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Research Article

Tutor roles in collaborative group work

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Abstract

Collaborative assessed group work can create challenges for both students and tutors. Both the benefits and challenges of assessed group work are discussed with particular reference to the context of teacher education. The relevance of action research, the concept of living theory and the ethical nature of tutor practice in relation to group work are considered. The concept of 'role' is used to analyse aspects of tutor practice based on outcomes from an extended process of action research. A description of one role system of different tutor roles is given as a prompt for reflection and self-study.

Introduction

Whilst collaborative learning has many benefits it also can create challenges for students and for tutors. This is particularly so if groups work together on substantial tasks over an extended period of time or on tasks that require a significant degree of self-organisation and negotiation within the group. These challenges are accentuated if the outcomes of collaboration are either directly or indirectly connected to assessment. Here, we draw on outcomes from an on-going action research project into collaborative assessed group work to explore how tutors can support students to meet these challenges. The central analytical concept employed is that of 'role'. Analysing different aspects of tutor activity in terms of distinct roles and as a role system is one way that tacit knowledge cam be made explicit, 'living theory' (Whitehead and McNiff, 2006) developed and practice refined.

We are tutors working in the Mathematics Education Centre at Sheffield Hallam University who have collaborated for the last four years on examining and developing our practice in relation to collaborative group work focussing on a single module that is part of an undergraduate mathematics teacher education programme. Peter's principal role has been module leader and main tutor, whilst Mark has contributed to supporting the inter-relational aspects of the process that the students engage in. In addition, Peter and Mark have supported each others self-study of their practice in relation to group work. Here, we present one outcome of our collaborative research: a description of Peter's role system in relation to group work assessment. A role system is a constellation of interconnected relational practices.

We begin by discussing collaborative assessed group work in relation to our pedagogical context. We then locate our research practice as part of the tradition of action research and the developing tradition of teacher educator self study. We share some of our purposes and motivations in relation to collaborative group work. We discuss the way in which we use the term 'role' and then offer an analysis of one set of tutor roles related to collaborative assessed group work.

Collaborative assessed group work

Collaborative learning can have many different forms and may occur quite informally in the context of other learning strategies and environments such as tutor led seminars, lecturers and workshops. However, our concern here is with more formal collaboration that occurs in relation to assessed group work. Assessed group work can have at least three different forms. Firstly, groups may engage in activities that are intended to support student learning such as reading groups but where assessment is individual. Secondly, group outcomes may be assessed but not the collaborative process itself. The module we are concerned with in this paper represented a third possibility in which both the outcomes *and* the collaborative process are assessed.

Collaborative learning in higher education is arguably an under-researched area of practice. Research and scholarship has tended to focus on processes of collaboration embedded in specific pedagogical strategies such as 'peer learning' (see Flachikov, 2001), or that are often found in problem based learning (see for example, Bould and Feletti, 1997) or enquiry based learning (see for example, Kahn and O'Rourke, 2005). This literature has tended to focus on particular pedagogical forms rather than the phenomena of collaboration itself. Considering the process of collaboration suggests the need to attend to how students collaborate, how this is experienced, the outcomes of working with others and the way in which these inform and shape the activity of the higher education tutor. It is the latter issue that is our particular focus here.

We are aware that for some the process of working as part of group is unsettling and challenging. If given a choice some students would choose to work alone. Thus choosing to adopt group work as a pedagogical approach necessarily raises ethical issues which are heightened due to the fact that group work is linked to assessment. However, we believe that

there are many good reasons for requiring students to work in groups when learning mathematics. Some of these are: the importance of discussion on the development of mathematical thinking and use of mathematical language, the possibility of developing and testing conjectures within a collaborative community of inquiry, and the possibility of enquiring into a more extensive range of mathematical topics than might be possible for an individual.

Further, a key concern is to offer experiences that can act as an alternative experience to the extensive unconscious apprenticeship in teaching (Lortie, 1975) experienced in learning school mathematics. The experience of learning school mathematics as isolated and individualised is implicated in learners' disengagement (see for example, Nardi and Steward, 2003). We hope that the student teachers we work with will, through their own experience of collaborative learning, value forms of pedagogy that emphasises social aspects of learning and seek to enact aspects of their experience in the classroom when they teach. We believe that having a successful experience of collaboration is important to potentially enacting a collaborative experience in one's own classroom. Further, we view collaborative professional development processes as an important route to changing mathematics education practice more widely. By productively collaborating during their initial teacher education experience we hope to develop students' capability to work in such ways with their future colleagues in schools.

The context: undergraduate mathematics teacher education

Our focus is on one second-year module - Mathematical Systems and Structures - taken by second-year undergraduate students on a Mathematics with Education and Qualified Teacher Status degree course. The current cohort size is between twenty and twenty-three students. Recently, competition for places has meant that generally students on the course are highly motivated. The module includes topics such as fractals, chaos, recursion and iterative functions. After a number of tutor led sessions that introduce key concepts and the module content, most learning takes place through engagement in a collaborative project in groups of three-to-five students on a subject of the groups' choosing, supported by student initiated tutorials with the tutor. This can be characterised as enquiry based learning (Kahn and O'Rourke, 2005).

Each group produces a report of the project and this is assessed. Criteria have typically been weighted with seventy-five per cent of the available marks awarded for the mathematical content of the group's report and twenty-five per cent of the marks directly assessing the group work aspects as indicated, for example, by the coherence of the report. A system of self, peer and tutor assessment is used to generate an individual mark from the group report. Students self and peer assess their contribution and each group are asked to agree on a distribution of marks between them. So, for example, if a group agrees that everyone has contributed equally the group mark is distributed evenly. More often a group choose to recognise differences in contributions by asking for more marks to be awarded to one or more of the group members. As might be expected this process can lead to

disagreement and, on occasion, conflict within groups. Each group is required to keep records of meetings and work done on the project to allow evidence of different contributions to be assessed. Where the group members are unable to agree a distribution of marks, the tutor has the final decision. In addition assessment is informed by an individual interview with each student which is used to assess whether each group member understands the mathematics presented in the report. These can, and generally do lead to individual adjustments to marks.

Given the collaborative aspect of assessment the issue of group composition is an important one. A variety of methods have been used to inform group formation including Belbin (2010) team role analysis, as well as exercises in which students rate themselves and their peers according to their perceptions of their different group work skills and their capability to carry out particular roles needed in a mathematical enquiry of this kind. Additionally, students have been invited to influence group composition by stating their preferences for who they do and do not want to work with. There are various reasons for doing this including seeking to build upon existing positive collaborative relationships and to avoid grouping students who have experienced conflict in the past. Although recently we have tried to find a process through which students can choose their own groups, currently groups are chosen by module tutors informed by information on student preferences. We have also developed activities that are included in sessions after groups are formed to support the collaborative process, to assign roles in groups and to support reflection by the students on how their group is working.

One reason for including a significant element of assessed group work is that it offers the student teachers the opportunity to develop key professional teacher skills and qualities, some of which we find it difficult to envisage being developed except through group learning. These include the development of interpersonal skills such as practice in meeting commitments to peers, learning to negotiate and potentially to challenge inappropriate behaviour from peers. These interpersonal skills directly relate to those needed to work as part of secondary mathematics departmental teams. Others, such as giving feedback, parallel skills that are needed as teachers working with groups of school students.

Action research, living theory and self study

We have engaged in an extended process of action research to develop our practice. In the various traditions of action research we find different emphasises on the extent to which the aim is the development of practice or understanding. Focusing on the *action* in action research draws out attention to the action research cycle in which reflection and enquiry leads to new or different action. Understood in this way our action research on collaborative learning has consisted of multiple cycles that have taken place over the last 6 academic years. This in turn was founded on a longer period of development in this module involving practitioner enquiry and reflection. Research activities undertaken have included informal and formal discussion of practice and interviews including audio-recording with each other, interviews with other colleagues engaged in similar practices. Records of activities with students including student interviews and surveys as well as examination of documents

produced by students as part of the module - for example self and peer assessment sheets. In this paper we present outcomes of some of these activities focused on tutor roles that arose out of a role analysis that began in 2008/09.

A second way of understanding action *research* is to focus on the contribution to the development of theory. The concept of theory is itself, of course, open to different interpretations. One interpretation that accords with the action research process is to emphasise theory that is embedded in people's practice rather than abstracted from it. As Jack Whitehead and Jean McNiff (2006, 13) point out: 'Each person already has their own tacit theory within themselves about how they should live.' Thus one purpose of action research can be to make explicit the tacit theory that is embodied in a person's action: their living theory. A person's living theory is not objective or value free, rather it should make transparent the values and commitments that underlie practice. We continue by exploring some of the fundamental reasons that prompt us to use collaborative assessed group work in our practice.

One route to the development of living theory is through a systematic process of self-study. This is a method used in a growing body of work in teacher education (see Loughran, 2002), including mathematics teacher educators (Schuck and Pereira, 2011; Tzur, 2001). We consider teacher educator self-study as a form of narrative research. It seems to us that an important 'claim for the use of narrative in educational research is that humans are storytelling organisms who, individually, and socially, lead storied lives' (Connelly and Clandinin, 1990, 2). We are particularly interested in how and why our practice in relation to collaborative group work has developed and to this end we have supported each other to examine key events or moments in relation to our practice. These moments have been described in autobiographical research as 'nodal moments' (Bullough and Pinnegar, 2001). In our view collaborative group work may support the occurrence of such 'nodal moments' for the students:

> It is those sorts of moments, they are rare, I can pick them out in my life, that moment was so powerful that it changed the direction of my life, and there are others ones not so dramatic but still very important (Peter).

The legacy of previous moments including ones 'so powerful' that they changed the direction of our pedagogy are inscribed in our current practice in relation to group work. One background story continues to act as a powerful reference point for Peter and has shaped his role system in relation to group work.

> I had a confusing and puzzling experience shortly after working for the University. Early on I decided to have an assignment where students worked on a task in pairs. Two students ended up working together, one who appeared very conscientious and another who was relatively uncommitted and full of excuses as to why things hadn't happened. The committed one came to speak to me a number of times before the assignment was due in and was concerned that his colleague wasn't turning up for meetings or doing very much work. So after the assignment was handed in I met with both of them and the committed student told his story of what had happened and that the work was his. Then I asked the uncommitted one to respond and he said, 'That wasn't true, that it was lies and he had been arranging meetings to which the other hadn't turned up, I did the all the work.' I had no information to go on, I hadn't asked them to keep

> minutes of their meetings. I assumed that people would behave in a reasonable and transparent fashion but clearly they couldn't both be! (Peter).

This incident acts as a seed for the development of the different roles and related structures that are used in this module aimed at ensuring transparency, integrity and fairness.

Some students we have interviewed have described similar experiences in which their understanding of how others perceive and act in the world was significantly challenged and changed through the process of working with others. Thus collaborative group work has the possibility of providing opportunities for transformative learning through critical reflection on assumptions and personal meaning structures (Mezirow, 2000). When we are required to work in ways that might not be of our own choosing there is the potential for conflict between our self concepts, the way we present ourselves in the world and the way that others experience us. Luft (1984) proposes that in any group situation there is a four fold field of awareness (or unawareness) in relation to any individual in relation to the group, that which is open (known to self and known to others) that which is hidden (known to self and not known to others), that which is blind (known to others and not known to self) and that which is unknown (not known to others and non known to self). Working collaboratively risks some of what is hidden potentially being revealed or perhaps more uncomfortably coming to know some of what we are blind to but others are aware of. There is the risk of miscommunication and as we have stated above the possibility of conflict. Nevertheless, such situations can allow for the type of 'disorientating dilemmas' (Mezirow, 2000) that can catalyse deep learning. Some students who do experience conflict or an unsettling group process have reported that this leads to valuable learning about themselves or others or indeed changes in their perception of knowledge.

As well as challenging students, choosing to use collaborative group work as part of the learning and assessment process also creates challenges for tutors. It requires tutors to engage in a range of practices some of which a specific to this pedagogical approach. We have found it helpful to think about sets of interrelated practices using the concept of tutor roles.

The concept of role as an analytical and reflective tool

The use of role as a conceptual tool in analysis of social phenomena has fallen out of fashion since its widespread use some time ago variously in functional, symbolic interactionist, structural, organizational or cognitive role theory (see Biddle, 1986). However, role metaphors have been used as a means to contrast different approaches to teaching and learning in higher education. Perhaps, the most widely quoted of these is the comparison between the 'sage on the stage' with 'the guide by the side' (King, 1993). However, here we are concerned not with conceptualising the tutor role as whole but rather with understanding specific parts of it. Our use in this paper draws principally on that developed by Jacob Moreno (1934) and further developed in the field of psychodrama and a specific aspect of this, role analysis and development (see Blatner and Blatner,1988; Clayton, 1993). The

concept of role was, for Moreno, a principle ontological category for understanding human experience, identity and social interaction.

The concept of role may be used analytically to categorise and understand aspects of activity. The analytical process involves writing role descriptions that summarise and concretise particular linked behaviours, emotions, and actions. For example, a role description for one aspect of any higher education teacher's role might be a 'fair assessor'. Roles are inherently relational - they are taken in relation to others. They may be described in terms of a role system that allows for the relationship between roles explored including relative importance of roles, the contexts in which roles are enacted and potential tensions or indeed conflicts between roles. Any description of a role system is a construction specific to a particular context. Further, the process of analysing and naming roles itself can lead to developments or changes in those roles or how and when they are enacted.

Even if the ontological and epistemological commitments about the nature of personhood, self or identity implied by the above description of role theory are disputed, we suggest that the concept of role and the practice of role analysis have value. Role theory and role analysis offer powerful tools for reflection on one's own and others' activity. It is also relatively simple as process. The role description given below resulted from a meeting in which Mark took the role of enquirer and asked Peter to describe his practice in relation to group work. As Peter developed his narrative, Mark would reflect back to him descriptions of his activity and ask him to describe these in terms of role. As each role was named it was written on a sheet of paper and then laid out on a large space on the floor. This allowed for further refinement of role descriptions and the relationship between different roles to be used by using proximity as a metaphor for the connections between different roles.

The description of the roles later informed the development of a set of specific roles for students to take when undertaking collaborative group work. So for example, one of the tutor roles identified was a 'workload regulator' (see below). This suggested that a useful role within a student group might be a 'scheduler' who is tasked to organise meetings and record who has undertaken to do what work. Thus role analysis may be a means to develop learner autonomy. Although we do not have space to develop our discussion of this here, we point here to Mead's (1934) concept of 'role taking' as important in the development of the social self. For Mead key to such development in children is the process of taking social roles in play and in games. This enables a concept of self in relationship to generalized others to emerge. We extend this notion to consider that taking specific roles in the higher education content supports the development and strengthening of a collaborative self.

Further, the process of identifying tutor roles and then developing dialogue with students about these roles can be understood in terms of Goffman's dramaturgical sociology (1973). Goffman in his study of roles in organisational contexts makes a key distinction between 'front stage' and 'back stage' performance. An example in higher education would be the differences between the ways tutors might discuss assessment tasks with other colleagues and how these are described to students. By a process of dialogue with students it is possible to bring some of the tutors back stage roles onto the front stage as objects of conversation

and, extending the metaphor, to ask students to potentially join us on the stage by taking some of these roles. This is one way to support the development of student autonomy.

A tutor role system in collaborative assessed group work

In this section we describe one possible role system in relation to collaborative assessed group work. There are other roles that are intrinsic to being a higher education tutor, regardless of pedagogy, that could be included in an expanded role system. We consider these as being a foundation for the role system in relation to assessed group work. For example, part of the higher education tutor's role is to be, as noted above, a fair assessor. We do not present this role system as universal description applicable in all cases. Such a description is necessarily situated in a particular context, related to the specific subject discipline and form of assessment. The nature of role analysis means that the number of roles that may be considered, or how they are described and constellated is, as a constructed narrative, open to revision and extension. So for example, in discussing this role system with colleagues who also include collaborative group work in their practice, other roles, such as a seller or advocate of group work have been reported.

We organise our description of our teacher educator group work role by considering the frequency with which we enact these roles. Indeed, some of these roles occur regardless of whether or not group work outcomes are assessed. Some are needed to support groups to function productively. We describe these as required roles. Other roles are played out with less frequency or only in particular circumstances and usually in response to the collaborative process not working smoothly. These are grouped as 'roles that may be required'. We then provide a brief description of each of these roles.

Table 1

Required roles	**Roles that may be required**
Designer of group worthy tasks Creator and maintainer of structures Sensitive personal, social and professional group work skills developer Contract facilitator Workload regulator Protector of subject & academic practices Sifter and holder of accumulated knowledge about process	Safety net Mediator Investigator Judge Boundary keeper/enforcer

We begin by describing the 'required roles':

Designer of 'group worthy' tasks

For collaboration to be productive the tasks must be suitable for group work. This includes both preparatory tasks and also the project tasks as well. A group worthy task is one which allows for collaboration and where the outcomes and learning, for each and for all may be greater through working together.

Creator and maintainer of structure

Assessed group work requires clear structures that support collaboration. Such guidance indicates how groups are established, organise themselves including specific roles within the group, self manage and seek support when needed. This needs to be communicated in written documentation and verbally.

Personal, social and professional skills developer

Collaborative group work requires students to exercise a range of personal, social and professional skills that may not be developed in other forms of learning. Such skills may be developed by using particular exercises for example, to skills in offering feedback to others. Further theoretical frameworks about group process may be shared, such as the Johari window model discussed above. The tutor also seeks to facilitate reflection on how groups are working together.

Contract facilitator

Our experience is that groups function better if they are required to develop clear and explicit written agreements or contracts with each other. These also act as reference points should conflict arise within a group. Developing such agreements is often a new experience for students and so needs active facilitation. Sometimes it is helpful for groups to re-contract later in the process is difficulties have occurred.

Workload regulator

Arguably being a 'workload regulator' is an aspect of the role of the higher education tutor regardless of pedagogical form they are using. However, assessed group work places additional demands on students. It requires students to meet outside programmed sessions; this can be difficult for them to arrange particularly those. Sometimes students will be involved in more than one group work assignment at the same time on different modules and thus maybe part of more than one collaborative team. Part of the activity of being a workload regulator includes relatively straightforward ones to undertake such as scheduling times for the groups to meet. More complex can be negotiations with other colleagues on the programme. The role of workload regulator also extends to regulating one's own workload as group work can be very time consuming.

Protector of subject and academic practices

This is a role that is a core aspect of the higher education tutor role. However, there are particular aspects of this role that arise in relation to group work. Sometimes a group will agree a mathematical 'fact', perhaps from the internet and decide on its truth. That they are working together gives a collective conviction of the validity of this 'fact'. This requires intervention in the group at periodic meetings to question and uphold the agreed truths of the mathematical community. Similarly, when students are engaged in collaboration issues of identifying the nature of individual contribution and wider issues related to academic integrity have particular nuances.

Sifter and holder of accumulated knowledge

Each group of students experiences the module once only. The tutor has the possibility of reflecting on each cohort's experience and feedback and to use it to refine the structures and process for group work. For example, in this module current practice is that collaborative groups are formed through a combination or student expression of preference for who they wish to work with and not work with combined with tutor deliberation. One reason for this is the experience that the tensions of working within a group can have several undesirable outcomes for close friends, either they form a defensive sub-group, that is, they jointly characterise others as the problem, or the strain on their friendship damages the relationship with consequences for the rest of the course.

In addition to these required roles there are a number of other roles that may be needed when working with particular groups. The issue of why some groups need specific additional support is complex and not one we are able to explore here. However, when students engage in assessed group work tasks our experience is that some groups experience conflicts or tensions that they are not resolved within the group but require tutor support.

Safety net

A specific aspect of providing a safety net is to support individuals or groups when in difficulty and proved alternative strategies for individuals and groups to succeed where there are absences or personal crises. Extended absence or unexpected personal circumstances can affect student progress on any module but when working collaboratively on assessed group work tasks such occurrences not only impact on individual students but on the rest of the group. Where necessary it may be necessary to change the nature of the collaboration or to offer alternative individual routes for module completion. It is important to involve the whole group in decisions to change the nature of collaboration and reassure other group members that they will not be penalised because a colleague has found themselves in this situation.

Mediator

The role of mediator arises when working with groups in conflict. Usually at least one group in a cohort will experience some sort of conflict. As previously discussed group

work can create considerable pressures as the contribution of each member is perceived as affecting the credit of others even if assessment procedures mean that differential contributions are taken into account and individual marks are possible. It is often the point at which the relative marks are assigned by the group that conflict arises. Important mediation practices include ensuring different perspectives are listened to and supporting the group to find a resolution.

Investigator

Where there are disagreements about who has done what or about the nature of conflicts in the group it may be necessary to investigate them. It is important that students are required to collect evidence of meetings and a record of work so that as an account of how the group has worked can be developed.

The judge

The intention of the assessment process is that groups will work in such a way that through a process of peer assessment they will agree the distribution of marks. The tutor is neutral as to whether this is an even distribution or not. However, the situation can arise in which members of a group do not agree. Part of the tutor's role is to be a final arbiter and assessor who makes a decision based on the evidence presented and the individual interviews with the students.

Boundary keeper/enforcer

Given the potential vulnerability of students in an assessed group work situation it is also important to be willing to intervene to ensure that both the collaborative process and specific group agreements or contracts are respected. Occasionally, individual students may engage in disruptive or disrespectful behaviour. This might include destructive criticism of others or using aggressive behaviour to coerce the group into agreement with their point of view as well as more passive forms of disruption such as continually failing to come to meetings or not contributing to the project. Very occasionally it may be necessary to remove a student from a group.

Concluding remarks

At the start of the paper we distinguished between assessed group work that involves assessment of both task and process outcomes from other forms of collaboration linked to assessment (of individual outcomes as an example) or indeed with shorter term or more informal forms of collaboration. However, we suggest that our analysis is also potentially useful in thinking about some of the roles a tutor takes in these other situations.

If learning collaboratively is a 'high stakes' activity for the student teachers we work with, it is also a risky activity for us as mathematics teacher educators. Given that one of the roles of teacher educators is to model teaching (McGee and Lawrence, 2009) we are conscious that our practice in supporting collaborative learning is a model for the students.

The importance of our practice as a model is amplified due to the relative lack experience student teachers have experienced in their own schooling of this way of working in mathematics (see for example Povey and Angier, 2006). Thus our motivation to self study and to know more about the roles we play is informed by a particular criticality that arises from our identity as teacher educators as well as ethical concerns as higher education tutors.

In addition, where students do aim to enact such practices we know that they will be going against the stream - we are preparing for them to engage in collaborative professional development. Our concern to support student teachers to become potential change agents in terms of promoting collaborative learning gives an additional importance to our work. Promoting collaborative group work is also high stakes because the activities and roles that it requires of us, as we have discussed in this paper, are demanding. Perhaps appropriately, they involve us in internal conflicts and dilemmas that are similar to ones that arise for students engaged in collaboration as we too negotiate landscapes in which there may be no right path. Some of these roles require interaction with students in which we, like our students, risk that which is hidden to others or unknown to ourselves to be revealed.

Assessed group work involves important ethical questions for tutors about conflicting issues of individual and collective agency, needs and learning possibilities. This underlines the importance of tutors critically examining their practice. By analysing our practice in terms of different roles we take we are able to untangle and see more clearly some of the complex threads of tutor practice in relation to assessed group work.

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