–student peer support							0.02	0.02
Preference for group learning								
Self-efficacy in group work								
Values of group work								
Multiple R		0.29		0.56[***]		0.57[***]		0.57[***]
R^2 (%)		8.6		31.4		32.8		32.8
Adjusted R^2 (%)		2.5		25.9		26.4		25.4
R^2 change (%)		–		22.9		1.4		0
Effect size[d]		0.09[a, b]		0.46[c]		0.49[c]		0.49[c]

Variables	Model 5		Model 6		Model 7	
	b	β	*b*	β	*b*	β
Individual characteristics						
Age	0.04	0.01	0.06	0.09	0.07	0.12
Gender	−2.71	−0.08	−2.65	−0.08	−3.33	−0.10
International/domestic	−0.19	−0.01	0.18	0.01	0.28	0.01
English language	−1.06	−0.06	−1.08	−0.05	−0.65	−0.03
Campus	−0.78	−0.06	−0.78	−0.06	−0.44	−0.04
Group learning environment						
Metacognitive awareness	1.46	***0.47***[***]	1.27	***0.44***[**]	1.20	***0.42***[**]
Procedure and knowledge in group work	0.16	0.09	0.05	0.03	−0.02	−0.01
Student–student peer support	−0.02	−0.03	−0.03	−0.04	−0.06	−0.08
Preference for group learning	−0.33	−0.18	−0.35	−0.19	−0.31	−0.17
Self-efficacy in group work			0.25	0.12	0.25	0.12
Values of group work					0.74	0.16
Multiple R		0.59[***]		0.60[***]		0.61[***]
R^2 (%)		35.1		35.9		37.5
Adjusted R^2 (%)		26.8		26.7		27.6
R^2 change (%)		2.2		0.8		1.6
Effect size[d]		0.54[c]		0.56[c]		0.60[c]

Effect size:
[a] = small.
[b] = medium.
[c] = large.
[d] Calculation of effect size using Cohen's (1992, p. 157) guideline, Effect size = R^2 / (1 − R^2), small effects = 0.02 to less than 0.15, medium effects = 0.15 to less than 0.35, and large effects = above 0.35.
[*] $p < 0.05$.
[**] $p < 0.01$.
[***] $p < 0.001$.

Appendix 4

Table 5
Differences in deep approach to learning scores.

	Mean		Standard deviation		p value	Effect size[d]
	Week 5 (n = 81)	Week 13 (n = 98)	Week 5 (n = 81)	Week 13 (n = 98)		
Deep approach to learning	32.89	34.87[b]	6.47[c]	6.38	0.04	0.02[a]

Effect size:
[a] = small.
[b] = medium.
[c] = large.
[d] The guideline proposed by Cohen (1992) for interpreting effect size values were: 0.01 = small effect, 0.06 = moderate effect, and 0.14 = large effect.

Appendix 5

Table 6
Results of hierarchical multiple regression analyses for surface approach to learning.

Variables	Model 1		Model 2		Model 3		Model 4	
	b	β	*b*	β	*b*	β	*b*	β
Individual characteristics								
Age	−0.24	***−0.37*** **	−0.22	***−0.34*** **	−0.20	***−0.30*** *	−0.20	***−0.30*** *
Gender	5.67	0.16	7.28	0.20	6.76	0.19	6.42	0.18
International/Domestic	2.18	0.07	1.52	0.05	2.80	0.09	2.93	0.09
English language	−3.45	−0.16	−2.95	−0.14	−1.84	−0.09	−2.01	−0.09
Campus	−0.88	−0.06	−2.14	−0.15	−1.63	−0.12	−1.73	−0.12
Group learning environment								
Discomfort in group work			0.73***	***0.34*** **	0.65	***0.30*** **	0.64	***0.30*** **
Meta-cognitive awareness					−0.60	−0.19	−0.54	−0.17
Student–student peer support							−0.05	−0.06
Multiple R		0.40*		0.51**		0.54**		0.54**
R^2 (%)		16.2		26.4		29.3		29.6
Adjusted R^2 (%)		10.3		20.1		22.1		21.3
R^2 change (%)		–		10.1		2.9		0.3
Effect size[d]		0.19 [a,b]		0.36[c]		0.41[c]		0.42[c]

Effect size:
[a] = small.
[b] = medium.
[c] = large.
[d] Calculation of effect size using Cohen's (1992, p. 157) guideline, Effect size = R^2 / $(1 - R^2)$, small effects = 0.02 to less than 0.15, medium effects = 0.15 to less than 0.35, and large effects = above 0.35.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Appendix 6

Table 7
Differences in surface approach to learning scores.

	Mean		Standard deviation		p value	Effect size[d]
	Week 5 (n = 51)	Week 13 (n = 97)	Week 5 (n = 51)	Week 13 (n = 97)		
Surface approach to learning	20.76	23.78	6.59[b]	7.42[c]	0.02	0.04[a]

Effect size:
[a] = small.
[b] = medium.
[c] = large.
[d] The guideline proposed by Cohen (1988) for interpreting effect size values were: 0.01 = small effect, 0.06 = medium effect, and 0.14 = large effect.

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