Individual paper

Developing a psychology undergraduate research community in a new university

Patricia Roberts, Candan Ertubey, Isabella McMurray & Ian Robertson

Psychology is a science-based discipline in which research is inextricably embedded in teaching and learning activities. Educators use different methods to help students in their learning of the nature of research and the practical skills required to conduct research, with students playing either a passive or more active role in the learning process. This paper details the steps taken at a post-1992 university in the UK to involve final-year psychology undergraduate students as researchers in a staff-led neuropsychology project. The theoretical frameworks underpinning this study were the teaching-research nexus and learning communities. The aims of the project were to engage students in active learning and to foster the development of higher order skills – evaluation, synthesis and reflection – through the development of a learning community. A thematic analysis of student questionnaires identified three overarching themes: Bringing theory alive, critical thinking and problem solving skills, and working in research communities. Staff reflections of working on the project are discussed together with future directions.

Keywords: *Students as researcher; theory to practise; learning community.*

GIVEN THE NATURE of psychology as a scientific discipline, there is an established history of research underpinning teaching in psychology. Indeed the British Psychological Society (the Society) represents psychology and psychologists in the UK and details core curriculum requirements for students to undertake throughout their degree programme. One of these requirements is exposure to a variety of aspects of the research process.

Educators have used different methods to enhance students' learning of the research process. Examples include teaching students the mechanics of how research is undertaken, having students participate in class room experiments, or holding undergraduate research conferences (Garde-Hansen & Calvert, 2007). A recurring view is that for students to gain a depth of understanding and knowledge of the research process their engagement in research is essential, for example, through active

learning (Chapdelaine & Chapman, 1999; Healey & Roberts 2004).

Others have examined the relationship between teaching and research (Brew & Prosser, 2003; McWey, Henderson & Piercy, 2006) exploring areas including the research culture in relation to outcome measures such as employability (Urwin & Di Pietro, 2005).

Jenkins, Breen and Lindsay (2003) suggest that the inclusion of staff research in the undergraduate curriculum assists in motivating students in their studies and enhancing the student experience. However, the link between staff research and teaching is not always evident to the students and it is not always easy to achieve. Previous research has investigated the extent to which there is a nexus between research and teaching roles (Neumann, 1994; Griffiths, 2004; Healey, 2005). Healey (2005) argues that utilising a teaching-research nexus framework can assist academics in encouraging students to

be active 'participants' in the learning process.

Stefanou and Salisbury-Glennon (2001) investigated the impact of active learning and the development of learning communities on undergraduate students' motivation, depth of understanding and engagement with the subject matter. They found that students who worked both actively and collaboratively had higher levels of intrinsic and extrinsic motivation, had more internal control over their learning and lower levels of test anxiety.

This paper seeks to integrate two theories and bodies of literature – the teaching-research nexus and learning communities – in order to evaluate the impact of students and staff working together on a neuropsychological research project.

The Teaching-Research Nexus

A theoretical framework exploring the connections between teaching and research was proposed by Griffiths (2004) and further developed by Healey (2005). Griffiths (2004) details three approaches: first, a research-led approach where the class content is determined by the teacher and focuses on research findings; second, a research-oriented approach where students learn about the research process again directed by the teacher; third, a research-based approach where the division between teacher and student is reduced as both are engaging in the research process through inquiry-based learning. Healey (2005) diagrammatically represented Griffiths' (2004) framework and added a fourth element: a research-tutored approach (Figure 1) which places emphasis on small group discussions with students reviewing the research process.

In Healey's matrix, 'research-led' and 'research-tutored' refers to the approach that much of the psychology curriculum dwells on past research, particularly at Level 1 where students learn the mechanics of conducting research through taking part in staff-led research. Furthermore, students are generally required to write essays and discuss papers, which demonstrates a more passive approach to research.

Psychology degree students, throughout their programme of studies, are often 'participants' in the research process. At other times they are the 'audience'. Also the emphasis varies between research content, process and problems. As a result, both the

Figure 1: Curriculum design and the research–teaching nexus.
Source: Healey (2005, p.70).

STUDENTS AS PARTICIPANTS

	Research–tutored Curriculum emphasises learning focused on students writing and discussing essays and papers	**Research–based** Curriculum emphasises students undertaking inquiry-based learning	
EMPHASIS ON RESEARCH CONTENT			EMPHASIS ON RESEARCH PROCESSES AND PROBLEMS
	Research–led Curriculum is structured around teaching current subject content	**Research–oriented** Curriculum emphasises teaching processes of knowledge construction in the subject	

TEACHER-FOCUSED STUDENTS AS AUDIENCE

structure of the psychology curriculum and the pedagogy employed are already in place to ensure that students' intellectual development is informed by the teaching-research nexus (Neumann, 1994).

To foster active participation in research and student collaboration with their peers and staff, different approaches have been examined. For example, Hughes, Brown and Calvert (2008) offered second-year undergraduate bioscience students part-time paid work in research laboratories. Following an evaluation of the scheme in terms of impact on staff and students, the outcome was reported as positive both from staff and students with students indicating that the scheme had had an influence on their decision to pursue postgraduate study.

The above research implicitly highlights the importance of research partnerships between teachers and students. Partnerships with undergraduate and postgraduate students have been examined within the inter-related frameworks of 'learning communities' (Stefanour & Salisbury-Glennon, 2001) and 'communities of practice' (Wisker, Robinson & Shacham, 2007). Such partnerships ensure that undergraduate and postgraduate students' academic development is enhanced when students and staff become involved in learning communities (Stefanou & Salisbury-Glennon, 2001; Wisker, Robinson & Shacham, 2007). The history of the development of learning communities has been fruitful and such communities can benefit all participants in some way, for example, by increasing motivation to learn and developing problem solving and critical thinking skills.

Developing a research community

Drawing on Vygotsky's (1978) core idea that learning is socially constructed, the terms 'learning society' or 'learning community' have been used to refer to a form of pedagogy where learners share a common goal (and, ideally, shared values) and are actively engaged in the learning process as a group (Zhao & Kuh, 2004). Lave and Wenger

(1991) coined the phrase 'communities of practice', emphasising the view that learning is not just the product of acquiring a set of behaviours or due to information processing, but is best seen as a socio-cultural phenomenon where language, social relationships and context play a large part of the learning process. Wenger (2007) proposed that communities of practice are made up of three elements. The first relates to a shared interest and commitment to a specific topic or domain, the second is the formation of a community that shares knowledge and activities and where relationships are built, and the third element refers to the members of the community becoming practitioners, with a variety of resource including the ability to solve problems. This is in contrast to much of traditional teaching methods where knowledge is abstracted from the practice in which it occurs. Thus, a learning community should facilitate student learning as well as their personal development by taking into account students' individualism as well as their commonalities allowing them to share experiences and build connections that enhance their experience of higher education. Active learning, in the form of research-led teaching, can be seen as a vehicle for developing such a learning community in which problem solving and inquiry-based learning are embedded (Lave & Wenger, 1991).

In a teaching context, the impact of a learning community has far-reaching benefits for students. It provides not only a sense of belonging among the student group but also the ability to achieve a common goal and share learning experiences. These effects serve to increase the interest of the students in the topic they are researching leading, in turn, to 'deep' learning (Mann, 2001).

As educators it is essential that we find ways of bridging the gap between academic studies and 'real world' experiences. Healey (2010) recently reiterated that undergraduate students will benefit more from research if they take an active part in it. He then suggests that staff and students need to

find new ways of working together in that process. There is an established history in the US of psychology students and academics collaborating on 'real world' research projects. For example, Chapdelaine and Chapman (1999) describe how students undertaking a supervised and assessed community-based project with the local police improved their understanding of research methods. The authors also discuss a catalogue of other similar studies that have been conducted with psychology undergraduates in the US. Although others have recognised the benefits of students as researchers (see, for example, Landburm & Nelson, 2002), Garde-Hansen and Calvert (2007) note that the partnership between students and staff working together on research has not been a particularly widespread practice within education institutions in the UK.

The aims of this paper are: first, to detail through a staff-led research project conducted at a post-1992 university how teaching and research links, as detailed by Healey (2005), have seen a shift in the emphasis at one institution from students as audience to students as active participants; second, to examine the development of a student research community during a staff-led project. This is in line with the concepts discussed by Lave Wenger (1991; Wenger 2007). These aims are achieved by describing a research project linked to aspects of teaching neuropsychology and to students' evaluations of this project followed by staff reflections on the whole process.

Planning the project

Funding was secured from the institution's Centre for Excellence in Teaching and Learning to engage third-year psychology undergraduates as student researchers in a staff-led neuropsychological project. As the student researchers in this project were to receive a small financial sum for their work this was included in the funding proposal and accepted. The research proposal also included details of how all the third-year students would benefit from this project in

anticipation that not all the cohort would apply to actively participate in the research. A virtual learning environment was established where information relating to the project was posted and all students could access this site so that they could review progress of the research. As not all students would take an active research role in the project, it was considered an important part of the students' level three development to participate by acting as the adult control group. The student researchers worked with other students in the department and in two community settings. Four members of the staff were involved with the organisation of this research and supported the students throughout the process. A brief description of the research is detailed below. Further details of the project findings are currently in preparation (Roberts et al., in preparation).

The aims of the staff-led project were three-fold:

1. To investigate the effectiveness of two different neuropsychological assessment techniques: computerised neuropsychological assessment and the more traditional paper and pencil methods of assessment of both adults with closed head injury and children in special needs programmes from primary schools (9 years to 11 years with age 8 as a critical age).

2. To compare the results of adults and children with difficulties against normal comparison control groups to see the differences in their level of function with regard to attention and working memory.

3. To compare two neuropsychological assessment techniques (computerised assessment with traditional paper and pencil tests).

The unifying intent of these aims was to provide students with the context to conduct real world research. Chapdelaine and Chapman (1999) note that having good relationships with community agencies can alleviate some of the obstacles of involving students in researching in the community.

In the current research project, the staff team had already established links with a brain injury association. Previous collaborations included student visits to the association as well as visits from staff and clients from the unit coming to the psychology department to give talks. New links were made with a primary school that involved a number of written and face-to-face communications. Therefore, before the commencement of the project, all of the organisations were clear about the aims of the project and exactly what the students' and lead researchers' roles were going to be.

In relation to ethics, the project adhered to the Society's ethical guidelines (2009) and was given ethical approval by both the department and Health Research Institute at the university. Approval was also given by the brain injury association, the school and their Local Education Authority. All participants volunteered to take part. Consent was given from children as well as from their parents. All of the staff and students taking part in the research received cleared Criminal Records Bureau (CRB) checks. This is a mandatory national requirement for any individual who intends to work with vulnerable groups in the UK. The CRB checks were funded by the organisations in which the students would be working.

Recruiting student researchers
The opportunity to take part in this research project was extended to 65 final year psychology students. Following the invitation, 30 students expressed an interest to take part and were subsequently invited to come forward for an interview. A total of 20 students attended interviews which were taken by three of the authors. The criteria the students were interviewed against were their expressions of enthusiasm for the project, their commitment and how they would manage their time. Of the 20 students who were invited for interview, 13 students attended. Eleven out of 13 students accepted the role of student researcher (10 females, one male). The student group was made up

of five students who had entered university through the traditional route, coming straight from school or college and six mature students.

Procedure for the neuropsychological research project
Phase 1: Training students in the use of specialist equipment necessary for carrying out the research.
During a three-week period, students were given an introduction to the staff-led project followed by training on the specialist equipment to be used in the research. During this phase, two students left the group (one traditional and one mature) for personal reasons leaving a total of nine students who were fully engaged in the remaining stages of the research process. Following the training, students were set small tasks of writing up the instructions to support the test administration. Students arranged to meet in small groups to familiarise themselves with the equipment.

Phase 2: Students' data collection from fieldwork
Students collected data from four different groups: an adult control group made up of 20 final year psychology students who were not working as student researchers; adult patients suffering from acquired brain injury; two groups of school children from a local school – a control group and an experimental group (children in a special needs programme). The student researchers worked under the supervision of senior members of the research team using computerised and pen and paper methods to assess all participants' performance on tests of executive functioning, visual-spatial ability, attention and semantic/verbal memory.

Phase 3: From data collection to dissemination
Throughout the research, students applied and developed their existing knowledge of conducting research that they had learnt at an earlier stage in their studies. The practical application of these skills through fieldwork

was a new dimension for the students and their acknowledgement of the benefits of this is commented upon in their evaluation of their engagement in the research. Through the fieldwork, students were able to experience important aspects of data collection: for example, appropriate communication and listening skills to meet the needs of the client groups, delivering clear standardised instructions to accompany each test used and empathy for the needs of the participants. Furthermore, their existing research methods knowledge assisted with data entry, analysis and the write-up of the method section of the final report to funders. Students were also encouraged to become involved in disseminating the findings to the organisations with three students assisting with the preparation of the results sections and two students preparing the method sections for a series of oral presentations. All students attended the presentation of the research with one student assisting with the delivery of the presentation. Students were offered the opportunity of attending a conference with one student accepting the invitation.

Phase 4: Evaluation of the students' experiences of being involved in staff-led research

Following data collection, entry and analysis, students were asked to complete a questionnaire comprising 16 questions designed to evaluate their experiences of being involved in the research project. This evaluation extended from the training phase through to dissemination. The questionnaire was divided into three sections. The first section included general questions relating to the impact of their engagement with the research process on their academic studies. Six questions in the second section related to their experiences of the training and testing phase. Finally, the third section related to their overall evaluation of their experiences and how these experiences might impact on their future employment and postgraduate studies.

Findings from the student evaluation

From engaging in this project we wanted to determine what exactly the benefits were and how we could maximise these, along with suggestions for improvements to inform both teaching practice and future research collaborations. Students recorded no negative comments other than occasional difficulties with equipment and their comments are noted below.

A thematic analysis was conducted on the students' evaluation of their involvement. Thematic analysis is regularly used in psychological research in order to identify similar categories or themes within the corpus of data (Braun & Clarke, 2006). A benefit of this method of analysis is that it is not necessarily joined to a distinct theoretical perspective and can incorporate both inductive and deductive analysis. The research team read through the data line by line and identified three overarching themes which summarised the data: Bringing theory alive; Critical thinking and problem solving skills; and Working in research communities. These are detailed below along with comments from students who took part and their participant number.

Bringing theory alive

Students articulated their enthusiasm and the benefits of taking part in the project. All of the students acknowledged how their involvement provided them with a valuable link between theory and practice.

> 'I think participating allowed me to put theory into practice in a supported environment.' (P2)

> 'This project helped to consolidate and clarify my learning, making the theory we'd learnt 'real'.' (P5)

Furthermore, they reported gaining excellent experience from working in a clinical setting where they highlighted an understanding of the link between the curriculum they were studying and working in the field. Moreover, they felt this applied knowledge would benefit their future personal and professional development.

'Taking part in the project has provided me with practical experience of data collection, data treatment and data entry into SPSS, as well as enhancing my research methods knowledge and report writing understanding. Moreover, the project has enabled me to engage in and work with clients that I may not have had the opportunity to do so otherwise.' (P6)

Critical thinking and problem solving skills and the research process

Students felt that the project had provided them with the opportunity to gain a deeper understanding of the research process. They were able to explore different areas of the research process, which had the effect of enhancing their critical thinking skills. Within the scope of the Society's curriculum students are taught the ethical guidelines that frame research activities (BPS, 2009). In the department, students are also given opportunities to evaluate how these guidelines are applied to different individuals and settings. However, in this project students showed a deeper awareness and appreciation of how the ethical guidelines are applied to different client groups prior to, and during, the testing phase.

'It made me more aware that I had to protect the privacy and dignity of clients and the need to obtain consent forms prior to commencing the testing.' (P6)

All students reported that the training they received on how to operate the equipment ran smoothly. Three students noted technical difficulties during the administration of the computerised tests to the client groups; however, they considered that some difficulties were to be expected in field work and through applying problems solving techniques and critical thinking skills the difficulties were resolved.

'There were a few technical hitches, with computer buttons failing but the team coped well and found workarounds'. (P7)
'The equipment used was sometimes troublesome (laptop) but this could be overcome by flexibility.' (P9).

When conducting research as part of normal teaching and learning the projects are designed and conducted by staff with students acting as participants and generally the process runs smoothly. However, it was recognised that there is more room for difficulties to occur in 'real world' research as this participant noted:

'Applied research is potentially full of unexpected operational issues, for example, the individual differences of researchers and any impact this has on the reliability of results. Both the researchers and their participants weren't always available for the tests so a degree of flexibility was needed, and the equipment was sometimes needed elsewhere, temperamental, or simply in the wrong location needing a trip to collect and return it. This has made me reflect on how research is done in the real world and I think enhance my problem solving skills' (P3).

The students' reflections in questioning the research process cohered with Landrum and Nelson (2002) who conducted a national survey with 211 psychology educators in the US relating to their experiences of research assistantships. They found that students had the opportunity to enhance critical thinking skills was the item rated the most important benefit of being a research assistant.

Working in research communities

The student researchers acknowledged the importance of working within and as part of multiple research communities at different times throughout the project. Figure 2 provides a diagrammatical representation of these research communities. The student researchers are in the centre of the model. Through working together and sharing common interests they evolved into their own community of practice with their fellow student researchers.

The starting point is the existing cohesive nature of the department where all students work together with a common goal to achieve their degree. The students as

Figure 2: Model of working in research communities.
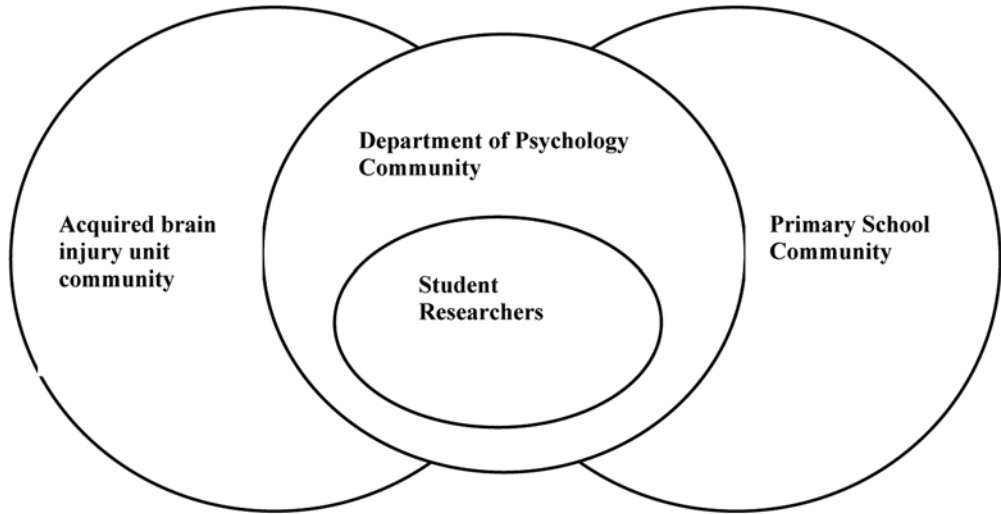
researchers came together because of their shared interest in neuropsychology and working on a project conducted in the 'real world' and as a consequence of their establishing a supportive and effective learning community this extended to their working relationship with the two client groups.

Students reported on their peer collaboration as part of the group of student researchers.

'I enjoyed the sessions where I worked with my assigned partner.' (P5)

Figure 2 illustrates that this student researcher community is within a wider research community of the Department of Psychology, which includes both staff teaching and research, and student learning. The student researchers also acknowledged gaining and sharing knowledge with other students from their cohort who took part in the control group. Indeed, anecdotal evidence from the control group suggested that the student researchers were enthusiastic in conducting the research and were also motivated in the seminar sessions to share their research experiences informally with their peers. This supports Vygotsky's ideas of more skilful students supporting their peers.

What was expected from students was clearly set out within a time frame before the project began, along with details of how the students' role fitted into the broader project. The students were aware of what needed to be achieved and by when. Working in partnership with shared goals and solving problems together as they occurred may have gone some way into minimising any power imbalances between staff researchers and student researchers. These shared goals echoed the community of practice ideals (Wenger, 2007).

'The whole team work very well together, resolving problems as they occurred.' (P1)

Collaborating in these communities provided a cohesive enjoyable research experience.

'We were all very supportive to one another throughout the study, there was such team spirit.' (P7)

There was recognition by some students of what their own role was in the research team and an acknowledgement that they felt a sense of responsibility to their peers, staff and the organisations they were working in.

'I feel I was a reliable and effective researcher who assisted and supported other team members.' (P5)

Student researchers also described the benefits of working beyond the department and learning from the organisations in the local community. For example, one student highlighted that being a student researcher had provided her with a valuable insight into the complexities of working with school children and adults with acquired head injury. She also felt she had gained an understanding of the need to empathise with clients' needs while giving full consideration to the boundaries of the organisations.

> 'Yes, as it provided me with some valuable 'real life' experience working with young children in a school environment.' (P6)

> 'I definitely benefited from working with the brain-injured clients and enjoyed it enormously, particularly their candour in discussing their limitations and their willingness to participate in activities which highlighted their limitations as well as their abilities. I developed a greater understanding of the challenges they faced and also the process of rehabilitation.' (P5)

Staff reflections of the process

Staff reflected on the whole process and their reflections concurred with those of the students specifically in relation to the educational value of the students' participation. Moreover, staff described how they saw students developing their research skills through asking questions to staff, and through their interactions with both staff and clients at the two organisations. Staff also commented that the life experiences that the mature students brought to the project were invaluable and they were very supportive to the traditional students particularly during testing of the clinical group. It was noted that the research process was time-consuming for staff working with the students, however, staff felt that the advantages outweighed this. Staff acknowledged the benefits of working in the project in relation to enhancing students' employability and postgraduate study potentials.

Conclusions

The aims of this paper were to detail, through a staff-led research project, how teaching and research can be linked, and to examine the development of a student research community. Students' evaluations of their experience have shown that engaging them as researchers allows them to be more active agents in the research process. These findings support the work of Griffiths (2004) and Healey (2005) in that the students were engaged in the research process through active learning, very much shifting from the left side of Figure 1, passive engagement, to the right side, active engagement, where students are both participants but also involved in the research process.

The findings also support the ideals of a community of practice (Lave & Wenger, 1991; Wenger, 2007). However, rather than developing their skills, knowledge and attitudes in one research community that we originally envisaged, the students described multiple distinct and interlinked research communities (see Figure 2). From the student evaluation it would appear that they felt a sense of belonging to a group that had a common set of interests and goals to be achieved. This is in line with the view of Zhao and Kuh (2004) who reported that a learning community facilitated student learning and personal development.

The project promoted an integrated approach to facilitating both vocational and academic education. It also aided the development of students' knowledge of methodological designs together with the theoretical perspectives that underpin them as evidenced by their evaluations. Furthermore, since the completion of this project a new group of students has been trained in the use of the equipment and is working in the field. It is encouraging that this enthusiasm is continuing and that the project demonstrates sustainability in engaging students in staff-led projects.

Students reported that their understanding of the theoretical explanations of cognitive functions was enhanced by

observing first-hand the cognitive effects of brain damage in adults. This has provided the opportunity for students to gain a broader understanding of working in a 'real world' research setting, which included having to adapt to problems that arose, rather than learning within a more passive research or teaching setting. The project has therefore enhanced the skills that are fostered within the psychology curriculum and provided valuable experience that the students can incorporate in their final year project and curriculum vitae.

Limitations and future directions

The limitations to this study should be noted. The number of students who agreed to take part in the study was a small percentage of students who could have taken part (14 per cent of year group). Some students who did not take part commented that they preferred to concentrate on their academic studies. Therefore, in future, it may be beneficial to offer a similar programme to second-year students, who do not have the same final-year pressures.

There were a number of small managerial challenges throughout the course of the project. The project did not form part of the regular curriculum programme and managing students as researchers in different settings was more staff intensive than using more experienced research assistants to conduct the research. However, as specialist equipment was used for this project, training would have been required for all researchers regardless of experience. Staff involved in the project considered that the time taken to support the students as researchers was outweighed by the benefits in terms of completion of the research project and the group cohesiveness. This would have been more of a challenge if a larger number of students had volunteered to take part.

The student researchers received a small financial sum for their work. This brings into question the extent to which such projects can continue to be sustainable due to financial and management constraints. However, students indicated during their initial interview that the monetary reward was not their prime motivator for taking part. Moreover, during the study students offered to work more hours than required in order to 'help out'. Extra hours were due to 'thoroughly enjoying the experience'. They stated that they had a sense of pride in completing the job.

The students who worked on this project have now graduated; four have become volunteers in a new phase of data collection, which involves the training of a new cohort of student researchers. This will enable knowledge to be cascaded to the next cohort of student researchers.

Despite the limitations noted above the students who did take part in the research project built on their research knowledge and skills gained through their undergraduate studies. As a consequence of undertaking the project the graduates are now in a stronger position to consider working in the area of applied research in the future. In terms of future studies, as previously stated, the staff working on the project would like to take the experience of working in research communities further and engage students in their second year in staff-led research projects. A follow-up study is planned to determine if the final destination of students in relation to postgraduate studies and career choices has been influenced and enhanced by working on the project.

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