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CORNOCK, Claire <<http://orcid.org/0000-0002-6918-5918>>

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## **The evaluation of an undergraduate peer assisted learning scheme at Sheffield Hallam University**

**Claire Cornock**

Sheffield Hallam University, UK

### ***Abstract***

The peer assisted learning (PAL) scheme in the mathematics degree at Sheffield Hallam University consists of final year PAL leaders guiding groups of first year students through an assessment task. Evaluation of the scheme in 2014-15 took place through a number of methods, including questionnaires, reflective log book comments and group contribution sheets. The scheme was found to help to ease the transition into university, help develop a mathematics community through the creation of support groups, and encourage inter-year interactions, developing skills, and increasing confidence of all involved. Engagement and enjoyment was very high and success extended far beyond the duration of the scheme. Despite the overall success, improvements will be made following on from comments and suggestions made by students.

**Keywords:** peer assisted learning; mathematics community; peer support; inter-year interactions; skills development.

### ***Introduction***

The mathematics degree at Sheffield Hallam University has included a peer assisted learning (PAL) scheme since 2008, in which first year, first semester students are supported by final year PAL leaders. Further details of this scheme have been presented elsewhere (Waldock, 2011). This paper will examine the benefits of the scheme in more depth and provide a thorough evaluation from the 2014-15 academic year.

Typically a PAL scheme involves students in the latter stages of study supporting students in the initial years at university. PAL aims to help in the difficult phase of starting university

by creating peer support groups (Hill and Reddy, 2007, p.98), with benefits including raising retention rates, helping the transition into university and improving skills (Hammond et al., 2010, p.202).

New students at university face a large number of changes, including being in a new city and living away from home for the first time. This initial time at university is of particular interest as it has an effect on the rest of their programme (Lawson, 2015, p.39). Course level differences include the contrast between mathematics in A level and higher education, particularly regarding rote learning (Hoyles et al., 2010, p.830). In addition, students are expected to have less dependence on staff and be more responsible for their own learning, whilst getting used to new teaching and learning styles, with fewer opportunities for support, especially from family and friends (Hill and Reddy, 2007, p.98).

The creation of PAL support groups also has implications past the initial transition stage and, as pointed out by Luk (2007, p.172), encouraging discussions amongst students makes a course more 'worthwhile and enjoyable'. Challis (2015, p.87) says that group work fosters 'feelings of belonging to a community of learners of mathematics' in general. Development of a learning community holds great value and significantly improves the university experience. Zhao and Kuh (2004, p.132) say a learning community is an 'effective educational practice', with benefits including improving students' success and increasing satisfaction.

The primary aims of the PAL scheme at Sheffield Hallam University are to help ease the transition into university, to help students settle and increase retention rates, and to aid in the development of a mathematics course community.

### ***Set up of the scheme***

Within the scheme at Sheffield Hallam University it is compulsory for all mathematics degree students to take part and produce a presentation, report and poster within a group, which accounts a very small amount towards the assessment for one module. One or two final year students act as facilitators for each group of around six to eight first year students. The scheme, beginning in induction week, is based around the development of skills instead of subject content. They are provided with suggestions, but are encouraged to pick their own titles for their PAL project, with the only condition that there is some

mathematics included. Recent examples have included smarties, beer pong and the Olympics.

### **Final year PAL leaders**

The final year students are there to facilitate the process and guide the first year students in their work. As mentioned by Hill and Reddy (2007, p.98), final year students are not intended to replace other forms of university support, but to be an additional support to help the students in the project and beyond. The PAL leaders at Sheffield Hallam University arrange meetings and help them set targets, but they are not there as teachers and do not do any of the work for the students.

At the start of the academic year the PAL leaders undertake a day of training. As mentioned about the PASS scheme at the University of Manchester and UMIST, the importance of the training cannot be stressed enough as it sets the 'right 'tone'' for the entire duration of the scheme (Coe et al., 1999, p.73). In the training at Sheffield Hallam University, PAL leaders explore their role with the aim that they develop confidence to fulfil it successfully, particularly surrounding effective group management and facilitation skills. At the end of the day the students meet their PAL group in a relaxed and informal atmosphere.

### **Introduction to the scheme**

The first year students meet their PAL leader at the Maths Arcade session in the induction week programme as an ice breaker. Following on from the success of the Maths Arcade at the University of Greenwich (Bradshaw, 2011), one was created for the students doing the mathematics degree at Sheffield Hallam University as part of the project that established arcades at several universities (Bradshaw and Rowlett, 2012). A Maths Arcade is a collection of strategy games, usually run as a weekly session. It features in the induction week programme where the first year students meet their PAL leader straight after the PAL leader training has taken place.

## **Staff involvement**

Staff involvement is kept to a minimum during the scheme. Wadoodi and Crosby (2002, p.241) present the advantages of restricting direct staff involvement. At Sheffield Hallam University, a PAL coordinator oversees the full process and provides help and support throughout to PAL leaders and first year students. In addition to having a PAL coordinator, each PAL group has a member of staff attached to it who is on hand to offer support and guidance where appropriate. Staff are given guidelines which include recommendations for minimal contact within the PAL sessions.

Even though the involvement from staff in PAL sessions is kept to a minimum, the level of support is very high. The support and encouragement from staff is described 'imperative' in a nursing peer-mentoring case study (Li et al., 2010) following on from the review of Wilkes (2006, p.46). The PAL leaders at Sheffield Hallam University are expected to have regular contact with the member of staff to report on progress and address any issues. In addition to the support from staff, peer support is encouraged through regular lunchtime support sessions with the PAL leaders.

## ***Methodology***

The scheme was evaluated with the intention of finding out whether any improvements could be made. This included looking at whether aspects such as the training, the way students are introduced to the scheme, and the level of staff involvement, were appropriate. In addition to this, it was investigated whether the scheme helps students both in their transition into university life and beyond the scheme's duration, as well as contributing to the development of a mathematics community. Themes that emerged from the results that contributed towards these factors were support groups, inter-year communication, development of skills and confidence levels.

There are a number of ways the PAL scheme was evaluated in the 2014-15 academic year. As well as conducting questionnaires with first year students and final year PAL leaders regarding the scheme, all final year students have filled in a general survey and one has been carried out relating to the Maths Arcade. In addition to this, information has been gathered from peer assessment forms and log book entries. Ethics were considered when using these forms of evaluation. In particular, responses made in questionnaires

were made confidentially and no personal information was requested. The students were also informed of how the information would be used in the evaluation.

### **First year questionnaire**

A questionnaire was carried out with all the first year students who were present at the presentations at the end of the scheme. The main aims of this questionnaire were to look at how the scheme could be improved, find out about their experience of it, and how the scheme had helped them. The survey was carried out by 87.9% of the year group (94 out of 107). They were invited to give open responses to the following questions:

- How did you find the PAL scheme?
- What did you like about the PAL scheme?
- How could the scheme be improved?

In addition to these questions, they were asked whether they thought they would continue to work with their PAL group, their opinions on the level of staff involvement, and whether they asked their PAL leader questions about other parts of the course such as placements, management of workloads and electives. They were provided with a list of factors such as the PAL scheme and were asked to indicate which made their transition into university easier. In addition, they gave separate scores out of ten on how easy they found it to approach and talk to a member of staff at the start of the year and how they found it at the time they carried out the questionnaire. They were also asked the same question regarding approaching other students in their year and other year groups.

### **PAL leaders questionnaires**

Questionnaires were carried out at two points in the process by the final year PAL leaders to find out about their experience and for suggestions of how the scheme could be improved. The first questionnaire was carried out at the end of the training and was filled in by 73.9% of the PAL leaders (17 out of 23). As well as being asked whether they enjoyed the training, about its usefulness and whether they felt well equipped to start being a PAL leader, they were asked for suggestions of how to improve the scheme.

In the questionnaire filled out by 87.0% of PAL leaders (20 out of 23) at the end of the scheme, they were asked the same three open questions as the first year students. In addition, they were asked what support they took advantage of, whether they would have liked more direct staff involvement in the scheme and whether the training had included everything they had needed.

### **Final year questionnaire**

A questionnaire was carried out at the start of the second semester with 65.4% of the final year students (53 out of 81) in one of their lectures, which included a mixture of students who had been PAL leaders and those who had not. They were asked whether they felt like they were part of a mathematics community and which factors made their transition into university easier.

### **Maths Arcade questionnaire**

Evaluation of the Maths Arcade in general took place at the end of 2014-15 through a questionnaire that was sent to all students; a total of 13 students responded. As part of it, they were asked whether they enjoyed the Maths Arcade during induction week and whether it was a good place to meet their PAL leader. Relevant comments from amongst the responses have been included in this paper to address whether the introduction to the scheme was appropriate. The disadvantage of this survey was the low response rate and its usefulness in representing the views of all the students was limited.

### **Peer assessment forms**

The first year students had to fill in peer assessment forms to indicate the level of input from the members of their group. They were asked to rate each group member's contribution and were asked to provide reasons whether all group members should receive the same mark for their work. These forms have been used to give an indication of engagement.

## **Log book comments**

Throughout the first year, students are required to fill in online reflective log books on a weekly basis. The students made comments about the PAL scheme throughout its duration, which included reports of progress, any problems they faced, and their opinions of the scheme. As mentioned by Moore (2011, p.9), reflective logs 'can provide rich data and personal insights whilst also benefitting from broad student coverage'. A disadvantage of this form of evaluation is that the comments can be unstructured.

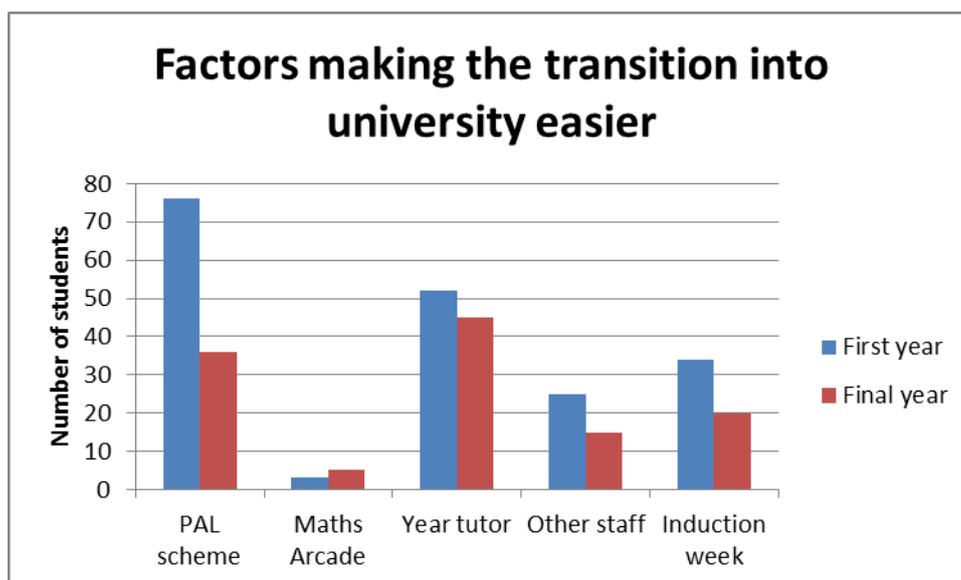
## ***Results and discussion***

The overall response from the PAL leaders and the first year students about the scheme was generally very positive. Several of the PAL leaders and first year students mentioned that they had found the scheme 'very enjoyable'. Engagement in the process was very high, with many of the students putting a great deal of effort into the work. Following from the peer assessment sheets, only 3.7% of students (4 out of 107) received zero marks and 6.5% (7 students) had their marks reduced. Many of the first year students made comments in their log books about 'looking forward to the next meeting'. One student commented in their log book at the end of the scheme that the PAL scheme 'really shows how much [we] care about [our] students'. The PAL leaders found the process 'very rewarding' with one student saying that this was because '[their] help [was] benefitting [the students]' degree'.

## **Easing the transition into university**

The scheme is very successful at helping to ease the students into university life. When asked about what they liked about the scheme and how they found it, many of them mentioned that it helped in this way. Comments from the first year students included that the PAL scheme 'helped [them] settle' and 'it makes the transition easier'. PAL leaders commented that 'it's a good way for students to meet and integrate' and that they liked 'helping a group settle into university life'.

The first year students (94 students) and the final year students (53 students) who were surveyed were asked what factors made their transition into university easier. The responses are displayed in Figure 1:



**Figure 1. Questionnaire results on factors making transition easier.**

There were a mixture of responses, but a significant number of them mentioned the PAL scheme.

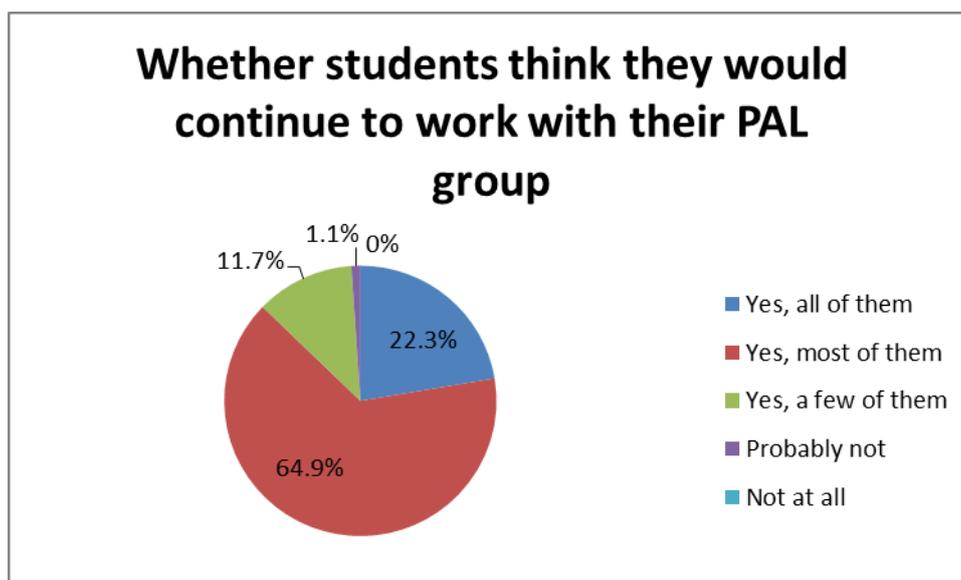
### **Development of a mathematics community**

Out of the final year students who were surveyed, 86.8% of them (46 students) said that they felt part of a mathematics community, whereas 13.2% did not (7 students). There are a number of aspects that contribute to this, but the PAL scheme plays a part towards this as it helps with the formation of support groups. When asked about the PAL scheme and what they liked, many of the first year students mentioned meeting people. Comments included that it was a 'good way to get to know people on the course' and that 'it made it easier to make friends'.

In the survey, several of the students mentioned that they liked that the PAL scheme helped them get to know people when they first arrived. Comments included that the scheme allowed them to make 'instant friends'. One student commented in their log book that 'the PAL group scheme really helped [them] to break the ice and make friends early on in the year'. They said 'it especially helped people who might have been too shy to initiate conversation and [they] feel the whole year has benefited from it as people are able to talk to each other easily'.

A few students made comments about the difference between meeting people on the scheme and within classes. One student commented that 'it gave [them] chance to meet some people in a small group which is easier than meeting them in a class'. It allowed them to create support networks for other areas, with one student commenting that it 'was easy to get to know people for help on the course'. They found that it was 'good to get a group of people who [they] know for seminar classes at the start of the year when [they] don't know anybody'. One student mentioned in their log book towards the start of the year that 'the whole idea of a PAL group has been brilliant as [they] wouldn't have [had] a clue who [they had] be sitting next to in any lecture if [they] hadn't of made [those] friends'.

The friendships tend to extend far beyond the end of the scheme, with comments including that it 'allowed [them] to make new friends whom [they] hope to remain friends with'. Comments from logbooks included that they 'spend time as a group in and out of the university', they 'socialise in lessons and outside' and that they 'hang out almost all the time'. It can often be observed that many of the students continue to work with members of their PAL groups throughout the remaining time on the degree programme. In the final year survey, a student mentioned that they have 'stuck to [their] PAL group'. One student mentioned that 'speaking to other students would always be the first port of call when needing help'. Observations of the students throughout the degree programme suggest that there is a great deal of peer support that takes place between the students. When the first year students were asked whether they think they would continue to work with their PAL group, they made the responses presented in Figure 2:



**Figure 2. Questionnaire results on whether students would continue to work with their PAL group.**

The vast majority of the first year students (98.9%, 93 students) said they thought they would continue to work with at least a few of their PAL group, with a large proportion (87.2%, 82 students) stating that they thought they would work with either all or most of them.

The PAL scheme promotes discussion between the different year groups and these students enjoy the inter-year interactions. The PAL leader comments included that the scheme was a 'good opportunity to interact with students earlier on the course' and that they liked that they 'got to meet students from other years'. The first year students liked 'working with a student who had experienced [the scheme] before' and that it 'was nice to work with the PAL leaders'. Several comments in the log books after the Maths Arcade session had included that the PAL leaders were 'friendly' and 'helpful'. A first year student recognised that the PAL leaders would be 'very beneficial towards [their] group as [they] work on [their] project'.

The students appreciated the opportunity to discuss other aspects of the course, such as placements and the degree structure. When asked what they liked about the scheme, comments from the PAL leaders included that they 'liked the chance to inform the students on placements and their final two years of study'. One of the first year students commented in their log book at the start of the year that they could 'see it being very

helpful for understanding the experiences that the 3rd year students have been through'. When surveyed at the end of the scheme, the first year students said they liked, 'the fact the leaders would help [them] about uni life', that they 'were able to help [them] with [their] questions', and they gave them 'good advice'. When surveyed, 88.3% of the first year students (83 students) said that they had asked their PAL leaders questions about other parts of the course and 10.6% (10 students) said that they had not.

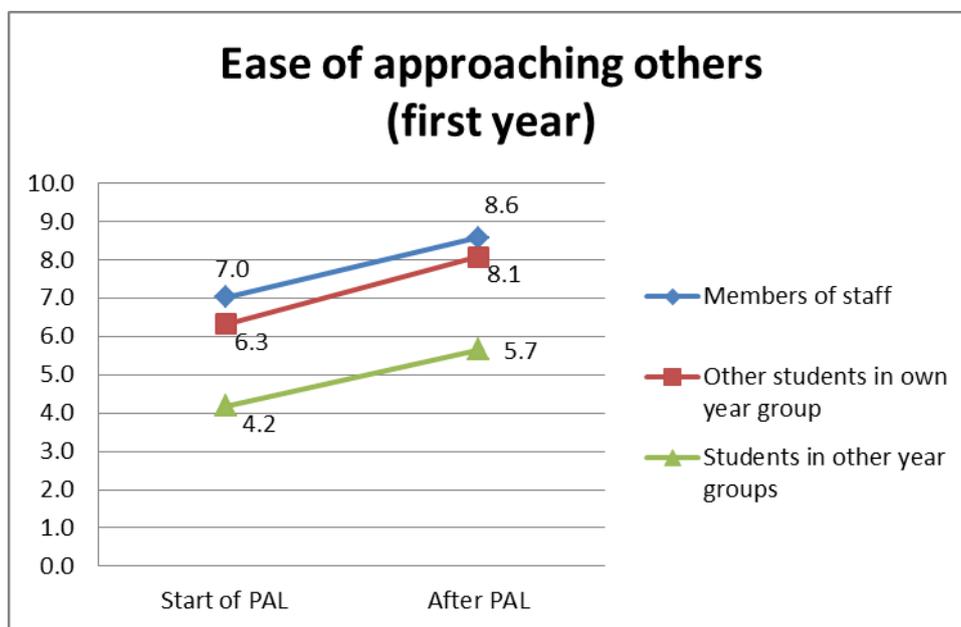
### **Development of skills and confidence**

The first year students recognised and appreciated the chance to develop their own skills. As a PAL leader mentioned, it was a 'good opportunity for first years to boost their group work skills and presentation skills'. When asked what they liked about the scheme, many of the first year students also mentioned the development of skills such as group work and communication. One student mentioned that they '[improved] skills which haven't really been covered before' and another said that the scheme 'encouraged collaboration in a way [they] had not really studied at A level'. One student commented in their logbook that 'PAL overall has helped with a range of skills' and mentioned organisational skills explicitly. Other comments included that they 'gained confidence with [their] presentation skills' and those skills had 'increased dramatically'. Regarding team work, the students 'had a great experience learning to work as a team'. They also found 'the work [they] did collectively was helpful with the report writing because [they] had not done that before'.

The PAL scheme also has added benefits such as PAL leaders developing employability and personal skills. Several of the final year students said that they developed skills including leadership, interpersonal, organisational and group work skills. As one student said, it gave them 'good experience of chairing a team'. The PAL leaders gain valuable experience that they can use when making job applications. One student mentioned that they could 'use [the scheme] as an example in applications and interviews' and another said that it 'helped want to be teachers gain experience'. A first year student commented in their log book that having 'PAL leaders [is] a great thing' as 'this would be a great thing to put on [their] cv for leadership skills'. Soloman and Crowe (2001, p.181) came to similar conclusions regarding skills developed and future careers in a peer tutoring scheme.

As mentioned by several of the first year students, the scheme was 'also good for confidence building'. The first year students were asked to give a score from zero to ten to

indicate how easy they found approaching and talking to a member of staff at the start of the year and at the end of the PAL scheme, with zero being the lowest score. They were also asked to do this regarding talking to students in the same year group and other year groups. The average scores are presented in Figure 3:



**Figure 3. Questionnaire results on the ease of approaching others.**

First it is noted that there is only a slight difference in the average scores provided for the ease of talking to staff and other students in the same year group. There have been increases of 22.9%, 28.6% and 35.7% for the average scores for the three groups. When students were asked why there had been an increase, 19.1% of them (18 students) said it was because they had got to know people, 13.8% of them (13 students) said it was because they had got 'more used to the uni environment' or that they had 'had time to settle in'. A general increase in confidence was mentioned by 14.9% of them (14 students) and 9.6% (9 students) said they felt 'more comfortable' or 'more relaxed'. The PAL scheme or the PAL leaders were explicitly mentioned by 4.3% of the students (4 students). One student mentioned that the increase in scores was 'because [they] made friends with people in [their] PAL group'.

## Improvements that could be made

There was mainly a positive response from the students about the scheme. When the first year students were asked how they found the scheme, 15 students (16.0%) made a neutral comment. Some said they found the scheme challenging, hard, frustrating or difficult (5 students, 5.3%). A couple of the students did not like how it took time away from other modules and another couple did not like how little the project counted towards their marks. The amount the project counts towards their first year marks is currently being reviewed with the anticipation that it will increase. Other comments from the students included that the scheme was boring, stressful, draining and that they 'didn't like it at all'. One student in particular did not like the group work.

When asked how we could improve the scheme, there were a number of common responses, including the timing of the assessment (9 students, 9.6%) which is currently being reviewed. Some students suggested having no presentation or presenting to a small audience (6 students, 6.4%). Next year, the students will have to present to fewer students. Other comments included that they would have liked more guidance and information (10 students, 10.6%). There were also comments about having more support from PAL leaders or a better PAL leader (6 students, 6.4%). As there will always be a variation in the support offered by the PAL leaders, this can only be improved to a certain degree. This will be attempted through developing the training further, ensuring that the PAL leaders have clear instructions and giving the first year students all the vital information about the scheme directly.

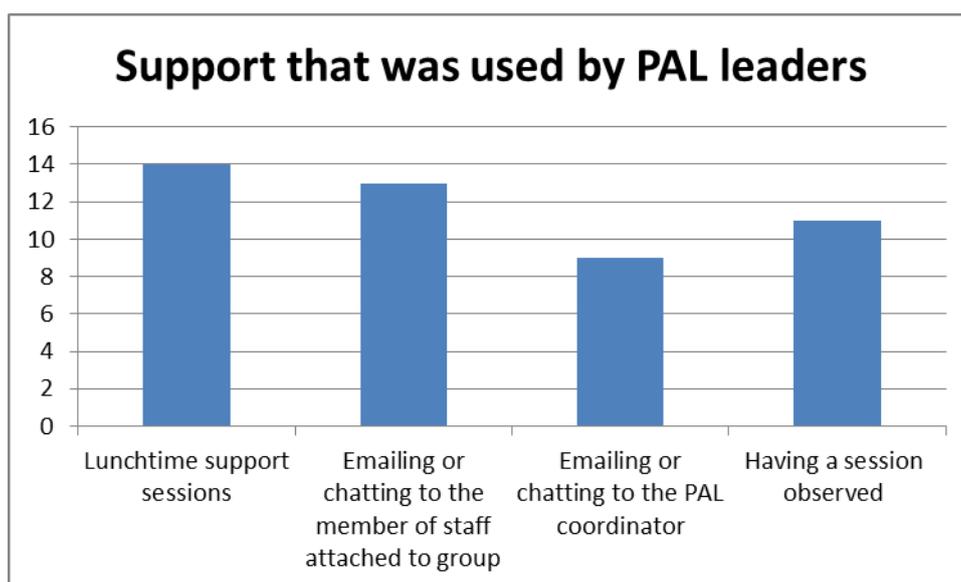
When the PAL leaders had been asked how they had found the scheme, all of them had something positive to say. One student mentioned that 'it got a little stressful' and another said it was 'very tough sometimes', but these students were very positive otherwise. When asked how the scheme could be improved, the PAL leaders suggested that more emphasis should be put onto the importance of attendance, how the students can get the most out of their PAL leaders, and engagement between meetings. This can be addressed when introducing the scheme to the students.

All PAL leaders surveyed at the end of the training said that they had enjoyed it and had found it useful. All of them said they felt well equipped to start being a PAL leader, with one student commenting that they had 'been equipped with plenty of information'. There were a few suggestions of how to improve the training which have been taken into

consideration in the preparation for the next year. In the questionnaire filled in by the PAL leaders at the end of their training, suggestions to improve the training were to condense it and to include more activities. The training has been re-developed and is now based around more activities.

Positive comments from first year students about the Maths Arcade in induction week included that they did enjoy it because it allowed them to 'bond with [their] PAL group' and that it was a good place to meet their PAL leader because 'it was [a] laid back environment and didn't feel awkward'. A placement year student said it had 'allowed [them] to get know [their] fellow students a little better' and a final year student described it as a 'good ice breaker'. It was clear that some of the students did not enjoy the Maths Arcade. One student commented that the session had been too long and the session will now be shortened in response to this.

The first year students saw very little staff involvement in the scheme with the main form of communication with the first year students being through their log books. When surveyed, 76.6% of them (72 students) said there was the right amount of support from staff, 23.4% of them (22 students) said they would have liked to have seen more, and none of them said there was too much. One first year student commented that they had 'easy access to staff if help was required'. Out of the 20 questionnaires from PAL leaders, the methods of support used are displayed in Figure 4:



**Figure 4. Support used by PAL leaders.**

The majority of the PAL leaders (70.0%, 14 of them) said there was the right amount of support. Some of them (30.0%, 6 of them) said they would have liked to have seen more support from staff, and none of them said there was too much. Looking at the reasons for wanting more, there seemed to be a variety in the support offered by the members of staff involved. The PAL leaders found that 'the support network [was] brilliant' and that there was a 'good level of support'. Overall they liked that they 'were able to just get on with it', that they could 'choose [their] own method for helping the group' and that 'there was a lot of freedom and responsibility'. One student commented that they found that the 'support sessions kept everything on track'. There was one suggestion that there should be more contact from the staff assigned to each group. This is currently being reviewed and final year PAL supervisors are being considered to ensure a more consistent experience for the PAL leaders.

## ***Conclusions***

The PAL scheme within the first year of the mathematics degree at Sheffield Hallam University is generally very successful at easing the transition into university and helping develop a mathematics community. The creation of groups encourages peer support throughout the degree programme as most of the students continue to work with at least some of their group beyond the end of the scheme. Having the scheme begin on their first day helps the students make instant friends and they appreciate being in the same tutorial groups together. Inter-year communication is currently quite limited, but the PAL scheme gives the first year students the opportunity to consult final year students on aspects of the course such as placement years.

Using the Maths Arcade as an ice breaker activity works well for when the PAL leaders meet their PAL groups at the end of their training. The amount of direct staff involvement is kept to a minimal, but an extensive support system is in place to ensure the smooth running of the scheme. In addition, both the first year students and the final year PAL leaders develop employability skills and an increase in confidence. In particular, the first year students develop their presentation and group working skills, whilst the final year students practise leadership skills.

Suggestions for improvement will be taken into consideration and changes will be made where necessary, but overall the response to the scheme is generally very positive. Enjoyment of the scheme can be observed through the high engagement levels and comments made by the students. The benefits of the scheme, which continue far beyond its duration, are recognised by the different students involved.

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### ***Author details***

Claire Cornock is the Course Leader for BSc Mathematics at Sheffield Hallam University. She has been the coordinator of the group's peer assisted learning scheme since 2013 and has implemented a number of changes. Her use of group work extends beyond first year peer support, especially within tasks where learning and assessment are integrated. She is interested in improving the university experience for students through developing activities and support mechanisms outside formal teaching sessions. She is active in researching teaching and learning pedagogy, with innovative approaches including the use of Rubik's cubes in teaching algebra topics.