

Title: Research Pedagogy in a UK Radiography Education Setting

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Declarations of interest: This article is based on a thesis successfully submitted for a Professional Doctor of Education (EdD) at Birmingham City University which was funded by Birmingham City University.

## **Abstract**

### **Introduction**

This paper focuses on research pedagogy in radiography and the importance of research for the profession by exploring one university's endeavours to realise the aims of The Society and College of Radiographers *Research Strategy 2016-2021*<sup>1</sup> around embedding research in the curriculum.

### **Methods**

Co-Constructed Depiction method was developed as an innovative use of imagery in data collection, analysis, and presentation of results, being symbolic of the practices of the radiography profession by foregrounding the importance of images and their interpretation. A total of eighteen radiography staff, post-graduate radiography students, and 3<sup>rd</sup> year radiography undergraduate students took part in individual semi-structured interviews that included participant image making.

### **Results**

Students and educators saw the importance of research for individuals and the profession. While students could identify where research was embedded in the curriculum, generally staff did not feel embedding was done well, but this may be because research is not made explicit enough in the curriculum. Participants suggested that research needs to become 'normalised'; being a part of all radiographers' work.

### **Conclusion**

The links between research, professionalism and care can be made more evident to students from the start of their studies so increasing understanding of their own relationship with the spectrum of research, and how this links to maintaining the standing of our profession and to patient care.

## **Implications for Practice**

The findings will inform future research pedagogy and curriculum development in radiography and other Allied Health Professions around embedding research in the curriculum in a way that educators and students recognise. A greater awareness of the importance of research for radiographers will lead to them being better prepared to take on advanced practice roles for the benefit of patients.

## **TITLE: Research Pedagogy in a UK Radiography Setting**

### **Introduction**

In 2015 The Society and College of Radiographers (SCoR) published a Research Strategy <sup>1</sup> with three key aims. Action points identify *who* in the profession should be responsible for the implementation of each aim, however there is no guidance regarding *how* these aims are to be achieved, this being left to the discretion of the agents responsible for effecting them. The first of these aims asks that as a profession we 'Embed research at all levels of radiography practice and education' <sup>1</sup>. The expectation is that embedding research will raise the professional standing of radiography by increasing the amount and quality of research undertaken, with benefit to patients being at the heart of this vision. The Oxford English Dictionary <sup>2</sup> gives a definition of embedding as: 'implant (an idea or feeling) so that it becomes ingrained within a particular context'. This definition supports the intention that research should be an integral part of teaching, learning and professional practice in radiography. How we might achieve this aim in practice was the focus of this research. Drawing on the experiences of radiography educators and students in one setting, improvements and changes are suggested which could be integrated into research teaching in radiography to help fulfil these obligations.

### **Literature Review - 'Hit the floor running' versus 'Hit the floor thinking'.**

Teaching students on a vocational degree such as radiography can lead to tensions between the need to enable students to be ready for practice on qualification, and on the

1 other hand building the skills needed to foster future lifelong learning. This is significant for  
2 radiographers as many need the requisite academic skills to engage in postgraduate  
3 education which may in turn lead to an increase in research output as anticipated by the  
4 SCoR Research Strategy <sup>1</sup>.  
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10 Payne & Nixon <sup>3</sup>, when describing the skills and attributes of newly qualified radiographers  
11 required by clinical departments used the phrase 'hits the floor running', meaning that newly  
12 qualified radiographers should be ready to work clinically in an imaging department as a fully  
13 competent member of staff from the day they start work, with little time to acclimatise  
14 themselves to the environment. Later Jackson <sup>4</sup> used the same phrase in his study of the UK  
15 radiography curriculum where he identified a disparity between the radiography community  
16 and educators in their identification of the significance of research as a vital skill for  
17 radiographers. Jackson <sup>4</sup> suggested that there may be a lack of awareness of the research  
18 culture within the profession which could be addressed by improving research teaching at  
19 undergraduate level. By embedding research in the curriculum newly qualified radiographers  
20 should be ready not only to hit the floor running, but to hit the floor running *and thinking*, and  
21 with the ability, based on their education, to progress both their embodied practical skills and  
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40 Radiography is not the only health profession to have undergone changes in the way  
41 students are educated over time, as courses in all allied health professions and nursing have  
42 become more academic and university based. This change in emphasis on the academic  
43 component of courses may have had an adverse effect on the integration of the practical  
44 and academic training for the job of radiography. For example, Baird <sup>5</sup> writing in 1996, only  
45 four years after radiography became a graduate entry profession, discussed the difficulties  
46 for students in matching practice in the clinical setting which she refers to as the practicum,  
47 with knowledge learned in the university. Baird continues that technical ability needs to be  
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1 complemented by critical thinking skills, implying that a professional radiographer needs both  
2 types of skill. However, she suggested that most professional undergraduate programmes'  
3 practicum focussed on the technical learning or how to *do* the job, at the expense of  
4 academia, which includes research and critique or how to *think* about the job. Baird's  
5 proposed solution to bridge this perceived gap is to include more reflection in practice. In  
6 other words, students need to develop their skills to think critically about what they are doing  
7 in practice rather than becoming technicians, uncritically following rules and regulations <sup>5</sup>.  
8 Writing later, McInerney and Baird <sup>6</sup> state that, in accord with professional registration  
9 bodies' requirements, critical thinking is essential for radiographers. They suggest integrating  
10 critical thinking into the whole curriculum and discuss their analysis of three learning  
11 activities. They acknowledge the limitations of their small-scale research and that while their  
12 study assessed pedagogical tools from a students' perspectives, there is no guarantee that it  
13 will translate into an increase in critical skills in practice. However, this study matches with  
14 the idea that students need to study research throughout the curriculum to help develop their  
15 critical thinking with the expectation that it will lead to an increase in criticality in practice.  
16 Without these skills, there is a reduced prospect of them being available to students once  
17 qualified and in practice.

18 Higgins et.al. <sup>7,8</sup> suggest that the radiography profession lags behind others in health care  
19 when comparing research output which might lead to a weakening of the professional field of  
20 radiography. They advocate that teaching research early in the course will improve the  
21 research culture, in line with the 'embedding' of research in the curriculum by the SCoR and  
22 identify that a change in research culture is needed <sup>8</sup>, which requires strategic policies and  
23 actions, in other words this is a change that must be supported by the profession, the  
24 universities, and the policy makers, as well as local teaching teams and this is happening  
25 now across radiography.

1 There is clearly an expectation from the SCoR and in the literature mentioned that research  
2 should be part of the radiography curriculum and indeed it is included, but the aim of this  
3 study was to gain an understanding about whether educators and students are aware of  
4 research embedded in their own curriculum, and what form that takes for them.  
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## 10 **Methods**

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13 Howell <sup>9</sup> describes social constructionism as a paradigm in which an understanding of reality  
14 is based on social interaction and while, according to Crotty <sup>10</sup> there is no true or valid  
15 interpretation of the world, it is possible to come to useful interpretations. A constructionist  
16 epistemology assumes that everyone involved in this research had their own perspective on  
17 the questions asked, so the interpretation of what was investigated was built by discovering  
18 what these individual views were <sup>11</sup>, indicating the use of an interpretive method of data  
19 gathering and analysis to, as Crotty <sup>10</sup> says, reach a useful interpretation of a local situation.  
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30 To integrate imagery within the method a new method called 'Co-Constructed Depiction' was  
31 developed for this study; a method focussing on understanding what is in the data by  
32 blending the words and images of each participant's ideas and concepts as a whole for  
33 display and analysis.  
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## 40 **Ethical considerations**

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42 Ethical approval was granted by the University Faculty Academic Ethics Committee.  
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44 Invitations to participate accompanied by an information sheet and consent form were  
45 emailed to potential participants. They were asked to give their consent to being involved in  
46 the research both in writing in advance of their interview, and as part of the interview audio  
47 recording, and it was made clear that they could withdraw at any point without prejudice or  
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## Participants

This interpretive study did not intend to subject data to statistical analysis, thus a non-probability theoretical sampling method was indicated <sup>12</sup>. Purposive sampling was used to invite participants who fell within the inclusion criteria to take part as they had knowledge of the issues being explored. The eighteen participants included nine academic staff from the radiography department of the university having a range of one to seventeen years in academic posts, five 3<sup>rd</sup> year students with no previous research experience, and four post-graduate students who held clinical posts and were studying at Master's level.

## Data Collection

Data was collected using a semi-structured interview format, each lasting approximately one hour <sup>13</sup> to elicit responses, using open-ended and non-leading questions <sup>14</sup>. Participants drew images during the interviews, which were analysed alongside the transcribed interviews. Participants were shown the image seen in Figure 1: *Drawing Information Diagram for Participants*, to explain the type of drawing they would be doing, without giving rigid guidelines and rules. The skeleton outline in the middle of each A3 size page acted as a guide and avoided presenting participants with a blank page, which seemed important as some participants had expressed concerns that something 'arty' might be required. Any line or shape would have sufficed, but for radiographers, the skeleton is a familiar image and its use acted as an icebreaker at the beginning of each interview. During the interview participants wrote their thoughts on the paper as they spoke.

*Figure 1. Drawing Information Diagram for Participants.*



1 The interviews were recorded and subsequently transcribed then participants' spoken  
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3 comments were added to their drawings, forming the Co-Constructed Depictions following  
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5 the method shown in Figure 2: *Process for making Co-Constructed Depictions*.  
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10 *Figure 2 Process for making Co-Constructed Depictions*  
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16 An advantage of this method is that there are both oral and visual materials to analyse and it  
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18 is possible to cross match the two for each participant, thus adding internal validity to the  
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20 findings. An example of one of the Co-Constructed Depictions is shown in Figure 3: *Co-*  
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22 *Constructed Depiction- Drawing 1 Question with colour key*.  
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31 *Figure 3 Co-Constructed Depiction- Drawing 1 Question with colour key*.  
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36 One of the questions asked was: '(How) do you think we embed research in the whole  
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38 curriculum?' Participants were purposely not given any definition of what was meant by the  
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40 concept 'research' to avoid influencing their responses. It was important to gain an insight  
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42 into their understanding of what research meant to them, and whether they differentiated  
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44 between creating knowledge, and identifying, accessing and using knowledge in the form of  
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46 research.  
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50 Co-Constructed Depiction as a new method of data collection and analysis aims to visualise  
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52 different people's perspectives on the research questions by creating a visual narrative using  
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54 their data in the form of words and images, to create two-dimensional depictions of  
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1 multidimensional perspectives. This becomes a depiction or illustration of a story co-  
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3 constructed between the participants, and the researcher and data analyst.  
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### 6 **Data analysis**

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8 One of Barthes' <sup>15</sup> theories having applications to medical imaging as well as photography is  
9 states that there are two elements of a photograph or image that arouse interest. The first is  
10 an element of general interest in the image that he calls *studium*, which in medical imaging  
11 might be the general interest in looking at the images produced. This is applicable mainly to  
12 the 'normal' appearance of an image, which in practice the absence of any pathology. The  
13 second type of interest is what Barthes suggests 'is this element which rises from the scene,  
14 shoots out of it like an arrow, and pierces me' <sup>15</sup>, which he calls a *punctum*. Barthes  
15 suggests that this part of the image, perhaps just a detail, metaphorically bruises one's body  
16 like a sharp point or tip. So, this is something within the image that piques the interest of the  
17 viewer and may have a physical effect on them, it 'animates' them' <sup>15</sup>, perhaps with an intake  
18 of breath or change in facial expression as they look at a pathology on a medical image even  
19 when they do not know the person whose image they are viewing. Co-Constructed Depiction  
20 draws on Barthes' idea of the *punctum*, to find the important things that participants drew  
21 and said, as they strike the researcher as important. An adaptation of Braun and Clarke's <sup>16</sup>  
22 theoretical thematic analysis, using existing theories and concepts, based on choices made  
23 as a result of the researcher's own knowledge and epistemology was used in conjunction  
24 with the *puncta* concept to identify themes within the data.  
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### 48 **Results and Discussion**

49 Responses to the research question: 'How is embedding of research in the radiography  
50 curriculum perceived, from both educators' and students' perspectives?' are discussed here.  
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52 The results for this part of the research project describe how staff and students saw research  
53 embedded in the curriculum and draws on two sub-themes of the theme 'improvements'  
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namely 'normalising research' and 'student participation in research' as these have already led to changes in undergraduate radiographer research teaching at the university.

### Seeing research in the curriculum

Participants were asked to think about the curriculum and say what were for them a form of Barthes' <sup>15</sup> *puncta*, in other words, what stood out, or struck them as being about research.

The students answered this question with comments such as:

I think, no it [research] is kind of like introduced to us slowly, slowly in the first year and then in the second year there is a bit more then in the third year it's pretty full on (P1 Student)

Not so much in the first year but second year. First year it's more planting the seed. Third year research proposal taking what we learned from previous years and putting it into practice (P2 Student)

All the undergraduate students gave positive comments that they did think research was embedded in the curriculum, although following further questioning this was something they thought they could see in retrospect but might not have realised at the time. One student suggested that lecturers should make it more obvious during the course, so they could see research throughout, and that way the research project in the third year would not come as such a surprise.

Two students, who from other answers given seemed to feel research was important for radiographers, made the following comments:

I saw research more as I went on with my studies by undertaking the research in your module...it's really come to light that it's always been present in the whole curriculum and I appreciate it more understanding more the actual effort that goes into research (P11 Student)

everything being based on research everything that is taught us throughout the whole degree, you look back and realise that everything has been sort of preparing you for something like that (P12 Student)

1 Again, these students seem to be able to see where research was embedded in the  
2 curriculum in retrospect, but unlike those above who saw research building through the  
3 curriculum, they could see research had been embedded through all their teaching and  
4 learning, not just in modules perceives as specifically preparing students for their third-year  
5 research module. These students are reporting what embedding research should be,  
6 according to the definition from the OED <sup>2</sup>: 'implant (an idea or feeling) so that it becomes  
7 ingrained within a particular context'. The idea, of research, has been ingrained or embodied  
8 within the entire curriculum, according to these students.  
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12 When staff were asked this question there was a more cautious response:  
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23 I don't think we do...if it's there it's there implicitly (P20 Staff)  
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...we do it carefully I think we do it in pockets (P4 Staff)

Generally, staff did not think that research was embedded in the curriculum and some found this a difficult question to answer, as it was not something they had overtly considered before in connection with how they teach. However, this may be an example of staff not recognising what they do well themselves as there was evidence from students that research was in the teaching. There may however be another explanation for this apparent blindness by staff towards research in the curriculum. Participants mentioned patients, technology and equipment very little in their answers to any of the questions about the importance of research for radiographers, perhaps because they are part of 'what we do' as radiographers; *of course* they deal with patients and technology, as in Bourdieu's <sup>17</sup> words, it goes without saying. This offers an opportunity to rethink research in the curriculum and teaching in a way that is more explicit for staff and students. Therefore, it is important to identify what links there are to research in the modules and teaching and encourage staff to emphasise these links to students, so students are left in no doubt about research being threaded through or embedded in everything they learn.

1 Some staff were critically aware of their own limitations regarding teaching research because  
2  
3 of their own lack of knowledge of the subject, saying for example:  
4

5  
6 ...our skills and our confidence in research as a team because I  
7 suspect most of us don't feel confident (P20 Staff)  
8

9  
10 ...some staff feel nervous about it because I think they were the  
11 students that also went through that [process of learning about  
12 research] and came out not feeling confident about research (P4  
13 Staff)  
14  
15

16 These staff participants seem to be expressing a deficit in their personal research ability,  
17  
18 identifying a shortfall in themselves and the team with regard to experience in doing and  
19  
20 teaching research while simultaneously misrecognising the skills they do have and currently  
21  
22 use on a research spectrum which includes arrange of research activity from reading  
23  
24 research through using research and performing research.  
25  
26

27  
28 There now follows a short discussion of two sub-themes about where research can be  
29  
30 embedded not only in the curriculum but in the profession, which led from the comments  
31  
32 made by participants about improving teaching.  
33  
34

### 35 **Normalising research**

36

37  
38 Several comments were made about research needing to be a normal part of radiography,  
39  
40 with one member of staff using the word 'normalise' from which this sub-theme developed,  
41  
42 for example:  
43  
44

45 ...it's [research] been turned into an extra ordinary thing and it  
46 shouldn't be - normalising that's a good word (P7 Staff)  
47  
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49 ...it [research] needs to become natural doesn't it, so we need to  
50 have that, that it's just normal, it's just what you do (P5 Staff)  
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1 Research should become a part of a radiographer's habitus and practice, just as using highly  
2 technical equipment and patient care is a normal part of radiographers' work. One student  
3 understood this, expressing how research had become normalised in their mind, saying:  
4  
5

6  
7  
8 ...by the third year you almost stop noticing that it's actually  
9 research, you start actually just doing it, start more naturally doing it  
10 (P2 Student)  
11

12  
13 When they say 'you almost stop noticing it' perhaps for them research is just what you do,  
14 without stopping to give it a name, and so it becomes part of the *doxa*<sup>18</sup> of radiography.  
15  
16

### 17 18 **Doing research as a student** 19

20  
21 Participants suggested that students might benefit from doing a small research project,  
22 rather than just a research proposal as a form of assessment, the suggestions being:  
23  
24

25  
26 ...practical research- they need to do it (P3 Staff)  
27

28  
29 ...personally, I think it would be more beneficial to actually do the  
30 research itself ...I find it very strange that we don't do it (P11  
31 Student)  
32

33  
34 Considering radiography is a vocational degree course, with students spending time in the  
35 clinical practicum learning 'on the job', these comments highlight an anomaly in the way we  
36 teach research. In the participants' university it had become a desktop exercise of writing a  
37 proposal, rather than a practical skill for students who are used to applying knowledge. This  
38 reflects Baird's <sup>5</sup> suggestion that there is a dichotomy between the practicum and academia,  
39 but this problem goes further than her suggestion that students find it difficult to match  
40 clinical practice with knowledge learned in the university as students may find it hard to  
41 practise research having not had chance to gain practical knowledge. Although students  
42 need to be encouraged to think critically about what they are doing, as Baird <sup>5</sup> suggests,  
43 there was little opportunity for students to practise research skills. One postgraduate student  
44 had a short elective period when they were able to:  
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1 ... [do] something that we wanted to do related to research so I  
2 followed a research physio for the day (P16 Postgraduate Student)  
3

4 Health Education England is currently exploring ways to offer students a research  
5 placement, but as a result of these responses, the university's students do now have the  
6 opportunity to perform a limited research project in the third year.  
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## 10 11 12 **Conclusion** 13

14 One of the tasks of radiographer educators is to help students develop their own version of  
15 the professional radiographer's habitus <sup>18</sup>, through exposure to the academic and practical  
16 aspects of radiography. This embodiment of *radiographer* needs to include research abilities  
17 and skills to afford members of the profession the ability to develop their activities within the  
18 research spectrum. In practical terms, the links between research and professionalism can  
19 be made more evident to students from the start of their studies. This would increase their  
20 understanding of their relationship to the spectrum of research, and how it links to  
21 maintaining the profession.  
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32 Although research elements were seen in the curriculum, more must be done to overtly  
33 'embed' research within it. There needs to be clarity for staff and students about where  
34 research already sits in the curriculum and activities, to meet the suggestions put forward in  
35 the *SCoR Research Strategy 2016-2021* <sup>1</sup>. Overall, research needs to be perceived as a  
36 normal part of teaching and learning, in fact it needs to be 'normalised' both in the university  
37 and in clinical practice.  
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## 47 **Implications for practice** 48 49

50 It must be clear to students that radiography is not a 'button pusher' job; not a mere *doing*  
51 job, but a profession in which radiographers can progress to advanced clinical practice, by  
52 *thinking*. For this, radiographer need to be ready to enact the four pillars of advanced  
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1 practice, clinical practice, leadership and management, education, and research, of which  
2 research has been shown by some to be the most difficult practically <sup>19, 20</sup>. Greater  
3 demonstration of the importance of these four pillars in advanced practice could be achieved  
4 by using the subject themes to underpin the undergraduate curriculum, in the form of four  
5 bases, to structure the subjects currently taught at undergraduate level so the links to  
6 advanced practice are apparent from the start of their education. This recommendation is  
7 applicable to all AHPs as they are all included in the Health Education England <sup>21</sup> framework  
8 for advanced clinical practice. There is national and international application for this work in  
9 radiography and other healthcare professions as research is important for professional  
10 development, and particularly for improvements in patient care wherever patients are being  
11 cared for worldwide.  
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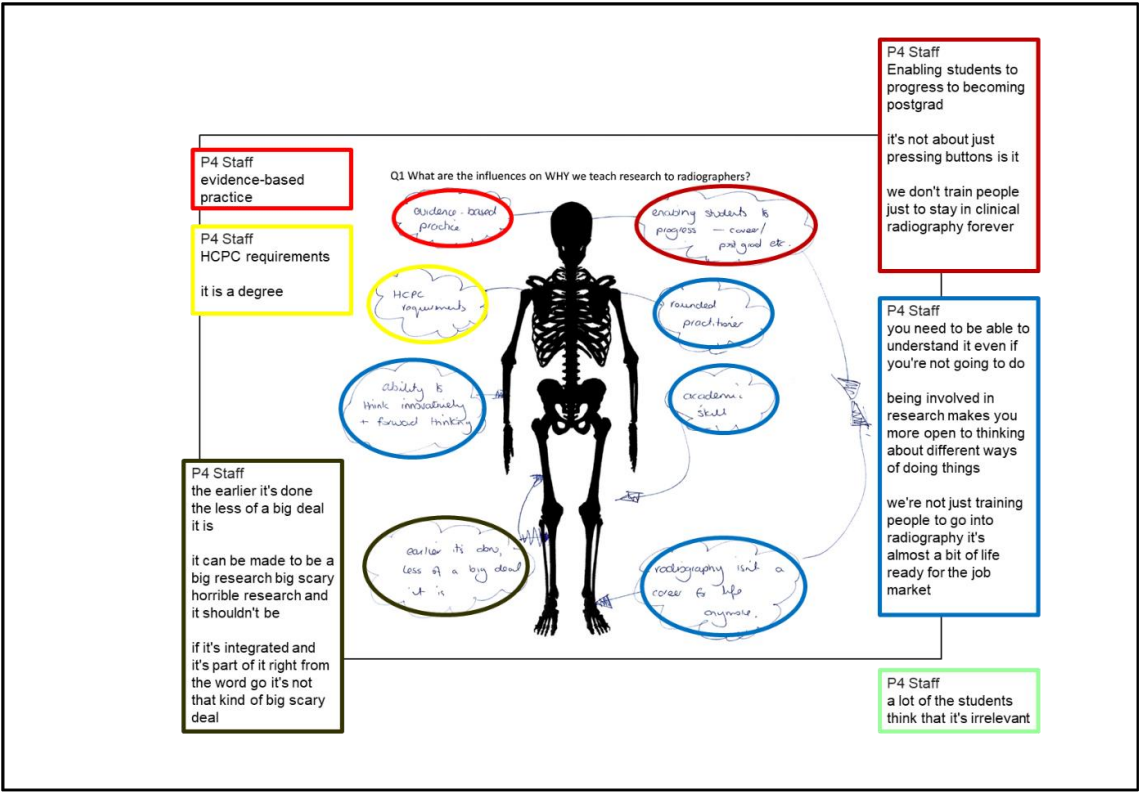
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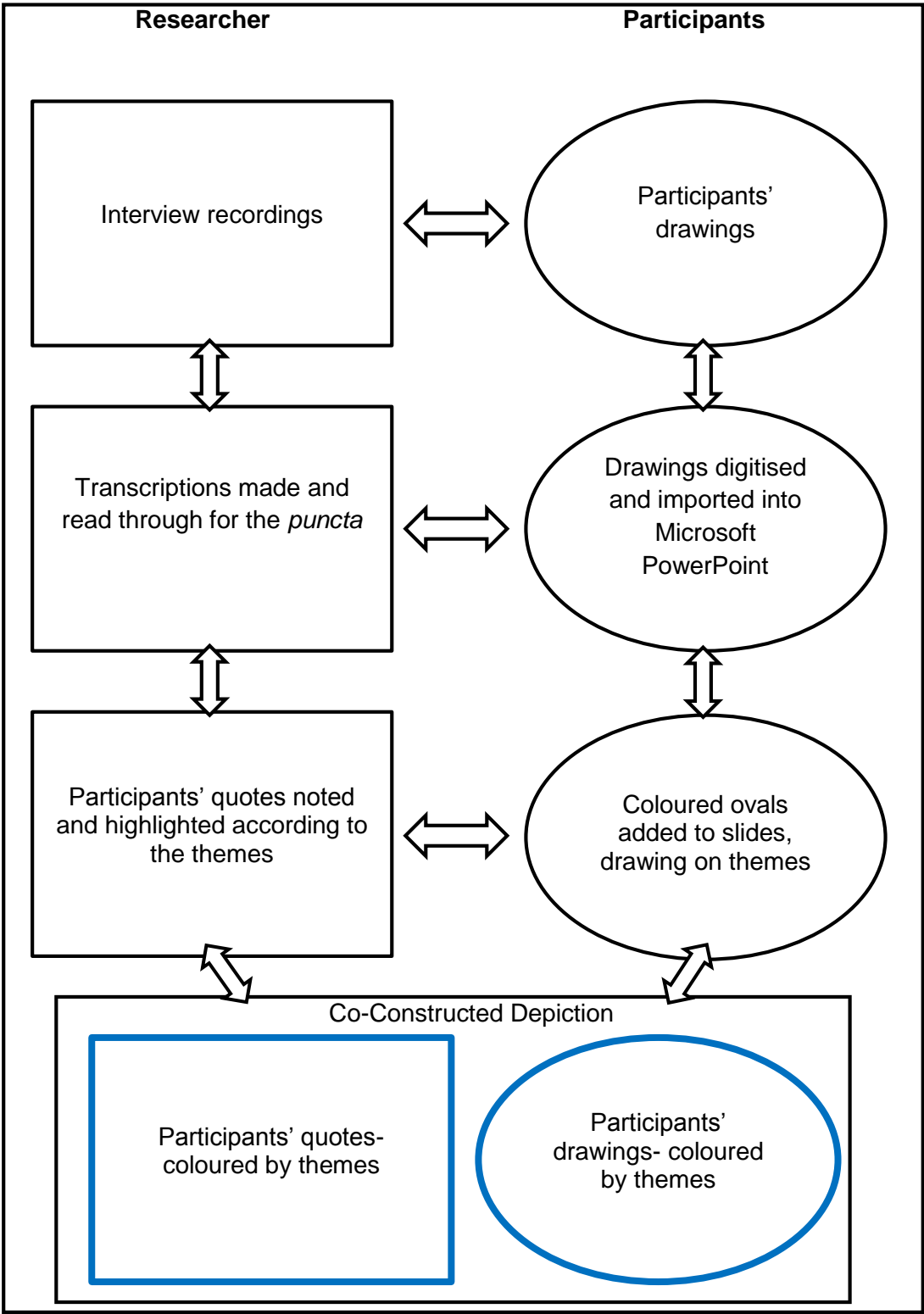
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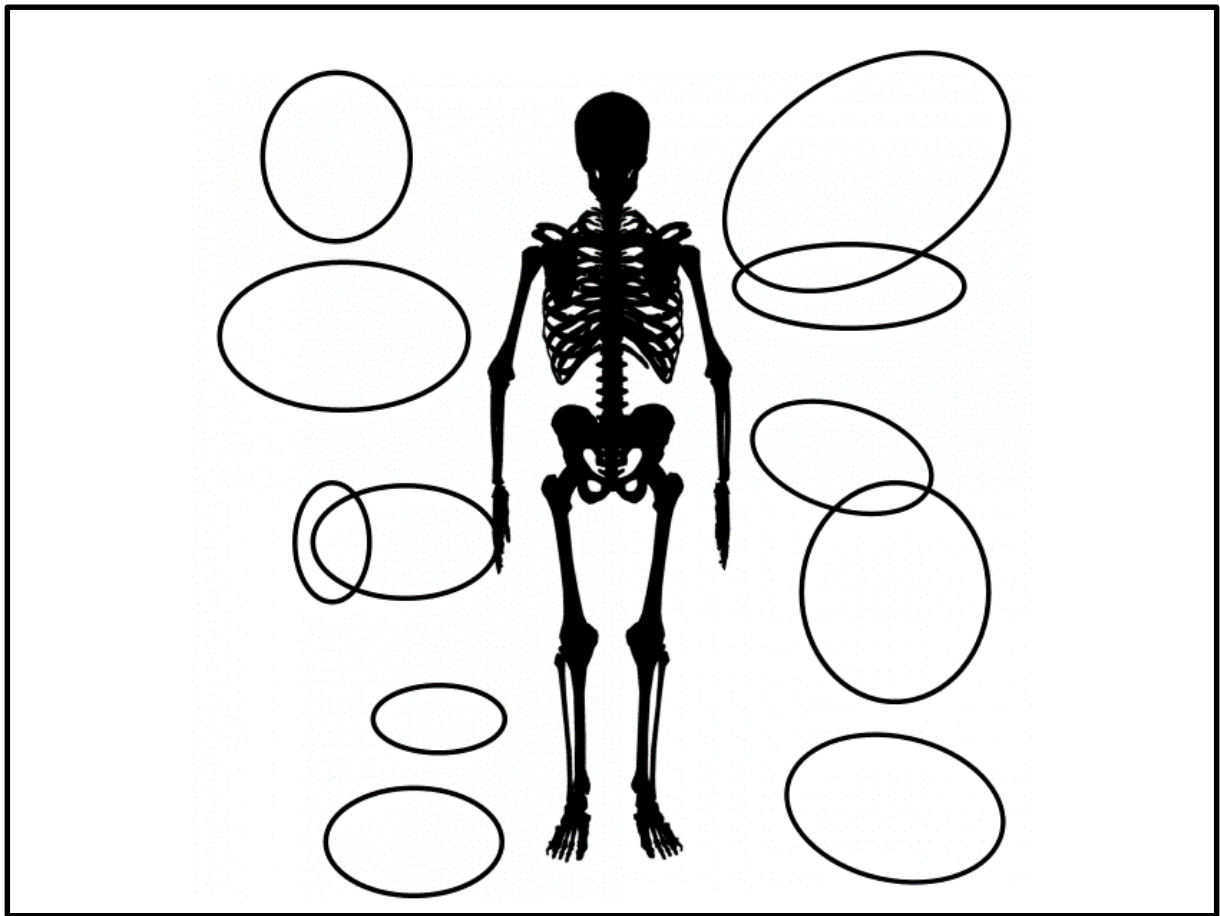
## Acknowledgements

Thank you to Dr R Smith and Dr A Wade both from Birmingham City University, doctoral supervisors for the original thesis, and to Mr N White Department of Radiography, Birmingham City University for proofreading guidance with this manuscript. Thanks also to the participants who generously gave their time to be interviewed.



Colour Key for Co-Constructed Depiction							
Habitus- all		Hit the ground running		Influences		Normalise research	
Habitus of lecturers		Professional field- Profession oriented		Constraints		Student participation in research	
Student constraints- habitus		Professional field- patient oriented		Suggestions for improvements		Embedding research- curriculum	





*Figure 1. Drawing Information Diagram for Participants.*

*Figure 2 Process for making Co-Constructed Depictions*

*Figure 3: Co-Constructed Depiction- Drawing 1 Question with colour key.*