STEPHANY VEUGER
Northumbria Uniuversity , United Kingdom

SAMANTHA GALLAGHER
Queens University, United Kingdom

HAYLEY CREIGHTON
Northumbria University, United Kingdom

IAN ROBSON
Northumbria University , United Kingdom

LINDEY COOKSON
Sunderland University , United Kingdom

MATTHEW RIDLEY
University of Liverpool, United Kingdom

UNCOVERING EXPECTATIONS AND PERCEPTIONS OF THE FINAL YEAR UG DISSERTATION - SUPPORTING THE STUDENT RESEARCH JOURNEY AND ENHANCING THEIR GRADUATE ATTRIBUTES

Abstract:

The aim of this study was to understand the experience of Applied science undergraduate (UG) project supervision. The final year UG research project has been coined the pedagogy of the 21st century. The diversity of supervisory styles is a key strength of project modules but is a source of student perceived inequality of experience in a high stakes terminal assessment. This project engaged final year UG students in a collaboration designed with inclusivity and partnership in mind. Student 'researchers' were equal partners and project evolution was led through their involvement in all aspects; study design, methods, resource development and dissemination of the outputs.

The overall goal and impact of the project was to provide structure and support to dissertation students and supervisors alike by developing research informed resources that are accessible, engaging and student centred. Three themes were regularly identified; education, practical and emotional support. A key finding was that the student-supervisor relationship strongly influences student experience, satisfaction and success. However, whilst 75 % of students strongly agreed that a good student/supervisor partnership positively affects the success of the final project, only 40 % felt strongly that they had managed to build a partnership with their supervisor. The team used the emergent themes to pull together a 'making supervision work' help guide, a visual model of how the student-supervisor partnership can support the development of skills and progression towards independence. To support this further, a list of discussion points were put together by student researchers aimed at making supervision more effective without making the process a prescriptive one. The answers are personal to each supervisor/student pair but the use of a standard set of questions provides parity, clarity and structure.

This project is readily scalable and we strongly believe that this strategic collaboration will see improvements in the student/staff experience of UG supervision.

Keywords:

Undergraduate, Research, Science, Perceptions, Expectations, Partnership, Education

JEL Classification: I29, I23

Introduction

The final year UG project has several educational functions regardless of the type of employment students choose to enter upon graduation. First, it is an important opportunity that enables students to make explicit links between taught material or knowledge with professional applications and secondly, it provides good initial training in research perhaps most useful to those who wish to go on to higher research degrees. Finally, the abilities of independence and report writing are gained which are applicable to a variety of types of employment.

"UG involvement in scientific research is valuable for students" (Weldon and Reyna 2015) and encourages a deep approach to learning (Ramsden 1992) . The opportunity to work independently ensures that the UG research project develops student autonomy and promotes the skills needed for independent learning (Todd and Bannister). Students develop skills valued by employers including critical thinking skills (Greenbank 2009). Students list skills developed from their UG project experience as being technical skills, self-confidence, communication skills and employability (Marbrouk and Peters). Moreover, the shift from teacher directed to self-directed learning is often cited as a mechanism to drive independent learning in final year UG students (White 2000, Todd and Bannister 2004)

The final year undergraduate (UG) project is regarded by staff and students alike as a high stakes assessment and has been coined the "pedagogy of the 21st century". The significance of the UG project is deemed to arise from its unique status in the programme as the most sustained research heavy piece of work that students undertake during their degree that involves self-directed study.The dissertation is often considered a journey towards independent thought achieved through a shift in focus from teacher-directed to self-directed learning. It therefore offers the potential for the further development of specific graduate attributes and skills (Healey et al., 2014).

Anecdotally, supervisors distinguish supervision from other forms of teaching, viewing the UG project as a unique opportunity for the student to venture into a new territory where authority and relationships are reconfigured (Todd et al., 2004) whilst students comment that taking responsibility for their own learning can create uncertainty and some may question their capability to conduct independent research.

Nicol and Macfarlane Dick (2006) stress how important it is to have very clear expectations of our students if any form of assessment is to be successful. However, the project is a terminal learning experience with the assessment delivered by multiple members of staff which leads to diverse approaches in the supervision of projects. Personal experience has shown us that students find the project a daunting experience and can feel insecure about their own capability to carry out independent research.

The dissertation process is one where the student and supervisor relationship is inextricably linked (Armstrong 2004). It could therefore be argued that the success of a project and the developing identity of a student as a researcher depends very much on the quality of supervision that students receive as well as the initiative of the students themselves. There is general debate within the literature around differing expectations, the roles of the supervisor and styles of supervision. Mismatches in expectations are a constant theme in the literature on supervision (Kiley and Cadman, 2009).

The literature offers a general consensus that the role of the supervisor is to offer guidance to enable a successful project, discuss ideas, designing the question and providing emotional guidance of being calming and caring influence. Nevertheless, the style of supervision varies significantly and good supervision is considered challenging (Todd, Smith and Bannister 2006). Indeed, student engagement in discipline research is not always carried out in partnership, there are instances where students make strategic choices to work in isolation or perhaps more worryingly, where the supervisory relationship breaks down. The challenge therefore is to strike a balance in the level of support provided in order to support a move towards independence. Delamont et al.,1998 discuss the difficulty that supervisors face when striking a balance between dominating a students' research and neglecting it. This has been explored more recently by Del Rio et al (2017) who suggest that supervision involves a complex interaction between autonomy and support.

There are numerous questionnaires and tools available to glean information on the similarities or differences in expectations between student and supervisor (Jamieson and Gray 2006). However, whilst student perspectives of the dissertation process is widely researched in terms of postgraduate research, little has been researched in terms of the UG experience, especially the complexities of the relationship between student and supervisor. The apparent lack of relevant literature in this area really highlighted the need for a project of this type. Moreover, there is very little information in terms of assessing or defining the UG research experience particularly in science education literature.

It is reported that issues for students often include anxiety, isolation, lacking a clear structure and feeling thrown in at the deep end (Calvert and Casey 2004).Therefore, an important area to consider is the skills set required to succeed and how the supervisor can support this.

This study sought to provide structure and support to dissertation students and supervisors alike by developing research informed resources that are accessible, engaging and student centred. Importantly, they will provide a widely applicable solution for use across different programmes, departments, faculties and Universities both nationally and internationally. It was Healey, Flint and Harrington's conceptual framework that helped us to locate our research as "co-researching and co-inquiring",

somewhere in the overlap between "subject based research" and "scholarship of learning and teaching." (Healey et al 2014). This study investigated the inclusion of students in subject-based inquiry, as well as the scholarship of teaching and learning where students engage in pedagogical research. Therefore, students were not only involved in carrying out research towards their final UG project, but engaged alongside staff in pedagogical research into the student dissertation experience. Working in partnership with students has been suggested to be one of the two principles of good practice of scholarship of teaching and learning (SoTL). Several case studies have been reported in the literature exploring students as partners (SaP) (eg. Cook-Sather et al. (2014)). Pauli et al (2016) investigated the impact of teaching and learning methods aimed at fostering partnership in UG students.

Our objectives were firmly aimed at enhancing the student learning experience and to understand the experience of dissertation supervision.

These broad questions were refined in consultation with student researchers to the following questions and this paper discusses our findings from 1 and 2.

1. How do UG students experience dissertation supervision?

2. What approaches do supervisors use to support UG project students?

3. How has being involved in this pedagogical project enhanced student researcher graduate attributes?

Bearing in mind Fielding's (2001) description of students as "radical agents of change" and his call for more emancipatory and participatory methods, we made a commitment to work as a team of researchers with shared responsibilities.The opportunity to learn with and from students was presented by the higher education academy (HEA) 'Students as Partners' strand of research. Indeed, engagement through partnership is an effective approach for enabling students and staff to authentically engage, opening up opportunities for collaborative and transformational educational experiences.

Methodology

This study is qualitative, participatory, small-scale pedagogical research. It is an interpretive project with a focus on understanding the subjective experience and process of UG research. In working with students as equal partners, the project was participatory and aspects of the project design (e.g. the *detail* of methods used and how they were implemented) were be co-designed with students. The qualitative approach focussed on generating experience narratives of students on the topic of how they experienced supervision support and aligning those with staff views on supervision. In addition, the student researchers were supported to reflexively

consider how participation in this project developed their identity and skills as a researcher.

Sampling

The sample of student-researchers (n:3), student participants (n:52) and dissertation supervisors (n:14) came from the Faculty of Health and Life Sciences, and specifically within the programme of Biomedical sciences at Northumbria University, UK.

Student researchers were recruited from the final year cohort. They were identified through a combination of purposive and convenience sampling. Recruitment was via a central email on the dissertation e-learning portal. There was no solicitation of volunteers. It was made clear that participation is voluntary and a full participant information sheet (PIS) was provided. The process of consent included opportunity for questions about the research to be raised. I made clear my independence from the process

Following the sampling and recruitment of the student-researchers, they were supported in turn to develop ethically responsible and practical purposive sampling criteria for sampling the supervisors and dissertation students. This drew on their knowledge of their own academic and social networks, but the same criteria used in the sampling of the original student-researcher sample was used

Study design

The *detail* of the methods were co-designed. Student researchers also played an equal role in data collection and analysis. At least 3 selected methods (questionnaires, semi-structured interviews and focus groups) were used to transcend the limitations of each one, triangulate data generation and to ensure voices come through and as a means of ensuring quality (Streubert and Carpenter 1995),

To address the research questions, a mixture of qualitative and quantitative methods were used to consider the "multiplicity of meanings, representations and practices" (Smith 2001). Bloor and Wood (2006) refer to PAR as dynamic cyclical process which moves through phases of planning action observation and reflection. The study detailed here used the philosophy of PAR and incorporated 4 phases including 2 phases of data collection and a final consultative phase with staff and students, incorporating the data into plans for further research (Figure 1). The phases described above oversimplify the social context of our research and the process was not necessarily as sequential as suggested here in terms of 'plan, act, reflect, evaluate'.
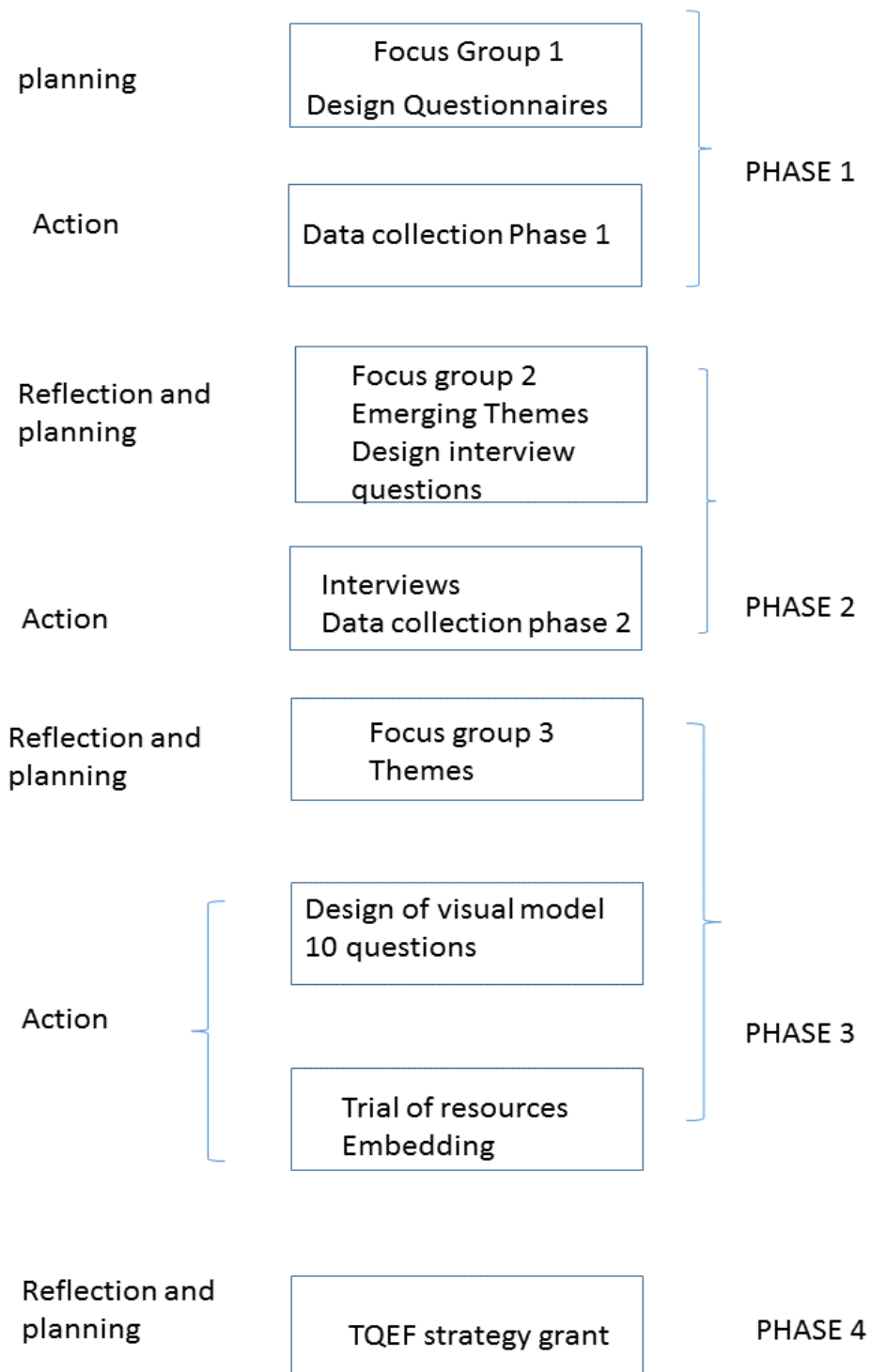
planning	Focus Group 1 Design Questionnaires	
		PHASE 1
Action	Data collection Phase 1	

Reflection and planning	Focus group 2 Emerging Themes Design interview questions	
		PHASE 2
Action	Interviews Data collection phase 2	

Reflection and planning	Focus group 3 Themes	
	Design of visual model 10 questions	
Action		PHASE 3
	Trial of resources Embedding	

Reflection and planning	TQEF strategy grant	PHASE 4

Figure 1 Phases of the study

Phase 1 : focus group 1, interactive poll with UG students and semi structured questionnaire with supervisors.

Phase 2 : thematic analysis of questionnaire data, early theme development, development of interview schedules and interviews undertaken by student researchers of both UG students and supervisors.

Phase 3; analysis of interview data, further refinement of themes, reflection and design of visual model and set of 10 questions. Trial of the leaflet with students and staff. Discussion with student researchers to evaluate their experiences

The student questionnairewas delivered as an interactive poll in order to encourage a reasonable response rate. This was carried out at the end of a teaching session by a pair of student researchers. N= 52 of sample size of 111 UG BMS students (46 % response rate). The questionnaire contained 16 questions. The first 9 concerned the student supervisor relationship and the remaining 7 concerned the student identity as researcher. Students were asked to choose their responses along a Likert scale.

Supervisors were given a similar questionnaire to students. N= 14 of a sample size of 67 = 20% response rate. In consultation with student researchers, there was some rephrasing of questions. The questions covered the general experience of the UG research experience, supervisor views on the benefit of research as well as exploring aspects of the student-supervisor partnership. Both fixed (Likert) and free format (narrative) responses were built into the questionnaire.

Interviews

The data from the initial questionnaires were sufficiently rich to enable us to begin early theme development and refine questions for interview to further explore these themes. The interviews were semi-structured to encourage discursive dialogues.

Specifically the interviews related to three themes: understanding student –supervisor relationship, independence and confidence. It was intended that the sample was as far as possible representative of the larger staff group in the department.

In-depth semi-structured interviews. Overall, 4 supervisor (3M 1F) interviews took place. All interviewees had previously filled in the questionnaire. The data from both questionnaires and interviews were analysed and discussed in focus groups with the research team. Supervisors did not interview students since the key information is about student expectations and also time constraints limited this possibility,

Interviews focussed on understanding what worked and what could have been done differently. Interviews did not focus on evaluating individual supervisors, or criticising practice or personality, rather they sought understanding of the supervisory *relationship* (in which two parties co-construct the activity of support. The interviews emphasised a) that the process is appreciative, so they are to think about 'what worked' and what would be 'even better if', and, b) the purpose of the reflective activity is to appreciate their experience and insights, so there are no 'right answers'.

Focus groups

We ran 3 focus groups. Focus group 1 was conducted in the context of training, briefing and supporting students to undertake their role as student-researchers. We openly discussed the motivations for each researcher involved - encouraging dialogue in which each party's views were respected and valued. Student co-researchers were supported in basic interview technique, confidentiality and legal issues, use of audio and management of data, consent and release forms.Focus group 2 drew early themes and this process was documented through photographs and field notes which were shared with all participants to capture reflexive insights of the process which will inform future work with students as researchers. During focus group 3, we worked with student-researchers to understand the value of their contribution in developing pedagogical tools, defining ethical issues and analysing data on student experience and explore the experiences of working alongside tutors on the co-production of research

Data Analysis

Analysis of open ended responses to interviews took a grounded approach. In addition to data in the form of transcripts of audio-recorded interviews, the project generated reflective and reflexive data through the work of the research team with student-interviewers. Transcripts were subject to basic coding analysis to generate themes for further reflection and group (academic staff and student-researchers) discussion. This 'two stage' analysis therefore built on initial themes of insight through focus group work which focussed on critically identifying, examining and reflecting upon key findings and ensured student-researchers were central to the process of analysis throughout.

We used a mixed methods approach with elements of qualitative and quantitative methods to produce converging findings. Quantitative data focussed on mean Likert scores whilst analysis of qualitative narratives led to the development of broad themes, organising themes and a global theme. The interviews were analysed individually, informed by a phenomenological approach to qualitative data.

Ethics

Ethics approval was received through the University process. Due ethical considerations were given to issues of access, consent, confidentiality and harm. The questions were designed to minimise the risk of psychological discomfort or distress. Student-researchers were trained in effective techniques to use in semi-structured and informal interviews where they also are, in effect, insider-researchers.

All individuals were allowed to influence the work. Decisions surrounding the research and outcomes are collective, a central philosophy of participatory action research (PAR). Development of the work must remain visible and open to suggestions to all researchers throughout the process and some student researchers remain involved with the work.

RESULTS

Student researcher comments allowed us to identify several characteristics that may influence whether the UG dissertation experience is a successful one including – how knowledgeable the supervisor is about the project, enthusiasm and availability.

The BMS final year UG cohort in 2016 had 111 (44 M, 67 F) students enrolled. 92 % FT and 8 % PT. The interactive poll analysis is based on 52 student participant responses to statements relating to their identity as a researcher and their real and expected relationship with their supervisor.

The staff questionnaire received 14 respondents (8 male and 6 female) from a range of grade (lecturer, senior lecturer, associate professor and professor). The questions were based around the student supervisor partnership and their role/approach to supervision.

This analysis begins by looking at the quantitative findings from the student interactive poll and supervisor questionnaire before considering the supervisor voice within the supervisor questionnaire.

Student questionnaire data

The first 9 questions assessed student experiences of the student-supervisor partnership.

>70 % of students strongly agreed that the student-supervisor partnership influences the success of their project whilst only 40 % strongly agreed that they achieved this. >80 % strongly agreed/agreed that their supervisor was sufficiently skilled to guide the research. However, feelings were mixed on whether their supervisor was enthusiastic; whilst the majority agreed, a significant proportion did not (20% were neutral or disagreed). There was a mixed response to 'my supervisor suggested

literature'. Similarly, the ease with which they felt they could meet with their supervisor varied with 20 % strongly disagreeing that they were able to do this when required. Perhaps worryingly was that 63 % strongly disagreed that feedback provided was constructive and >40 % were neutral or disagreed that their supervisor valued their individual needs. In line with recent NSS feedback, the initial poll data suggest that students do not feel that there is a parity of experience throughout the department.

The next 7 questions assessed students' developing identity. The results are very positive in terms of students feeling their research skills were enhanced and that their confidence had increased (50 % disagreed or strongly disagreed that they were confidant before the project whilst 88 % agree the experience has increased their confidence and 75 % agree that working with their supervisor enhanced their confidence). This suggests that for some it is the process rather than the partnership per se that has increased their confidence. Strikingly, 50 % strongly agree that they are more likely to go into a research post as a result of carrying out their project although 30 % remain neutral or disagree. The majority (60 %) believe the experience has improved their critical thinking and writing skills, however, their confidence around ethics is mixed. Importantly and in line with policy, 68 % strongly agree/agree that they have become more organised and independent. These initial data show that their student 'researcher identities' had grown as a result of the UG research project experience but that feelings around the student supervisor partnership are mixed.

Supervisors mostly agree that the partnership can influence success on the project but many are neutral when asked if it is critical. Staff feel strongly that they make efforts to be accessible to students (75 % strongly agree or agree). None commented on their knowledge or subject expertise but the majority strongly agreed (80 %) that they have these. An area where staff may have less expertise or be willing to support students is in the area of emotional support. The majority of staff agree that students grown in confidence and become more organised and independent. There was a mixed response to the suggestion that staff should be directive in the support they give the students as well as whether directives should be given to staff.

The narrative data on the whole supported the principle findings derived from the quantitative data. Importantly, the open-ended question section complements this analysis by providing a sense of the way in which staff consider research supervision in their own words. Moreover, qualitative comments make it easier to see what they actually meant when they selected their score showing a real value in obtaining voice. In places, it can show whether an incorrect score may have been chosen or highlight areas where the interpretation or emphasis placed on a question or score might not be the same for all. For example, one member of staff disagreed that it is important to suggest academic literature and then qualitative comments stated 'students are given 4 pertinent papers to help them begin'. When asked about the importance of partnership, quantitative results were varied but qualitative narratives illuminated these findings further. Interestingly, the majority of staff (64 %) strongly agreed or agreed

that it is important to support the project through the provision of literature whilst the majority of comments suggested that this is limited and if provided then it should only be at the start.   Some narratives showed very different viewpoints on why a particular quantitative score was chosen. For example, there were 2 examples of disagree that when qualified gave very different views; "my relationship to the student has nothing to do with how well they perform in their projects' versus "it's a personal thing – some like a close working relationship, others more distance. Important to gauge this on an individual level". One person ticked neutral and then said 'yes good working relationship important'.

The main theme that staff questionnaires repeatedly brought out was that of striking a balance and scaffolding their support. This is demonstrated by numerous qualitative comments such as "direction should not be allowed to be a comforter".

Taking the student and staff questionnaire data together, a complex picture emerged about the students' expectations for the dissertation and the student-supervisor partnership compared to what staff agree is important. Student views were not fully consistent with supervisors but there are some interesting areas of overlap (Table 1).

Comparison of staff and supervisor data

Table 1 Selected questions were compared for their mean scores to see if there are areas where scores and comments align or show disparity

Student Question	Score	Staff question	Score
The student supervisor partnership is an important <u>influence</u> on the success of the final project	**1.44**	Building a partnership between myself and students has an <u>influence</u> on the success of the final project Or	**2.07**
AND I was able to build a strong partnership with my supervisor	**2.43**	The partnership I build with my students is critical to their academic success	**2.36**
My supervisor has supported me by suggesting academic literature relevant to my project	**3.06**	It is important to support students by suggesting academic literature relevant to their projects	**2.14**
I found it easy to meet with my supervisor when required	**2.91**	I make efforts to be accessible to students as and when they need my advice	**1.64**
My supervisor was sufficiently skilled to guide me through the research	**1.82**	I have the skills and knowledge to confidently support students I supervise	**1.21**

project		OR It is important to have subject expertise	
I felt my supervisor appreciated my individual preferences and needs	**2.45**	I provide individualised support to each student	**1.64**
Work with my supervisor has increased my confidence OR Having experience of research has increased my confidence	**2.1** **1.68**	The students I supervise grow in confidence as researchers	**1.71**
As a result of my research project I have become more organised and independent as a researcher	**2.1**	I support my students to become more organised and independent	**1.85**
Conducting my research has improved my writing skills	**2.27**	It is important to support the academic writing skills of the students I supervise	**2.27**
I found supervisor feedback on my work appropriate and constructive	**3.75**	I actively provide verbal feedback to my students during the course of their projects	**1.12**

Student and staff data are largely consistent in terms of valuing staff for their level of knowledge and expertise as well as student growth in confidence and development of skills including writing, organisation and a shift towards independence.

Student- supervisor relationship: Students strongly believe that the relationship has an influence on the success of the final project whilst staff have a more varied response to this. Whilst none of the staff said they strongly disagreed with this statement 29 % were neutral. Interestingly, the score for students actually being able to build a strong partnership mirrored that of the staff belief about its importance (2.43 versus 2.36). This was therefore explored further in interviews. Following interview, student and supervisor voice showed some similar ideas around the importance of the partnership "if you feel like you are getting support from your supervisor then you may be more invested in the project yourself" (student) versus "helps many students believe they can be successful" (supervisor).

There is a lack of a general consensus on the provision of literature. Staff mostly agree (64%), however, 29 % are neutral or disagree and this is reflected in qualitative. Most staff will provide some literature at the start but some insist "this is an

independent piece of work" Students largely do not feel that they receive literature (likert mean score 3.06). This is one area therefore where clarification is needed.

Accessibility: This is an area where there is a large discrepancy in staff versus student findings and is an area which highlights the need for expectations to be clarified. Students do not feel that they can easily meet with their supervisors when required. Overall, however, staff feel that they are accessible. All staff were neutral or agreed that they make efforts to be accessible with one staff outlier who wholly disagreed. "I have an open door policy, knock any time "versus "No, expectations and schedule discussed and agreed at the start of the project. NOT an open door policy. As and when support does not encourage students' organisation and planning skills". Although this may appear a negative viewpoint, it is likely partially driven by workload constraints for the member of staff as well as a drive to push the students towards more independent and autonomous working practices.

Individualised support – again there is a clear disparity between what staff feel they provide and students feel they receive. 50 % of students agree but 31 % were neutral and 12 % disagreed that their supervisor was responsive to their individual needs. 57 % of supervisors strongly feel that they provide individualised support, 20 % were neutral whilst none disagreed. This may very well come down to an interpretation of what individualised support is and is likely linked to feedback, accessibility and provision of resources. Indeed, findings on feedback were grossly different. The overwhelming majority of staff strongly agree that they provide quality verbal feedback whilst 58 % of students were neutral or disagreed (20 % strongly disagree) that feedback was helpful or constructive. It may well be that students don't count verbal discussions as feedback and this is perhaps highlighted by one staff comment "It is unfortunate that our conversations are poorly recalled by students during write up". Indeed, the wording of the questions were not directly comparable and students may have focussed on written feedback when answering this question.

Broad themes of confidence, independence and the importance of the supervisor-student partnership were identified in the questionnaire data. Interview questions were written to explore these aspects further with a view to discerning what works, what doesn't and 'what would be even better if'.

What 'worked' echoed what 'did not work' and highlighted many of the findings from the questionnaire data. For example, accessibility was seen as a positive whilst lack of accessibility was frequently cited as a negative along with being left too much on their own. Yet, students acknowledge that being left is what drives their independence but this is perhaps recognised in hindsight following a protracted feeling of uncertainty "the project was completed individually pushing me out my comfort zones and making me a more well-rounded independent worker". This is in line with the voices of supervisors who regularly comment on the need to strike a balance and to scaffold their support Basic themes drawn from the data include but are not limited to;   negotiation,

motivation , ability to ask questions, skills development, communication and time. A strong consensus exists amongst the students interviewed that the role of the supervisor is to give support. Therefore the data were further placed under clear organising themes of practical support, emotional support and educational support. Following further thematic analysis, the global theme of the 'student-supervisor partnership' was identified. The aspect of partnership and approachability came up frequently. Many of the broad/ basic themes identified in the questionnaire data such as accessibility, independence and scaffolding are repeated within the voices under each of the organisational themes showing that none can be separated from the other.

Of particular note was that many students would be grateful for an opportunity to negotiate the style of supervision they receive.

In line with this and in response to the data, we developed a dual resource to help support the process of supervision (Figure 2).
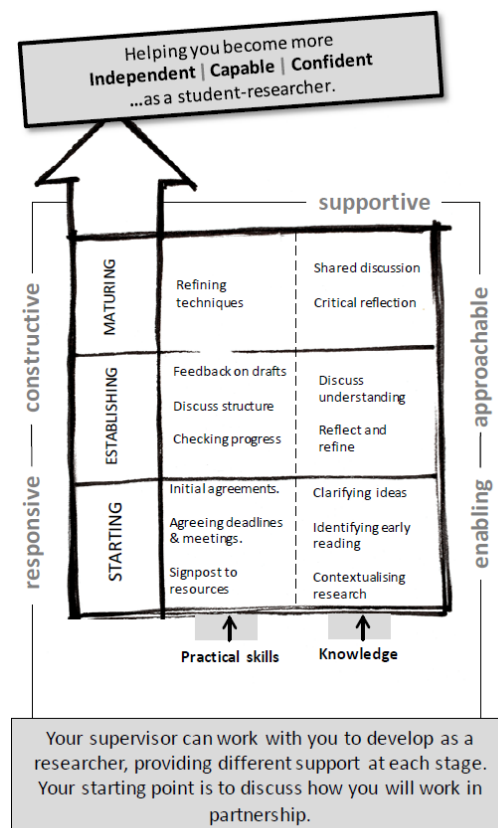
Figure 2

   a) **10 Points for discussion for use during initial meeting between each student and supervisor**

   b) **Visual Model ; Making supervision work**

This resource has been trialled with positive feedback during phase 3 through peer observation in Applied Sciences and as part of a separately funded project across the departments of psychology, sport, design and social work and communities at Northumbria University. Suggestions following discussion were that perhaps the students should write up answers to the questions and both student and supervisor sign the final 'agreement'.

"The central issue is how to keep the students highly motivated and engaged, so they can actively drive the project work forward instead of passively waiting then following my directions." "From the conversations I had with my students, clearly there was an impact. Two of the discussion points which attracted the most comments are: 'Who will be responsible for arranging contact' and 'Who will keep a record of meetings'. The former made the students realise that they should actively seek for help/guidance when it is needed and the latter promoted them to use their notebook much more effectively avoiding repeated discussion or briefing. Together, the 'Points for discussion' served as a checklist helping the students better manage/organise their project work and triggering them to do much more thinking". Applied Sciences Supervisor

Discussion

Here, the *problem*- different expectations and approaches to UG project supervision, has originated from the student community itself. We believe that the *problem* should be defined, analysed and tackled by students themselves. This project therefore took the position that "the social world can only be understood from the standpoint of individuals who are part of the on-going action being investigated"(Cohen 2000).

In general, both staff and students consider the UG project to be a valuable experience. There is clearly evidence of mixed practice with some supervisors favouring a formal mode of supervision and others favouring a more flexible approach. This need not be seen as a negative, the diversity of supervisory styles is a key strength to project modules. It is very interesting that none of the supervisors interviewed commented on what didn't work. This might reflect an inherent power differential with students interviewing staff or a bias or selectivity in voice.

Most of the comments from the students were positive and not many students chose to discuss negative aspects of the UG research experience. The majority were related to aspects of flexibility, approachability and support.

Three organising themes were regularly identified during interviews and co-constructed with student researchers : emotional support, educational support and practical support . Within these, broad themes were identified.

Practical support; Students expressed frustration at the lack of communication and flexibility of their supervisor and differences between resources provided by supervisors became apparent. As the applied science dissertation is heavily based on undertaking practical research , it became evident that many students felt underprepared and unsupported to conduct research independently.Broad themes identified were : the need for regular communication as well as flexibility regarding the supply of resources.

Educational support ; Students felt that educational support is required to provide direction and motivation for the topic area. Whilst some supervisors agreed, others insisted that assessment of the dissertation is based upon the student's ability to independently direct their research although they would offer guidance.Broad themes identified were ; Motivation direction/guidance, understanding and improving skills

Emotional support ; Both students and staff agreed that a level of emotional support is required to develop a good working relationship, improve student researchers confidence and help with stress. Broad themes identified were the need for help with stress, time management, confidence building and a successful working relationship

Central to this and the global theme identified was that students feel strongly that the student-supervisor relationship influences their experience, satisfaction and success

The need for parity of experience

This collaborative project placed the student experience at its heart and sought to improve the UG dissertation experience by supporting academic staff in their role as supervisor and enhancing support for student learning. Green et al. (1994) noted that "the relationship between student satisfaction and educational quality is far from straightforward, not least because student expectations are "variable and unpredictable". Here, student researchers were 'equal partners' and project evolution was led through their involvement in all aspects; study design, methods, resource development and dissemination of the outputs. Our research sought to tackle an existing problem; that students are dissatisfied with their UG research projects due to a perceived disparity in experience under different supervisors. This finding is not isolated to our department, faculty or University. For example, Greenbank and Penketh (2009) found in their study that a number of students were aware of differences in advice given by tutors. This perception has been reflected in frequent comments on the UK national student survey (NSS) and as a metric by which University quality is judged it makes this project and the dissemination of our findings and resources timely and critical given the focus on quality that the UK Teaching excellence framework (TEF) brings about.

The amount of research into the UG dissertation experience is strikingly little. Therefore, the findings of our study build on the aims of Todd, Bannister and Clegg

(2004) who sought to open the debate for considering the lived experiences and perceptions of UG research staff and students. Based on collective enquiry, a significant strength of this project came from sharing our knowledge which enabled new skills to be developed on both sides and resulted in the production of richer ideas.

Research findings, outputs and practice to be shared

1) A key output has been the generation of evidence including both student and supervisor narratives around the experiences and expectations of UG research project supervision, the developing identity of students as researchers and evidence for the importance of the student –supervisor partnership.

2) Making supervision work (figure 2)–a resource that presents a visual model of how the student supervisor partnership can be fostered and questions developed by student researchers that seek to support the initial discussion between each student and supervisor.

3) Students as partners in pedagogical research – the benefits for student researchers in terms of employability and development of graduate attributes.

4)Good practice guidance and transferrable recommendations in order to;

- Enable staff to build on their supervision style as well as enabling students to consider their roles in the research project.

-Increase the inclusion of students as equal partners in pedagogic research and benefits for academic practice.

52 students took part in an interactive poll and 14 supervisors answered a questionnaire. All interviewees, 15 students and 4 supervisors regarded the dissertation as an assessment of high educational importance within the context of final year study. Overall, a complex picture emerged involving the student-supervisor partnership, the need for approachability, and striking a balance in order to support, and promote the development of skills and the move towards independence.

The global theme identified was that students feel strongly that the student-supervisor relationship influences their experience, satisfaction and success. Although the diversity of supervisory styles is a key strength of project modules, it is also a source of student perceived inequality of experience in a high stakes terminal assessment. 75 % of students strongly agree that a good student/supervisor partnership has an effect on the success of the final project (vs 52% of supervisors) whilst only 40 % of students felt strongly that they had managed to build a partnership with their supervisor.

Students reported that they learned many general skills not necessarily all science based to include literature searching and referencing. Whilst the interactive poll gave mixed feelings about developing critical thinking and writing skills (30 % were neutral), these were two of the most frequently cited benefits of the project during student interviews. In line with our findings, Mabrouk and Peters (2000) demonstrated that students feel that the UG experience 'provides technical experience, the ability to develop good problem solving skills and acquire professional self-confidence' Our data show that it is very clear that there is real value to the UG project dissertation with > 70 % seeing an increase in their confidence versus what they predicted beforehand.

However, there is no general consensus between staff on standard practices such as the provision of key literature and this warrants further discussion throughout the department. On considering this, Clegg et al., (2006) state that "The supervisor can and should play a key role in providing guidance on sources of literature and data " and they go onto state that this should include reading lists with specific references. Consistent with the perception that students have of a disparity in support provision by different supervisors, interviews with supervisors suggested a varied approach to this. These differences can be easily remedied through a set of good practice guidelines for staff or through open discussion with each student regarding expectations and resource provision tailored to their particular project.

During interviews, the main skills cited by students were those of critical thinking, referencing and independence. Some of these eg writing skills, tutors felt students should already possess by this stage of study but admitted that many students were 'woefully underprepared'. Indeed, I have been aware of this for some time and have attempted to embed writing sessions into at least one module per year. These began as academic development workshops held during a separate reading week of study. These findings are in line with Tariq et al (1998) whose study identified support for writing skills is rarely sufficient for students to undertake their projects. Moreover, a previous study of mine demonstrated that many staff do not feel adequately skilled to explicitly teach writing skills.

Todd, Smith and Bannister (2006) highlight a dominant view that the dissertation can be viewed as a collaboration between student and supervisor. The student- supervisor relationship has been explored by a number of studies (Greenbank and Penketh 2009, Lea and street 1998). Lee and street stress that "the supervisory relationship is a complex one, subject to power dynamics and tensions". Consistent with our study, they also found that the relationship between student and supervisor was the most discussed theme during interviews. For a review -Bartlett and Mercer, (2000) discuss power models in supervisor-student relationships in detail. The term supervisor implies they hold knowledge not known by the student and therefore a successful supervisory relationship is dependent on the supervisor willingly passing on that knowledge. In order to move form an imbalance in power towards one of equality, the supervisor

needs to be able to recognise and support these changes in the balance of power. The development of our visual model seeks to expose and support the changes in power (Figure 2).

A good student-supervisor relationship should ensure that individual preferences and needs are considered and supported accordingly.Clearly there is a need for supervisors to be responsive to student needs but, worryingly, whilst supervisors felt they were being individual, the data showed disparity in what supervisors feel they are providing and what students perceive they are receiving. The differences may be in the emphasis placed on the type of support. For supervisors, more emphasis was placed on supporting practical and educational skills whilst some students spoke at length about emotional support. The organisational structure and the role of guidance tutors mean that many supervisors may feel they are providing individualised support tailored to a particular students practical and educational needs but fail to recognize their role in providing emotional support. Moreover, institutional workloading and role requirements mean that many staff consider emotional /pastoral support, the domain of guidance tutors. Therefore this is one area where student expectations might mismatch those of the supervisors or where there is a variety in approach and this warrants open discussion between students and their supervisor. Interestingly, Mabrouk and Peters (2000) found that the most valuable characteristic of supervisors include knowledge and availability. Indeed, we found that availability was a common theme in both our quantitative and qualitative findings.

Clearly, the student supervisor relationship is very important and this can be developed easily by clarifying expectations and setting realistic expectations for each person throughout the project. As a starting point, the points for discussion (Figure 2) are a mechanism that at least allows each member of staff to have an open discussion with students. The answers will be personal to each supervisor/student pair but the use of a standard set of discussion points provides parity, clarity and structure within a variety of UG projects across disciplines.

Along with skills of critical thinking, Orsmond et al (2004) state that acquiring independence is of high importance. Weldon and Reyna (2015) put forward the view that 'as crucial as teamwork is, it is just as important that the student can work on his or her own to solve problems'. Qualitative comments from supervisors on both the questionnaire and interviews demonstrate that this is very much a main aim of theirs with their focus being on striking a balance and scaffolding their support. Todd, Bannister and Clegg (2004) emphasise that- ' the first major task for a supervisor is to provide support – autonomous work does not come naturally to students and this requires careful support in order to be successful.

Nevertheless, it can be exceptionally difficult to strike a balance and it is perhaps this attempt at balancing the provision of support with moving student towards autonomy that can make some students feel less supported. Indeed it has been my personal

experience that too much support eg.in the form of a lot of directives and supporting literature and resources - can be counterproductive and promote panic in many students. Although it may support a love for the subject, it does not necessarily promote the transition to independence and autonomous thought . This echos the findings of Todd (2004) "personifies the potential tension between a tutors' perceived need to scaffold and support whilst at the same time facilitating and encouraging independent learning". Although students request support, they also agree that when left, they develop independence. Indeed, Weldon and Reyna (20015) assert that students are more successful in the lab when given more responsibility.

This balance is reflected inchanges in power as the project progresses. Todd, Bannister and Clegg (2004) found that 'the nature of staff involvement changed over the duration of the year', with the supervisor taking a more background role as time progressed. Our data showed a broad agreement that the supervisor's role changes through the process from a relatively directive hands on approach to a more background position. Our visual model (Figure 2) is designed to highlight the changing nature of their role from one of tutor through mentor through to peer and make explicit the level of support students can expect at each stage. Our findings suggest that there is a need for open discussion between staff and students to outline expectations and how they will work together to ensure a productive relationship that positively influences the outcome of the study. Stefani et al (1997) strongly believe in the need for transparency between staff and students and suggest a 5 stage project induction programme that includes an overview of the work, expectations of the project, resources and skills needed for independent work. Similarly, Greenbank and Penketh (2009) conclude that in order to obtain a better understanding of the values underpinning the project, tutors should enter into a dialogue with their students. Moreover. Most recently, a study by Del Rio et al, 2017 concluded that it is worth clarifying the role of the supervisor beforehand according to the skills to be developed and that the supervisor's position in terms of support needs to be clearly defined.

Beer (1995) describes the features of a simple contract agreed by student and supervisors. The advantage of these guidelines are that they are agreed on mutually before starting the project. Hockey (1996) cited in Todd and Bannister (2004) suggest a contract between supervisor and student. Following our trial through peer support, it was suggested that students should write up answers to the questions and both student and supervisor sign the final 'agreement'.

The way forward: meeting in the middle

The resources and findings, developed collaboratively with student researchers as equal partners and with equal voice, aim to support current practices without being prescriptive in terms of supervisory style. It is important that staff do not see this as a prescriptive mechanism on how to supervise. This is only meant as a scaffold to support discussions between each supervisor and each student – to enable

expectations to be clarified and agreed on. The key issue is that students feel heard and they know what to expect and what is expected of them for their particular project. This I important since factors that are known to increase engagement include 'belonging'. This is achieved through feelings of acceptance and involvement and comes with a move toward independence through an understanding of changing relationship dynamics that foster approachability and a feeling of being respected

Many staff would agree that there is a need for some formal guidance about the dissertation supervisor's role, particularly for new staff, to ensure that there is a shared understanding of what they are expected to do (or not do). Although none of the supervisors interviewed had had any formal training and directives given to them other than times of draft return, there was a broad consensus about what was expected (guidance, support, reading drafts). It was notable that those who responded positively to the question related to the need for directives were new staff of less than 2 years. However, of note was that many staff did not opt to complete questionnaires or interviews and this may reflect an inherent bias to keep things as they are and maintain their own practice or that they simply do not feel strongly enough either way.

This research had a number of limitations, such as a bias towards participation. The study was limited to department of biomedical sciences. It is possible that by using a different set of student or staff participants would have given rise to different results. This study is now being conducted in the departments of sport, psychology and social work, education and community wellbeing. It may be that when carried out in different departments, faculties or institutions that the data will look very different and therefore the data here are not generalisable. However the aim was not to present findings that are generalisable but to develop resources through the process of action research. That said, the findings raise interesting questions for further research in other departments and the leaflet and 10 questions serve as a starting point for individual departments who can then decide how to build on these findings.

By only using an interactive poll to assess student's ethical development it was not possible to follow up with students why they had answered as they had and we did not necessarily interview the same students Time limitations prevented further discussion with the students.

Conclusion

Sharing knowledge enables the production of richer ideas. A lack of project sustainability can be avoided if those involved in learning and teaching (deliverers and users) work together. This collaborative enquiry based approach sought to create meaningful change and promote ownership of the interventions produced. It has a number of strengths, particularly the ability to provide a robust real world application where the research activity responds directly to the needs of the participants.By

including students as co-researchers and knowing subjects we will ensure that this project has input from those it directly affects.

This is a readily scalable project and we strongly believe that this strategic collaborative project will see improvements in the student/staff experience and will have impact across the sector by showcasing the good work that is being done in health and life sciences. Further development and trial of the leaflet and similar resources will be used as a benchmark for supervision of UG project modules across the University.

This project impacts departments across the University, influences practice on UG research modules, encouraging a significant move towards students as active researchers. Interviews with student researchers has shown development and enhancement of graduate employability and attributes. It is clear that involving students in pedagogical research can enhance their learning and professional development.

Although it is possible to regulate some of the uncertainty regarding a student-supervisor relationship by structuring meetings and providing a set number of printed or online resources, the process cannot be a prescriptive one. Each student and supervisor should engage in discussions that will encourage independent study whilst providing the correct amount of guidance as required for each individual student (the partnership). The dissertation process is challenging for both students and supervisors and it is hoped that resources developed from this study will positively impact applied science dissertations in the future.

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