Student Conceptions of Group Work: Visual Research into LIS Student Group Work Using the Draw-and-Write Technique

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The use of collaborative pedagogies is a well-respected and common feature of higher education, and the ability to work well in a team is a desirable graduate and professional attribute. However, tutors can often experience significant issues with the support and management of student group work, and students can find group work difficult to manage and have very negative perceptions of group work. This paper examines LIS students' conceptions of group work as revealed through the students' drawings. Some 146 drawings of group work were collected from taught postgraduate and undergraduate students in an Information School. The drawings reveal a wide range of conceptions of group work, from very process- and tool-driven conceptions to more metaphorical conceptions of idea generation, puzzle, or a site of strength. Students were concerned with group structures and the role of leader. Group work is negatively affected by stress and perceptions of unequal contribution of group members. Implications are drawn for LIS educators, and suggestions are made for the use of drawing as a method of group support.

Keywords: collaboration, draw and write, group roles, group work, visual methods

It is widely acknowledged that people learn instinctively and naturally from others, and that much meaningful student learning happens in the small-group context (Race, 2007). Research has shown that group work has a positive impact on students' engagement and performance, leading to work of a higher quality and better marks than individual students can achieve on their own (Arendt & Gregoire, 2006). Students value the opportunity to share ideas and viewpoints and understand different perspectives (Gagnon & Roberge, 2012). One role of higher education is to prepare students for their careers as LIS professionals, and as a consequence, group work can be seen as a vital aspect of university study. Employers actively seek graduates who can work well with others (Race; Volet & Mansfield, 2006), and working together in small groups at university gives students the opportunity to build team-working skills and prepare for professional team-working (Rafferty, 2013). LIS professional bodies recognize that skills

for cooperation, networking, and partnership working are important aspects of LIS professionals (CILIP, 2017), as is understanding the social interaction aspect of learning (Bertot & Sarin, 2016).

However, students themselves have expressed varying, and often negative, opinions about working in groups in higher education (Hillyard, Gillespie, & Littig, 2010). It is not always possible for students to see the transferability of student group-work experiences to their professional lives (Arendt & Gregoire, 2006). Issues of fairness in group work make assessment problematic, particularly if there is "free-riding," where some group members do all the work and others do none (Slavin, 1990). The prospect of dealing with free-riding can cause students to dread modules with group work (Freeman & Greenacre, 2010).

KEY POINTS

- Visual research methods were used to investigate conceptions of group work among students based in one UK Information School.
- The drawings reveal a variety of student conceptions of group work, ranging from very concrete depictions of the functions and processes of group work to more abstract conceptions and include both positive and negative views.
- The range of conceptions represented in the drawings make a useful starting point for the discussion of roles and behaviors in group work with students.

Educators and theorists are convinced of the personal and professional benefits of group work; however, students are concerned with the realities of managing group work and achieving good grades. In this paper, the contested landscape of student group work is examined through the medium of student-created drawings, contributed by students in the Information School at the University of Sheffield. The drawings were collected and analysed using the "draw-and-write" methodology, which has been widely used with children (e.g. Weber & Mitchell, 1996) and is being used increasingly to collect data from adults both in a higher Education context (Dean, 2015; Hartel, 2014a) and in LIS research (Pollak, 2017). In this research, a protocol designed and implemented by Hartel (2014a, 2014b) to study student conceptions of information was used to provide a methodological framework for the collection and analysis of the data.

The central research question addressed in this paper is "what conceptions do students have about working in groups?" In addition, the study aims to discover how students work together in their groups, as well as the positive and negative aspects of group work that are expressed.

The significance of this study

Previous studies that have sought to understand group work have collected quantitative survey data (e.g., Hall & Buzwell, 2013), while others have collected qualitative data in the form of interviews and focus groups

(e.g., Volet & Mansfield, 2006). Much previous research has focussed on students' experience in a single module or class (Kimmel & Volet, 2010). This large study, which involved participants from across an Information School, attempts to understand LIS students' broader conceptions of group work, going beyond their experience in a single module or class. It is the first study of student group work to use drawings as data, and this novel methodological approach reveals a range of unique perspectives on this challenging yet extremely valuable aspect of learning in LIS education. In what follows, the theoretical literature on how students work together in groups is discussed first, followed by a review of the multidisciplinary and LIS-specific literature on the perceptions and opinions that students have about working in groups in the higher education context. Previous research using the draw-and-write methodology is explored, before the particular method applied in this research is discussed. A content and thematic analysis of the drawn data is presented, and then the results are discussed with reference to the literature.

Literature review

Theories of collaborative learning

Social constructivist theorists assert that cooperative learning is more successful than individual learning (Slavin, 1990). This social constructivist view of learning in higher education argues that students, through engaging in group work, take responsibility for their own learning and are given the opportunity to develop important abilities to analyse, evaluate, and synthesise (Ayres, 2015).

In their extensive research on group learning, D.W. Johnson and R. T. Johnson (1992, 1999, 2002; Johnson, Johnson, & Smith 2007) define cooperative groups as those where members work actively for the benefit of all, leading to higher achievement for everyone. Cooperative learning, as compared with competitive or individualistic learning, "results in higher achievement, greater long term retention of what is learned, more frequent use of higher level reasoning (critical thinking) and metacognitive thought, more willingness to take on difficult tasks and persist (despite difficulties) in working towards goal accomplishment, more intrinsic motivation, transfer of learning from one situation to another and greater time on task" (Johnson et al., 2007, p.19). The challenge for LIS educators lies in ensuring that group work at university achieves the happy state of cooperative learning.

Models of group roles and group functioning

It is often the case that group members take on different roles within the group, and sometimes these can be both formal (e.g., leader, secretary) and informal (Johnson & Johnson, 2003). Clearly defining roles and responsibilities at the start of group work can have a positive impact on the experiences of group members (Gagnon & Roberge, 2012). Groups can really struggle with issues of authority and leadership (Cartney & Rouse,

2006), so identifying a leader can be problematic (Fearon, McLaughlin, & Eng, 2012). Freeman and Greenacre (2010) advise that having defined student roles for groups, complete with explicit skill sets, is one way in which free-riding can be addressed by tutors.

Belbin (2010) categorises nine team roles that describe tendencies people need in order to behave in certain ways when they interact with others in a team environment. In higher education, students are often invited to self-assess their preferred Belbin team role; furthermore, the roles can also be used as a stimulus to discuss potential problems in groups and how they can be addressed (Smith, Polglase, & Parry, 2012).

A further view of group functioning is to look at the phases of group development, and the most influential of these is Tuckman's (1965) five-stage model (Forming, Storming, Norming, Performing, and Adjourning), which is widely cited in both the management and educational literature (Egolf & Chester, 2013; Johnson & Johnson, 2003). However, concerns are raised that the model is overly simplistic and does not represent iterative group processes, or what happens if the group does not achieve success – for instance, some groups do not move beyond the "storming" stage (Bonebright, 2010). Conversely, others do not go through this stage at all (Asgari, 2017).

How students work together

Students working together in a shared space is seen to offer much greater benefits than dividing up the task and working individually (Mayne, 2012). Research has shown that there is a connection between discourse and learning, namely, that discussions with peers can help students gather and clarify information, can support knowledge construction, can increase motivation and engagement, and can reinforce learning (Askell-Williams & Lawson, 2005). However, establishing suitable times and places for meetings can be difficult and is adversely affected by students' different and conflicting academic and personal commitments (Fearon et al., 2012; McKinney & Sen, 2016).

When not meeting face-to-face, students flexibly use a range of modern communications hardware (smart phones, tablets, etc.), and software (Facebook, email, WhatsApp, etc.) to work collaboratively (McKinney & Sen, 2016; Nortcliffe & Middleton, 2013). Even if students are working in co-located teams, much student group work is "heavily mediated by technology" (Benfield and De Laat, 2010, p.188) In particular, mobile phones enable communication at the point of need and facilitate rapid communication (Lauricella & Kay, 2013).

Students with differing academic goals can disrupt group work; for example, some students simply want to achieve a pass grade, while others who aim for higher grades can feel that they take on a disproportionate amount of work (Belluigi, 2014). It has been found that students identify that poor attendance at group meetings is a barrier to effective group work (Hassanien, 2006).

Free-riding or social loafing

Free-riding is present as a phenomenon in many disciplines and contexts, and various solutions have been tried (e.g., creating greater group cohesion and modifying the distribution of grades within the group) in order to address the problem (Hall & Buzwell, 2013). Groups where all members receive the same grade experience greater problems with free-riding (Clark & Baker, 2011). Free-riding can be incredibly destructive to groups, and those perceived as free-riders are punished by being given tasks to which they are unsuited, arranging meetings at times they are unable to attend, excluding them from email exchanges, and setting unrealistic deadlines (Freeman & Greenacre, 2010).

Students can struggle, though, to understand why their peers are not contributing well to a group, and they may not distinguish between laziness and other reasons for non-engagement (Freeman & Greenacre, 2010). Differing work styles can cause perceptions of free-riding, as can low self-esteem and low opinions of work quality (Hall & Buzwell, 2013).

Multicultural groups

Collaborative working enables students to work with people from different backgrounds, be exposed to different perspectives, and benefit from diversity in the student population (Boyer Commission, 1998). Kimmel and Volet (2010) found that culturally diverse groups had a more positive perception of the interpersonal, cognitive, and management aspects of their group work and seemed better able to create a good group-working environment.

Students from different cultural and national backgrounds have different prior educational experiences and different cultural norms that can make working in multicultural groups problematic (Popov et al., 2012). Chinese students, who often have a teacher-centred, didactic, and individualistic educational background, favour hierarchical structures in group work and seek to have a designated group leader, which is one way in which they attempt to deal with variable levels of contribution to a group. They seek compromise in conflict situations, and while they are comfortable working in study groups, they find that cultural norms around status and "face" limit their ability to be open about disagreements in group discussions (Chan, 1999; Clark & Baker, 2011; Wang, 2012). Research into multicultural groups in the University of Sheffield Information School, the same site of research as this study, found that culturally specific academic attitudes, difficulties in communicating effectively (exacerbated by poor competence in English), the complexity of the task, and the amount of support available had a major impact on the performance of multicultural groups (Asgari, 2017).

Group working in LIS education

There is a small body of literature relating to group work in LIS education; however, research tends to focus on aspects of group functioning related to the LIS research areas. For example, a number of studies focus

primarily on information behaviour in a collaborative setting (Hyldegård, 2006; O'Farrell & Bates, 2009). Other studies focus on the use of learning technologies or online tools to support collaboration; for example, Elgort, Smith, and Toland (2008) describe the use of a wiki as a platform for student collaborations, and Virkus (2008) comments on the range of web 2.0 technologies that have value in LIS education to support constructivist collaborative pedagogies. LIS students are adept at using a range of communication technologies yet still value face-to-face meetings (McKinney & Sen, 2016). Teaching information literacy to students in varied disciplines using collaborative pedagogy librarians is also a feature of the LIS literature (e.g., Ashley, Jarman, Varga-Atkins, & Hassan, 2012). In the Ashley et al. study, various approaches were trialled to ensure that groups were well supported in their enquiry projects (for example, individual and group journals) and had personal tutor support. A further subset of literature focuses on the differing experiences of distance and face-to-face LIS learner, including their experience of collaboration (Bernier & Stenstrom, 2016; Dow, 2008; Haigh, 2007). Nevertheless, it is apparent from the LIS-specific literature that many of the issues encountered by educators and students with regard to the support and management of group work mirror those in the multidisciplinary literature. For example, groups in LIS education have found it difficult to manage their time and communicate effectively (O'Farrell & Bates, 2009) and have experienced frustration and disappointment due to differences in motivation and ambition between group members (Hyldegård, 2006).

In summary, the large body of research about group work in higher education presents theoretical and empirical evidence of the positive aspects of student group work in an educational context. However, factors such as variable levels of contribution, leadership, planning, and communication can have a positive or negative impact on how the group works together, and ultimately on the educational achievement of individual students. Research has shown that students from different nationalities have differing, often culturally driven, expectations of the group-work process, which can lead to tensions in multicultural groups. Models of group work have focussed on roles adopted by group members and the stages groups go through, but little previous research has attempted to understand the detail of group processes and activities, or students' conceptions of group work.

Methodology

The increasing importance of imagery and visual culture in modern society has led to the development of visual research methods, which encourage deeper reflection on visual culture and understanding the diversity of human experience (Prosser & Loxley, 2008). The draw-and-write technique is a creative methodology that has been used in diverse ways to collect standalone data, or as a precursor to interviews or discussions with participants (Angell, Alexander, & Hunt, 2014). The methodology allows participants to express ambiguous and contradictory ideas and

opinions that cannot be easily expressed in writing (Weber & Mitchell, 1996) and can capture and reveal complex and abstract thoughts and emotions (Angell et al.; Bagnoli, 2009). The drawing is a visual product that enables researchers to understand a participant's understanding of the world (Guillemin, 2004).

Participants in this study were all current students at the University of Sheffield, and the study was granted ethical approval by the Information School. In the data-collection process, the students studying the selected modules were emailed in advance regarding the research project. For each module, the researcher arrived at the beginning of the teaching session, and following the Hartel (2014a, 2014b) protocol, students were given a 10cm × 10cm piece of white card (known as an isquare) and a high-quality black rollerball pen. The use of a specific size of paper restricts drawings from "sprawling" and aids in the manipulation and display of the images (Hartel, 2014a). The provision of a standard pen ensures consistency and limits the image to a monochrome representation so that analysis can focus on shape rather than colour (Hartel, 2014a).

The isquares, pens, and ethics consent forms were distributed and then collected after approximately 10 minutes. Students were simply asked to "draw group work" on one side of the isquare and asked to "write something about their drawing" on the reverse. The framing was left deliberately vague so as to invite students to contribute drawings about any aspect of group work that they wished. Thus their feelings, thoughts, and opinions were not constrained by the researcher, and it was possible to gather snapshots of what the students (rather than a tutor) felt was important or interesting about group work (Pridmore & Bendelow, 1995).

Demographic information was not collected from participants; however, Table 1 gives details about the students registered on each module included in the data collection. As can be seen from the table, a high percentage of international, primarily Chinese, students studied in the

Table 1: Characteristics of students registered on the modules

Module	Level of study	Total number of students	% International	Number of isquares collected
Business intelligence	UG	38	34.2% (*n* = 13)	11
Data mining and visualisation	PGT	22	63.6% (*n* = 14)	8
Business intelligence	PGT	168	94% (*n* = 158)	135
Academic & workplace libraries	PGT	33	69.6% (*n* = 23)	9
		N = 261		*N* = 163

modules where data was collected. Thus, the literature on multicultural groups in general, and on Chinese students in particular, was reviewed and the issues arising incorporated into the analysis and discussion. Some 163 isquares were collected, 17 of which included only text, with no drawing, so 146 drawings form the corpus for analysis.

Data analysis

In the data analysis phase, an undergraduate student (Cook) was recruited to work on the project, funded by the University of Sheffield's Undergraduate Research Experience (SURE) scheme. This provided a valuable student perspective on the drawings and facilitated productive discussions on the interpretation of the data. The Information School's international student support officer was also invited to contribute to the analysis, in particular to identify Chinese cultural symbolism present in the drawings that might aid in their interpretation. The analysis followed a distinct series of phases:

1. The isquares were numbered, photocopied, scanned, and saved as image files.
2. A quantitative content analysis was performed to quantify the type of images and graphical representations used in the isquares (Dean, 2015; Horstman & Bradding, 2002)
3. A thematic analysis was undertaken by both members of the research team, to identify common themes and conceptions of group work represented in the isquares. An Excel spreadsheet was used to record details of each isquare and the analysis in stages 2 & 3.
4. The "written description" and any text that had been written on the drawing was transcribed and recorded in the spreadsheet, and the descriptions used to support the interpretation of the drawing.

Meanings and themes from the analysis phase were then identified for discussion and presentation in this paper.

There is no commonly agreed-upon approach to the analysis of data collected using the draw-and-write technique, and researchers need to be explicit about the extent to which any written data accompanying the drawings is used to support the data analysis (Angell et al., 2014). Weber and Mitchell (1996) strongly assert that drawings can be as communicative as written text, albeit while offering a different perspective on human sensemaking. For this reason, this paper focuses on the presentation and interpretation of the drawn data. The textual descriptions were read and discussed by the research team and used to support the visual interpretation of the drawings. For the vast majority of the isquares, the text did not discredit or contradict the interpretation of the drawings but supported the researchers' interpretation of the drawing. In effect, this paper presents and discusses the drawn data, not the textual descriptions.

Results

Content analysis

Motifs and graphical representations in the isquares were counted, and the results of this content analysis are shown below in Table 2. In addition, the number of isquares that were categorised with a particular theme were also counted, and these data are included in the thematic analysis section.

Many stick figures, representing members of the group, varying from very simple depictions of the human form to much more detailed figures that featured expressive emotions, clothing, or objects being held, were present. People were often depicted with thought and speech bubbles, modelled on cartoons and graphic novels. Verbal communication, therefore, was seen to be a key aspect of group work, and 52 isquares contained explicit representations of communication between individuals. It was also interesting to see thoughts represented, both as thinking processes and also private thoughts and opinions on the group work, presumably kept unsaid.

Arrows were commonly used as connectors to link items in the drawings and to represent a process or a set of stages. Arrows often indicated communication and connectivity and were used to indicate the sequence of events that took place as part of a group-work project. The motifs present in the content analysis are explored in more detail in the thematic analysis below.

Table 2: Content analysis

Motif/Graphic representation	Number of isquares this appears in
Stick figure	82
Arrows	59
Circles	53
Table/desk	26
Thought/speech bubbles	26
Paper/writing	18
Technology (laptops, computers, phones)	16
Reading/books	13
Hands	10
Building/structure	8
Parts/puzzles	7
Question mark	5
Lightbulb	4
Whiteboard	4
Trees	4
Bamboo	3

Thematic analysis

Group work means working together face-to-face

Twenty-six of the isquares feature group members working collaboratively face-to-face, using tables or desks as a focus of the group activity. In some isquares (e.g., 28 below; see Figure 2), the drawing simply depicts one meeting. However, in others the face-to-face meeting is represented in the context of other group work activities, as in isquare 41 (see Figure 1), which show a series of meetings interspersed with individual work. Communication and ideas generation are often specifically labelled in these drawings of meetings, with either speech bubbles or thought clouds and with lines linking members with each other.

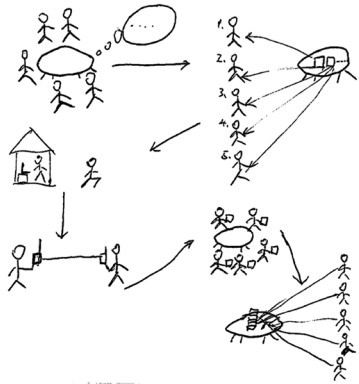

Figure 1: isquare 41

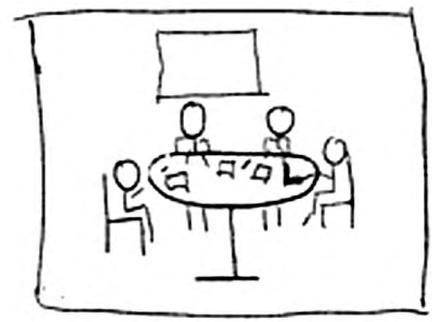

Figure 2: isquare 28

The tools to support collaboration are an important aspect of group work

It is evident from the isquares that students use a variety of technological and non-technology-based tools to support and facilitate their group work. In isquare 17 (see Figure 3), we can see a detailed depiction of hardware, software, and even power supply. People are not represented.

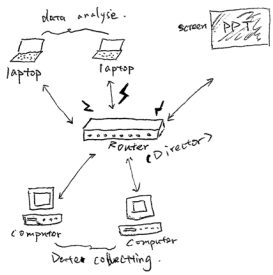

Figure 3: isquare 17

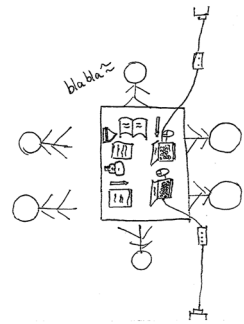

Figure 4: isquare 63

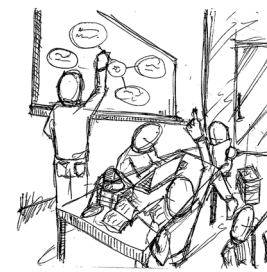

Figure 5: isquare 38

In isquare 63 (see Figure 4), similar consideration is given to the need for power for devices in the collaborative space, but here people meeting as a group constitute the central image. Books and writing implements can be seen, an indication that the group work is not conceived solely as being mediated by technology. In isquare 38 (see Figure 5), we can see a dynamic representation of a group meeting, likely taking place in a dedicated bookable group meeting space typical of libraries and learning centres, where students are making use of a whiteboard to frame and share their ideas. In total, four isquares contain whiteboards.

Group work is a process and involves a set of distinct phases

Nineteen isquares depict group work as a series of defined stages where groups meet, work individually, and then come together to share progress and exchange ideas. In these phases, there is often a process of information searching, gathering, and sharing, as shown in isquare 120 (see Figure 6). In isquare 41 (Figure 1), different locations, including the home, are shown, and while the whole group is shown communicating face-to-face, we can also see two members communicating by phone.

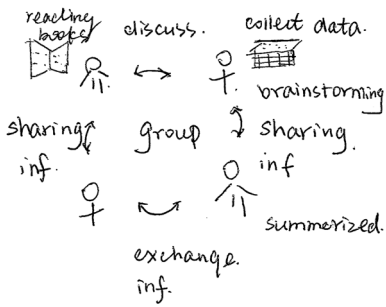

Figure 6: isquare 120

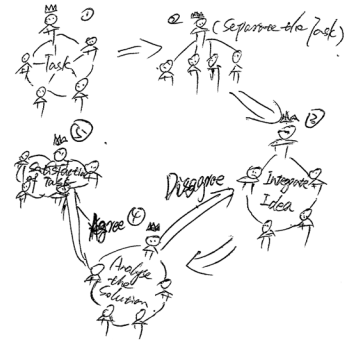

Figure 7: isquare 109

In isquare 109 (see Figure 7), the student is explicit about the fact that the group task is sub-divided into individual tasks that are worked on separately, and there is a subsequent process of rationalizing and integrating information. The student recognizes the potential for disagreement in this process. There is some evidence of the Tuckman (1965) stages of "Forming, Norming, Storming, and Performing," but more emphasis is given to tasks rather than to the interpersonal aspect of the stages of group work. The different activities that take place at certain stages in the group process are shown, for example, defining the task, assigning tasks to members, having a meeting, sharing information and progress, dispersing to work further, and coming together to create the final product.

Leadership is important, and groups can have hierarchical structures

Twenty-six isquares contain drawings of a leader, and often these are represented in a type of hierarchical structure reminiscent of an organisation chart

or organogram, as seen in isquare 34 (see Figure 8). In some isquares the leader is represented with a little crown demoting their status and authority in the group, is depicted delegating specific tasks to individual members, or defines the timeline of the group activity, as in isquare 54 (see Figure 9).

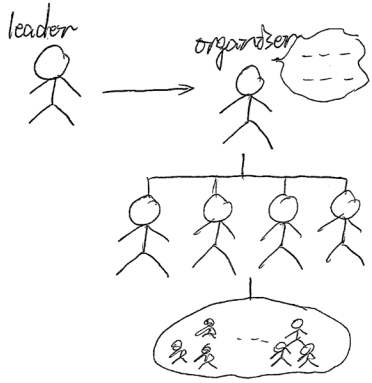

Figure 8: isquare 34

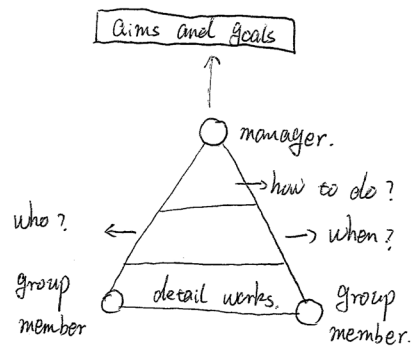

Figure 9: isquare 54

Some labels on drawings indicate that the group leader is responsible for defining the timetable of the group work and is in charge of synthesizing information found by other members. The leader seems to be analogous to the Belbin team role of "coordinator" (someone who delegates roles in the team), combined with "implementer" (someone who plans a strategy and ensures it is carried out). Other depictions of the leader are more egalitarian, with the leader represented in a circle or sitting at the same table as the other members of the group. Members, and the leader, are shown as having defined responsibilities commensurate with their abilities, skills and experiences which, although quite different, are equally valued, as in isquare 70 (see Figure 10).

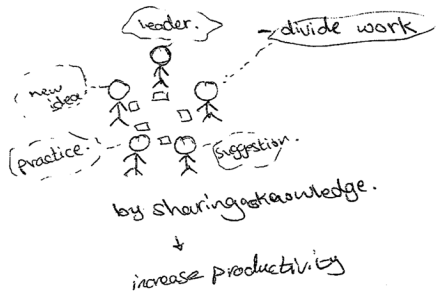

Figure 10: isquare 70

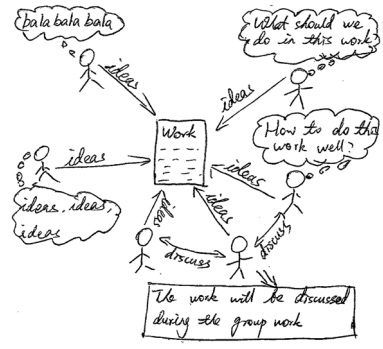

Figure 11: isquare 108

It is not possible to see the full range of the Belbin team roles represented in the isquares, and often the activities represented in the isquares could be assigned to one of the Belbin role descriptions but not to an individual in the team. More often, the action of "resource investigator" is carried out by more than one member of the group. Often, all members are depicted contributing to the shared output (as in isquare 108; see Figure 11), rather than this being the role of a "completer finisher."

Group work is about connecting with others

Twenty-three isquares were identified as expressing overtly positive representations of group work, and many of these showed hands, or group members connecting with each other by holding hands (isquare 6; see Figure 12). Even where students do not have a positive perception of group work, they are shown united in their unhappiness (isquare 77; see Figure 13).

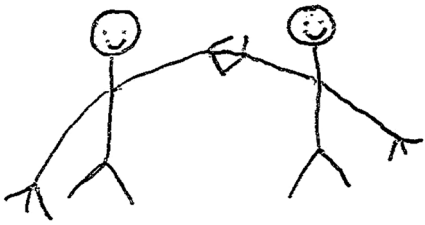

Figure 12: isquare 6

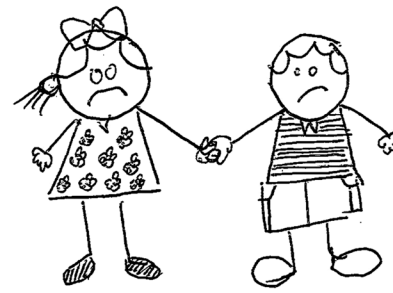

Figure 13: isquare 77

Group work is about generating ideas

A commonly used image seen in five isquares is a lightbulb, used to represent the generation of ideas and the positive experience of working together (see, e.g., isquare 5 in Figure 14 and isquare 81 in Figure 15).

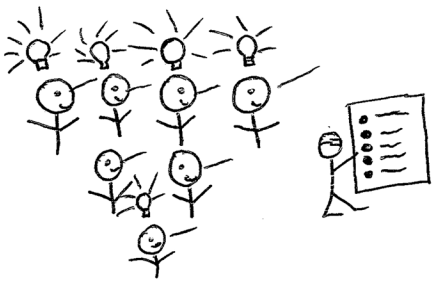

Figure 14: isquare 5

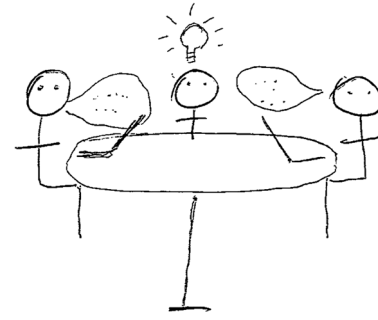

Figure 15: isquare 81

Group work is a puzzle with interlocking parts

Seven isquares depict group work as a puzzle, with interlocking parts indicating the necessary contribution of all members toward the shared goal, as in isquare 155 (see Figure 16). Two isquares (e.g., isquare 149; see Figure 17) show two tessellating Chinese characters (named in the written description), showing how different parts of the group fit together.

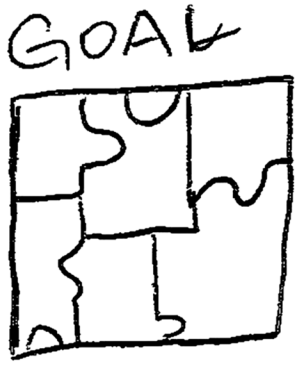

Figure 16: isquare 155

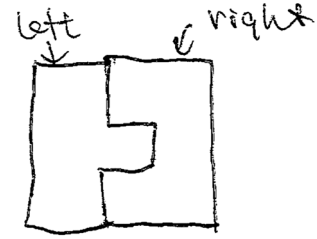

Figure 17: isquare 149

There are strength and growth in the group

Eight isquares were categorized as showing strength in the group, although a variety of objects were drawn that were interpreted as depicting this strength. Three isquares (e.g., 36; see Figure 18) contain drawings of bamboo, which is a common Chinese symbol for showing that that all group members are equally important. When the bamboo bucket is filled up with water, all the bamboo pieces are important to keep the water from leaking outside. Other images of strength and growth include trees (e.g., isquare 92; see Figure 19) and buildings (e.g., isquare 141; see Figure 20).

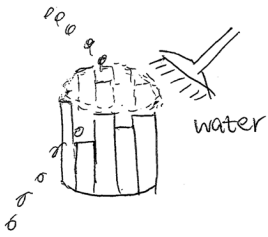

Figure 18: isquare 36

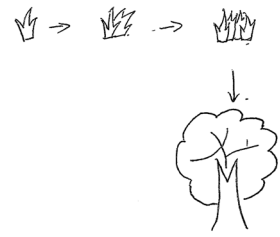

Figure 19: isquare 92

Figure 20: isquare 141

Group work is stressful; it is a negative experience

Apart from free-riding, a number of other isquares present a negative view of group work. In isquare 20 (see Figure 21), the tension between the positive framing of group work by academic staff and the stress and time-management problems experienced by students, is powerfully depicted. Communication problems experienced in multicultural groups is the theme of isquare 161 (see Figure 22).

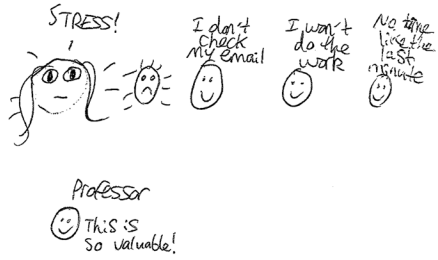

Figure 21: isquare 20

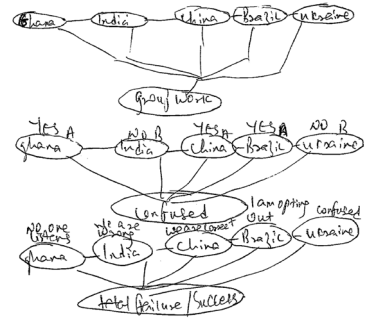

Figure 22: isquare 161

Free-riding is a problem with groups at university

Eight isquares contain drawings that showed free-riding, or the unequal contribution of group members. In isquare 22 (see Figure 23), we can see a classic image of free-riding, where four group members are having a meeting and a fifth group member is depicted as being at home, in bed, and is labelled "lazy." However, free-riding does not necessarily involve absence; sometimes it is represented as non-engagement in a meeting. A more metaphorical view of free-riding can be seen in isquare 57 (see Figure 24), where the relative contributions of group members are weighed on a scale, indicating the injustice felt by students who have a group member who does not contribute as much as they might. In isquare 30 (see Figure 25), multicultural tensions around free-riding are revealed by the student who created this drawing, in which one group member is asleep at the table, while another is reading a book labelled "not participating/listening." Each group member has been given a nationality.

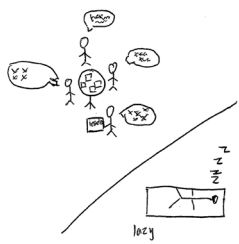

Figure 23: isquare 22

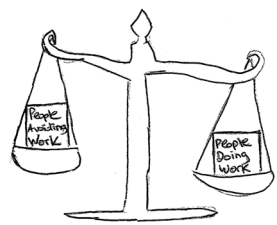

Figure 24: isquare 57

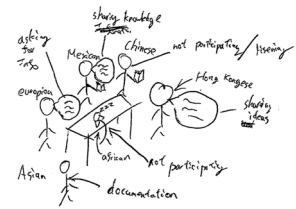

Figure 25: isquare 30

In summary, a very diverse range of images have been used to represent group work: from very literal drawings that show actual people working in groups, to drawings that show processes and activities and structures, to very abstract and metaphorical representations of group work. This diversity is explored in relation to the existing literature on group work below.

Discussion

Conceptions of group work

A strength of collecting drawn data is that it allows participants to express concepts through metaphors (Weber & Mitchell, 1996), and it is possible to see a variety of metaphorical representations of group work in this data set. Group work is "holding hands" and connecting with others, and these mages represent positive conceptions of group work that are echoed in the literature around the perceived benefits of group work (Cartney & Rouse, 2006; Johnson & Johnson, 1992). Groups are represented as being "strong" through working collaboratively toward a shared goal, and this corresponds to a Chinese proverb, "Only when all contribute their firewood can they build up a strong fire" (Clark & Baker, 2011). Group work is a puzzle, and a process, that involves people and activities fitting together in complex ways, and aspects of models of group roles and functioning (e.g. Belbin, 2010; Tuckman, 1965) can be seen in the data. Group work is about generating ideas and developing shared understandings. Some of these graphical forms (e.g. lightbulbs, trees) are similar to those evidenced in Hartel & Savolainen (2016) and reflect popular culture images imprinted during childhood. However, this does not negate the interpretations that can be drawn from these images.

The metaphorical conceptions of group work seen in these drawings offer a qualitatively different representation of group work from research using more traditional data-collection methods, although it would be possible for these methods to make some of these conceptions clear too. They give educators insight into the different ways in which students experience and view group work, which has implications for how we support groups and give positive points of discussion with students about how they view group work.

How students work together

It is possible to see evidence of successful cooperative groups, as defined by Johnson and Johnson (1992, 2002, 2003) in the drawn data. The interconnectedness of groups and the working toward shared goals of characteristic of "positive interdependence" are evident in the lines connecting group members, activities, and outputs, and in the images of holding hands. It is possible to see the value that students place on face-to-face meetings as "promotive interaction" by the large number (26) of drawings of meetings. Previous research has also underlined the importance of the meeting as an integral aspect of group work (Hassanien, 2006).

The student group with a hierarchical structure, with a clearly defined leader, came through strongly in the drawn data, despite the problems discovered with group leadership in previous research (Cartney & Rouse, 2006). Many drawings reflect a more organization-like team structure, mirroring how team structures are presented using diagrams in the workplace. The concept of a group leader was common in the data gathered from modules with high numbers of Chinese students, and this could be due to their preference for groups to have a defined leader, as discussed in previous research (Chan, 1999; Clark & Baker, 2011). As noted above, the full range of Belbin team roles is not evident in the drawings, but there is evidence that members take on different roles in the group and that this is an organized and successful process (Gagnon & Roberge, 2012).

The conception that group work is a process with defined steps of meeting, information searching, and individual working and producing is not present in the literature included in the review. Many drawings show a non-linear process, a complex interweaving of people and activities, and this reflects both the difficulty inherent in explaining exactly how a group works together and the complexity faced by students when they attempt to manage working together. The Forming, Storming, Norming, and Performing stages of group work (Tuckman 1965) are represented in the data, but often we see only one stage per drawing; for example, just the storming is represented through an image of group disagreement. The drawings that do depict stages of group work tend to show successful group functioning and focus more on the different types of activity, for example, the stages of meeting, communicating, discovering resources, and producing artefacts.

The technological tools that students use to facilitate their collaborative work are represented in detail, and this mirrors previous research that has demonstrated the vital role played by modern communication technology, in general and specifically in LIS education (McKinney & Sen, 2016; Nortcliffe & Middleton, 2013).

Positive and negative aspects of group work

The connection between discussions and learning (Askell-Williams & Lawson, 2005) is well represented in the drawings. Students are clearly aware of the need both for effective communication and to work together face-to-face. Meetings generate the ideas and lightbulb moments that are shown in the drawings. Some researchers identify that meeting and working together face-to-face has advantages over dividing the task and working separately (Mayne, 2012). While a good number of drawings do show these face-to-face meetings, many also show task division. This is a more pragmatic view of group work, in that groups cannot accomplish every task while being in the same place, but it also shows a flexible and dynamic way of working. Therefore, while meetings are an essential aspect of group work, it is important to acknowledge that they are not the whole story.

Communication, represented metaphorically with lines and connectors, and more overtly with speech bubbles and words, is an important aspect of group work seen in the drawings. Where communication goes well, the group work is a positive experience. Where there are communication difficulties, particularly where group members speak different languages or have different cultural backgrounds, this is problematic for group functioning. When groups don't function well we can see evidence of the stress and frustration found in previous research (Volet & Mansfield, 2006).

Free-riding is a problem for groups, since it causes much resentment and labels of "laziness" that (potentially) may not be justified (Freeman & Greenacre, 2010). In these data, a cultural element to perceived free-riding is seen, with group members of particular nationalities singled out for censure. It is important in LIS courses featuring large numbers of international students that educators acknowledge culturally diverse attitudes to group work and seek to support students through open discussion of roles, expectations, communication preferences, and language issues (Asgari, 2017).

Conclusion

This data set reveals student views of group work that are different from those revealed through previous research, offering new insights into how students work together. Models of group work have focussed on the stages of group work and the roles of group members, but these are not necessarily the only features of student group work. In particular, the structure of student groups and how students have represent the different processes of group work provide novel insights into group work in higher education. The interactions with each other and with information sources and technologies shown in these drawings show a complex and hard-to-manage experience of working together experienced by these LIS students.

The use of visual methods to explore student perceptions of group work offers the opportunity to contribute a differently nuanced understanding of what it is like to work in groups (Dean, 2015). By leaving the framing deliberately open, a more idealized view of group work was invited, and this may have facilitated some of the more abstract and metaphorical representations of group work present in the data set.

The drawings have been used to support student groups in the Information School. Student groups were presented with a selection of drawings and were invited to discuss their meaning in the initial stages of a group task. This enabled groups to open up discussions with each other about how they plan and manage their group work and enabled group members to be open about their preferences. It also facilitated discussion in multicultural groups about the culturally different ways in which students from different nationalities experience group work, which supported group cohesion. These kinds of discussions, if facilitated by educators, can

have real benefits for LIS students engaging in group work. Issues can be brought to the surface, and students can begin to negotiate effective ways of working. The value placed on face-to-face meetings raises issues for the support of group work in LIS education. Students need to be able to meet in groups and to have access to suitable institutional space for this specific purpose. They also need support to enable them to hold effective meetings.

There is no "right" way for students to work together in groups in a higher education context, and these drawings reveal a huge variety of opinions and conceptions about group work. Our challenge as LIS educators is to ensure that students' different expectations, methods, and practices around group work are understood and discussed openly, and that we acknowledge the difficulties as well as the benefits of this approach to education.

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Chloe Cook currently works as an assistant consultant at Steer. At the time the research took place, she was a student in the Department of Economics at the University of Sheffield and was recruited to work as an undergraduate researcher on the project.

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