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Student conceptions of group work: visual research into LIS student group work using the draw and write technique

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Abstract

The use of collaborative pedagogies is a well-respected and common feature of Higher Education and the ability the 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. 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 method of group support.

Keywords: Group work, collaboration, draw and write, Visual methods, group roles

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Introduction

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 such, group work can be seen as a vital aspect of university study. Employers actively seek graduates who

can work well with others (Race, 2007; 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).

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 increasing used to collect data from adults in a both 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) 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, and 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), others have collected qualitative data in the form of interviews and focus groups (e.g. Volet & Mansfield, 2006). Much previous research has focused 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 working 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.

Structure of this paper

The theoretical literature on how students work together in groups is discussed; and the multi-disciplinary and LIS-specific literature on the perceptions and opinions that students have about working in groups in the Higher Education context is reviewed. 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 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, Johnson and Johnson (1992; 1999; 2002; Johnson, Johnson, and Smith 2007) define cooperative groups as those where members work actively for the benefit of all, leading to higher achievement for all. Cooperative learning, (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 is 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 a 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), and identifying a leader can be problematic (Fearon, McLaughlin, & Eng, 2012). Freeman and Greenacre (2010) advised that having defined student roles for groups complete with explicit skill sets was one way that free riding could be addressed by tutors.

Belbin (2010) categorised nine team roles that describe tendencies people have to behave in certain ways when they interact with other 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 there are concerns raised that the model is overly simplistic and does not represent iterative group processes, or what happens if the group does not achieve success – some groups do not move beyond the "storming" stage (Bonebright, 2010). Conversely others do not go through it 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, i.e. that discussions with peers can help students gather and clarify information, can support knowledge construction, can increase motivation and engagement and 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, e.g. some students simply want to achieve a pass grade, 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) to attempt 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 giving them tasks they are unsuited to, 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 the reasons why their peers are not contributing well to a group, and 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 (The Boyer Commission, 1998). 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 (Kimmel & Volet, 2010).

Students from different cultural and national backgrounds have different prior educational experiences, different cultural norms that can make working in multicultural groups problematic (Popov et al., 2012). Chinese students , who often have a teacher-centered, didactic and individualistic educational background, favour hierarchical structures in group work and seek to have a designated group leader, which is one way they attempt to deal with variable levels of contribution to a group. They seek compromise in conflict situations, and while comfortable working in study groups, 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 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; e.g. a number of studies focus primarily on information behavior in a collaborative setting (Hyldegård, 2006; O'Farrell & Bates, 2009). Other studies focus on use of learning technologies or online tools to support collaboration, for example Elgort, Smith, & 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 using collaborative pedagogy librarians to students in varied disciplines is also a feature of the LIS literature (e.g. Ashley, Jarman, Varga-Atkins, & Hassan, (2012). In this study, various approaches were trialed to ensure that groups were well supported in the enquiry projects e.g. individual and group journals, and personal tutor support for groups. A further sub-set 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); 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 working in Higher Education presents theoretical and empirical evidence of the positive aspects of student group working in an education context. However, factors such as variable levels of contribution, leadership, planning and communication can have positive or negative impact on how the group works together, and ultimately 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 working have focused on roles adopted by group members (e.g. Belbin), and the stages groups go through (e.g. Forming), however 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 of visual culture and understand 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., 2014; Bagnoli, 2009). The drawing is a visual product that enables researchers to understand a participants' 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) protocol, students were given a 10cm x 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 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. In this way their feelings, thought 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:

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
		261		163

Table 1: characteristics of students registered on the modules

As can be seen from the table, there is a high percentage of international, primarily Chinese, students who studied in the modules where data was collected. Thus, the literature on multicultural groups in general, and Chinese students in particular, was reviewed and the issues arising incorporated into the analysis and discussion. 163 isquares were collected, 17 of which only included text, with no drawing, thus 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 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 surfaced for discussion and presentation in this paper.

There is no commonly agreed 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 & 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, the 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, and 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 this data is included in the thematic analysis section.

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

Table 2: Content analysis

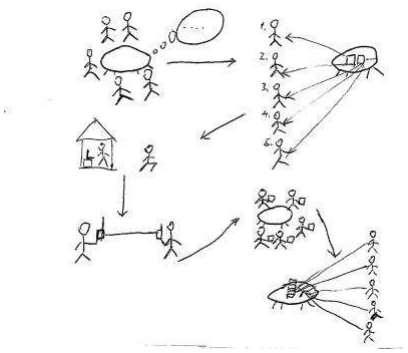
Many stick figures, representing members of the group, varying from very simple depictions of the human form, to much more detailed figures that featured expressive emotions, clothing or holding objects were present. People were often depicted with thought and speech bubbles, modelled on cartoons and 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 analysed below.

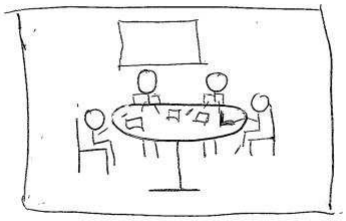
Thematic analysis

Group work means working together face-to-face

26 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) 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, which show a series of meetings interspersed with individual work. Communication and ideas generation are often specifically labelled in these drawings of meetings, either with speech bubbles, or thought clouds and with lines linking members with each other.



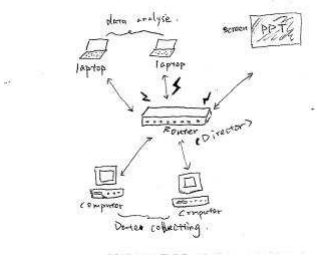
isquare 41



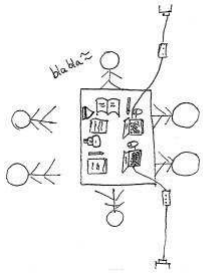
isquare 28

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

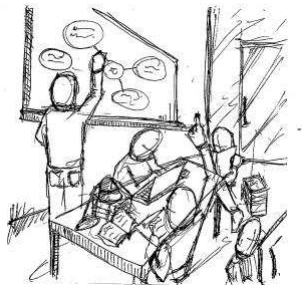
It is evident from the isquares that students use a variety of technological and non-technology-based tools to support and facilitate their group work. In isquare 17 we can see a detailed depiction of hardware, software, and even power supply. People are not represented.



Isquare 17



isquare 63

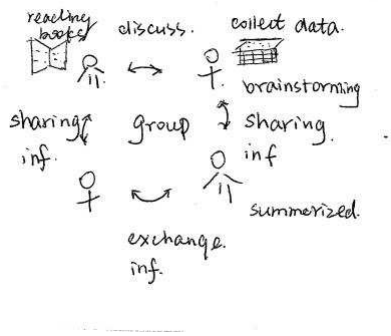


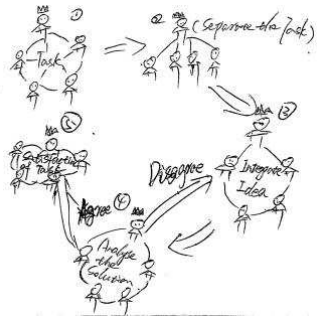
isquare 38

In isquare 63, similar consideration is given to the need for power for devices in the collaborative space, but here people meeting as a group provides the central image. Books and writing implements can be see, an indication that the group work is not solely conceived as being mediated by technology. In isquare 38 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 4 isquares contained whiteboards.

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

19 isquares depicted group work as a series of defined stages where groups meet, then work individually then come together to share progress and exchange ideas. In these phases, there is often a process of information searching, information gathering, and information sharing shown in isquare 120. In isquare 41 (above) 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.



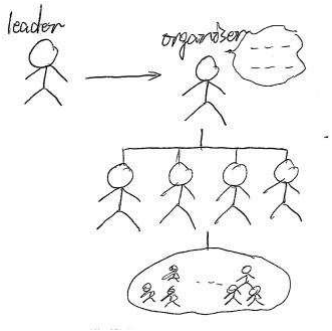


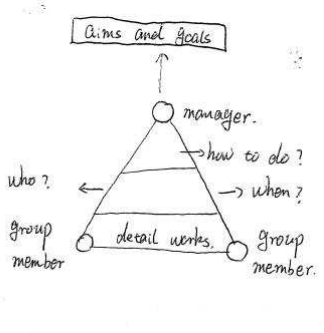
isquare 120 isquare 109

In isquare 109 the student is explicit about the fact that the group task is sub-divided into individual tasks which 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 the interpersonal aspect of the stages of group work. The different activities that take place at certain stages in the group process are shown e.g. 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

26 isquares contained drawings of a leader, and often these were represented in a type of hierarchical structure reminiscent of an organisation chart or organogram, as seen in isquare 34. In some isquares the leader is represented with a little crown demoting their status and authority in the group, and is depicted delegating specific tasks to individual members, or defines the timeline of the group activity as in isquare 54

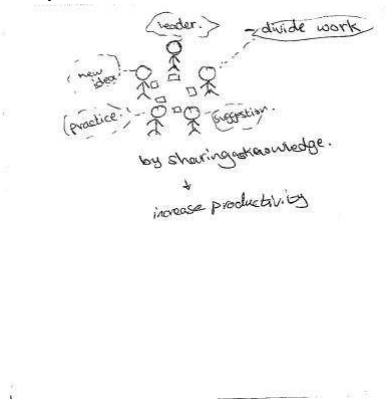




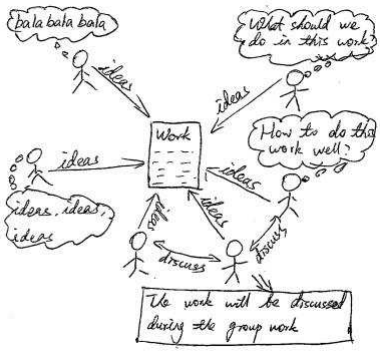
isquare 34 isquare 54

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



isquare 70

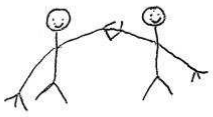


isquare 108

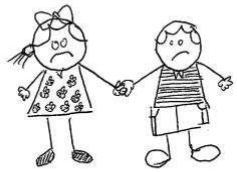
It is not possible to see the full range of the Belbin team roles represented in the isquares, and often the activities represented in the isquares could be assigned to one of the Belbin roles descriptions, but not to an individual in the team. More often the action of "resource investigator" is carried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

Group work is about connecting with others

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



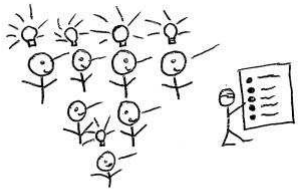
isquare 6



isquare 77

Group work is about generating ideas

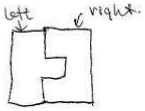
A commonly used image seen in 5 isquares were lightbulbs, used to represent the generation of ideas and the positive experience of working together e.g. isquare 5.



isquare 5 isquare 81

Group work is a puzzle with interlocking parts

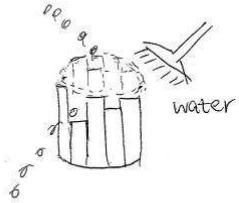
Seven isquares depicted group work as a puzzle, with interlocking parts indicating the necessary contribution of all members towards the share goal as in isquare 155. Two isquares (e.g. isquare 149) showed two tessellating Chinese characters (named in the written description), showing how different parts of the group fit together.

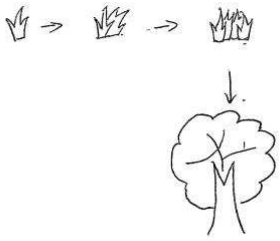


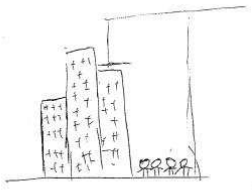
isquare 155 isquare 149

There is 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 “strength”. Three isquares (e.g. 36) contained drawings of bamboo which 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 included trees (e.g. isquare 92) and buildings (e.g. isquare 141).



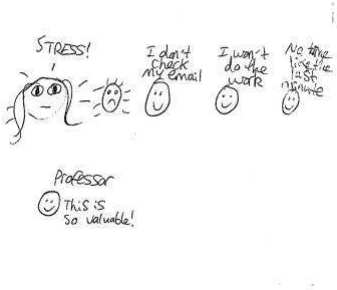


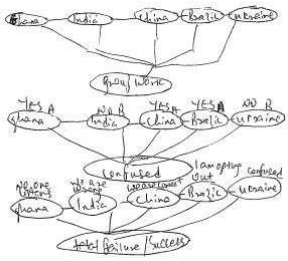


isquare 36 isquare 92 isquare 141

Group work is stressful, it is a negative experience

Apart from freeloading, a number of other isquares presented a negative view of group work. In isquare 20 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.

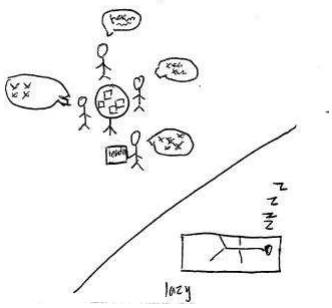


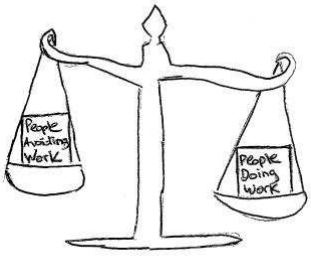


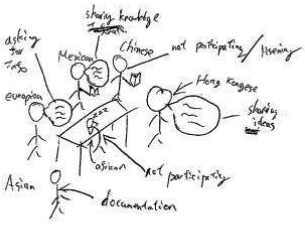
isquare 20 isquare 161

Freeloading is a problem with groups at University

Eight isquares contained drawings that showed freeloading, or unequal contribution of group members. In isquare 22 we can see a classic image of freeloading 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, freeloading does not necessarily involve absence, sometimes it is represented as non-engagement in a meeting. A more metaphorical view of freeloading can be seen in isquare 57, 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 multicultural tensions around freeloading are revealed by the student who created this drawing, in which one group member is asleep at the table, and another reading a book labelled “not participating/listening”. Each group member has been given a nationality.







isquare 22 isquare 57 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 working. 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 the literature around the perceived benefits of group working (Cartney & Rouse, 2006; D. Johnson & Johnson, 1992). Groups are represented as being "strong" through working collaboratively towards 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, 2010b; 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.

These 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 surface some of these conceptions. They give educators an insight into the different ways that students experience and view group work, which has implications for the way in which 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 towards shared goals of characteristic of "positive interdependence" is evident in the lines connecting group members, activities and outputs and the images of holding hands. It is possible to see the value students place on face-to-face meetings as "promotive interaction" by the large number (26) 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 the way that 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 noted in previous research (Chan, 1999; Clark & Baker, 2011). As noted above, the full range of Belbin team roles is not evident in the drawings, however 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 search 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 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 e.g. just the storming is represented with a group disagreement. The drawings that do depict stages of group work tend to show the successful group functioning, and focus more on the different types of activity e.g. the meeting, communicating, resource discovery and production of artifacts.

The technological tools that students use to facilitate their collaborative working and 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 & negative aspects of group working

The connection between discussions and learning (Askell-Williams & Lawson, 2005) is well represented in the drawings. Students are clearly aware of the need for effective communication, and the need to work together face to face. Meetings generate those 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 good number of drawings do show these face-to-face meetings, there are also many that show task division. This is a more pragmatic view of group working, in that groups cannot accomplish every task while being in the same place, but also it 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, it causes much resentment and labels of "laziness" that (potentially) may not be justified (Freeman & Greenacre, 2010). In this 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 which feature large numbers of international students that educators acknowledge culturally diverse attitudes to group working 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, and offer new insights into how students work together. Models of group work have focused on the stages of group work and the roles of group members, but these are not necessarily the only features of student group working. In particular, the structure of student groups and how students have represented the different processes of group work, are novel insights into group working 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 surfaced, 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 have access to suitable institutional space for this specific purpose. They also need support in being able 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 working. 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 group working.

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