

Inside a Radiology Academy – Trainees' perceptions of new and traditional learning methods

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Abstract

Aim: To investigate trainees' perceptions of learning in both a radiology academy and its associated clinical departments.

Materials and Methods: Ten academy trainees participated in semi-structured interviews. All had experienced both academy and clinical work, and had initially spent alternate weeks in each setting, but this was changed to three days clinical each week prior to the study. Their responses were analysed for themes and issues which might give particular insights into combining academy and clinical learning.

Results: Alternating between the academy and clinical departments was universally disliked because of a perceived lack of continuity in training. This was felt to inhibit both learning and development of working relationships. Introducing three days' clinical experience each week was seen as an improvement. Participants suggested synchronising academy teaching with clinical training was challenging, particularly in respect of support during diverse departmental attachments. As a result, academy and clinical learning were perceived as poorly integrated. Many trainees saw academy e-learning as a secondary source of information, and preferred books. However, skills lab training in sonography was perceived as relevant, realistic and well supervised. Clinical placements were praised for similar reasons, with trainees emphasising their desire to undertake responsible work, influence patient care, and join the departmental team.

Conclusions: Trainees felt that lack of continuity was a major inhibitor in their learning, in terms of both alternating locations and difficulty with synchronising academy and clinical teaching. Although some academy teaching methods were praised, improving integration between academy and clinical training remains a major issue.

Introduction

In 2005 three radiology academies were opened, located in Plymouth, Norwich and Leeds. The academies' purpose

was to help deliver the new means of training clinical radiologists defined by the Radiology – Integrated Training Initiative (R-ITI). This scheme was devised by the Royal College of Radiologists in response to a shortfall in the number of radiologists being trained in the UK, acknowledging that traditional training schemes were becoming saturated and were unlikely to produce the necessary increase (1).

The Integrated Training Initiative aimed to expand scheme capacity by using innovative means to teach trainees outside clinical departments for part of their first three years' training. By using methods including purpose written e-learning and skills lab training, it was hoped that trainees would spend half their time outside hospital departments, and half undertaking clinical attachments as previously.

The academies would act as the means for delivering these new methods, and trainees would alternate between them and their clinical placements. This would allow two trainees to utilise each clinical placement previously occupied by a single individual, and thus increase training capacity without overburdening consultant trainers. Thus academy training was not designed to supersede clinical experience, but to complement it.

At the commencement of their training in 2005 trainees at our institution spent alternate weeks undertaking academy based learning and clinical placements. This was subsequently amended to three clinical and two academy days each week, but both arrangements represented a significant increase in formal teaching than had previously been the case. In addition, formal and workplace learning became clearly demarcated and this distinction offered an opportunity to study both facets of training and how well they supported each other.

Thus the overall aim of this project was to investigate whether academy trainees felt that this new form of training was meeting their learning needs. Their perceptions of both formal and workplace learning were explored, with particular emphasis upon the integration between the two. Another purpose of the work was to look at how these findings might inform the improvement of academy training in the future.

Materials and Methods

Since the aim of this study was to explore trainees' perceptions, semi-structured interviews were selected as the most appropriate means of data collection, because the information which could be gathered by this means was felt to be potentially far richer than that which might be obtained by other methods such as questionnaires. Interviews would allow specific areas of interest or concern to be discussed in depth, whilst their semi-structured nature meant that there would be some standardisation of data.

The project was approved by the local research ethics committee. Following this, all fourteen trainees who had commenced their training in 2005 were invited by letter to join the study. This cohort had all completed at least eighteen months of training by the start of the research, and of those invited, ten agreed to be interviewed. The invitations to join the study were accompanied by comprehensive written information, which included details of its purpose, how it would be conducted and the rights of those being interviewed.

Written consent was obtained prior to each interview, and interviewees were informed that they could withdraw at any time without the need to give any reason. All of the interviews were conducted by the study author and each trainee was interviewed once. The interviews were conducted in private and each lasted from twenty five to forty minutes. During the interviews trainees were asked to describe their perceptions of their learning in each setting, the organisation of training, academy teaching methods, clinical attachments, integration of the two areas and finally any particularly good or bad features of training.

Each interview was recorded and subsequently transcribed. The transcripts were anonymised, both in terms of interviewees and any person referred to during the conversations. They were then analysed for both ideas held in common and minority or outlying views which might give particular insights into training. The analysis sought to develop themes and explore issues derived from the interviewees' responses regarding academy teaching, clinical learning and the combination of the two.

Results

The themes which emerged from the data concerned issues of continuity (time spent in each area, academy and clinical learning content, integration of academy and clinical attachments), academy teaching methods and clinical attachments.

Continuity of training - timing

The initial system of trainees alternating between the academy and clinical attachments on a 'week in, week out' basis was the first subject addressed in each interview, and the trainees were unanimous in expressing negative feelings about it. Trainees felt that their learning was adversely affected, particularly in terms of practical skills. Interviewee three commented: 'There was a lack of continuity, especially in the more practical fields such as screening and ultrasound, where you'd almost have to relearn what you'd learnt the previous week'.

Alternating weeks were also perceived to have a detrimental effect upon building working relationships, as was stated by Interviewee two: 'We were losing touch with the people in the department, so nobody knew who we were at the end of the attachment...there wasn't any relationship bond between us and the radiographers'.

These factors meant it proved difficult to develop or enhance trainees' practical skills whilst they were away from the hospital department. However, a minority were more upbeat regarding the continuity of training in non procedural work, as trainees were able to view imaging obtained within the hospital department whilst they were in the academy. This was supported by Interviewee four, who said: 'Depends on the modality ... especially CT and MR, cross section, you should be able to get somewhere up to equivalent, I think'.

The problems with 'week in, week out' became apparent during the academy's first year, resulting in a change to three days' clinical and two days' academy training each week. This seemed to address some of the problems trainees had encountered whilst trying to learn practical skills, as shown by this comment made by Interviewee seven after undertaking an ultrasound attachment based on clinical exposure every week: 'I had learnt more and felt more confident just in the practical skills of doing things, compared to the GI and to the vascular blocks with the week in, week out'.

Continuity – learning content

A related issue to that discussed above was whether the material trainees learnt in the academy was properly integrated with that provided during their clinical attachments. Ideally, the two would be well matched, but this proved difficult because of the diversity of the trainees' attachments. This was illustrated by a quotation from Interviewee eight: 'Temporally they're not associated, so that it requires you to recall the fact that you had a lecture some time back on the paediatric chest and abdomen, but your paed attachment isn't till so many months hence or you've already had it and you could have really done with that beforehand'.

Many interviewees felt their learning was adversely affected by this perceived lack of integration. In contrast, when

academy and clinical training were seen as well synchronised, trainees could be very positive about their learning, as mentioned by Interviewee two: 'That was the best ever in the academy ...luckily for me I had my ultrasound teaching ... academy teaching and my attachment at the same time which really helped'.

Although the academy programme included a lecture course, and fixed training sessions in plain film reporting and ultrasound, trainees also had time to undertake self directed learning. Use of resources such as e-learning might have allowed some academy time to be tailored to individuals' clinical attachments, although such a connection was only explicitly mentioned by a small minority. This is illustrated in this quotation from Interviewee one: 'I take the lead from the clinical attachment, so whatever I see in the clinical attachment, I will follow up at the academy'.

However, there were other issues related to the use and availability of e-learning which are discussed later.

Continuity – integration of academy and clinical attachments

The perceived difficulty in supporting clinical training from the academy was not only related to timing and subject matter. Integration also seemed to be inhibited by some trainees feeling that the academy environment lacked realism and responsibility, as explained by Interviewee ten: 'It's more like a classroom than on-job training, and it never gave me the feeling to be in the academy for a week and feel like I am a registrar in clinical radiology. It gave me more of a studenty kind of feeling'. This perception that the two areas were separated by more than location might have inhibited their integration, but other interviewees took a more optimistic view by citing instances where theory learnt in the academy had supported their clinical work. This point was made in the following quote from Interviewee nine: 'I think the musculoskeletal modules have been very good for A and E reporting and some of the GI modules have been really good for the CT'.

Some trainees favoured bringing clinical work, such as reporting, to the academy as a means of improving integration between it and the hospital departments, thus importing the realism and responsibility of the workplace. Interviewee seven suggested: 'Utilising academy time more, as a learning but also as a working time ... if a consultant is rostered to do plain film and there are people in the academy, just grab his or her plain films and do them with them. It's still a working session, but teaching is coming in as an added bonus'.

Academy teaching methods

Aside from lectures and tutorials, academy based learning was delivered by the utilisation of new methods, with e-learning and skills lab training featuring most prominently. The e-learning was planned to be presented as a large number of sessions, aiming to create a resource which would complement and enhance clinical training, rather than act as an electronic textbook.

E-learning

Unfortunately, only forty sessions were available to the trainees who commenced in 2005, and the limited nature of this was apparent: 'forty modules I managed to finish in a week or two' (Interviewee one).

Although the numbers of modules subsequently increased, other interviewees openly expressed a preference for learning from books, some citing practical reasons such as the familiarity of printed material or fatigue caused by prolonged viewing of a monitor. Although the e-learning may not have been designed to be comprehensive, or as an exam primer, some trainees perceived the latter as one of its weaknesses, as Interviewee three said: 'I think the Eld (e-learning) has been very good for initial learning, whereas as the exams have come nearer, I've fallen back to textbooks'.

The latter might be seen as appropriate, but the interviewee's view of the e-learning as an initial resource, rather than a tool for continued use, was not an isolated view. However, other interviewees praised the e-learning for being up to date and for its ability to present anatomy in an interactive three dimensional fashion. The interactive nature of the e-learning was perceived as helpful by several trainees such as Interviewee five, who said: 'If you read something and the next slide on it quizzes you on what you have read, which I think is the very good way of learning because it stays in your mind'.

Skills lab training

Skills lab training was introduced in order that trainees might practise practical procedures in a protected atmosphere, without any potential to harm patients during the early stages of such learning. It was also seen as a means of ensuring trainees could still improve their procedural skills during time spent outside the clinical department. The two main components were ultrasound training and a vascular simulator, and these methods were the subjects of the interviewees' comments.

Ultrasound training in the academy was initially supervised by senior trainees and latterly by a consultant sonographer, and this was almost universally praised by the interviewees. The success of this arrangement was described by Interviewee nine, who said: 'You've got really good people teaching you on machines in a non threatening environment. You know that someone's there that you can ask if you're having problems'.

Trainees initially learnt by scanning each other, before examining patients, and in the opinion of a minority, this lacked realism and consequently reduced the value of the training. This view was put forward by Interviewee eight, who said: 'I thought it was much better when we had the patients in. I think that was great. I didn't think it was as useful when we were scanning ourselves'.

The importance of realism in skills lab training was emphasised when the interviewees discussed their use of the vascular simulator. It was not described as useful by any trainee, and a fairly typical statement was made by Interviewee seven, who commented: 'We all played with it (the vascular simulator), thought it was great, and then I did some real life vascular stuff , and then went back to the simulator and realised you can't simulate real life'.

The interviewees also commented on a lack of supervision whilst they used the vascular simulator and a consequent lack of feedback from trainers. This was in contrast to the ultrasound training, and emphasised the perceived need for supervision and the provision of feedback as an integral part of skills lab work.

Clinical attachments

During the period covered by the study, the trainees undertook an initial general placement followed by a series of attachments in various radiological specialties, each of three months' duration. When interviewed, they were asked to comment upon their clinical training in general, rather than discuss individual attachments in detail. Most comments regarding clinical training were positive and the trainees were unanimous in their view that time spent in the radiology departments should be increased. This was reflected in this quotation from Interviewee nine: 'Because clinical's always going to be much more useful really. When you're junior, you just need to do as much as you can and unless your academy time is focussed on getting you more adept at the clinical side, then I don't see the point of the academy time'.

In terms of the clinical attachments themselves, many of the interviewees felt their learning was enhanced if they were treated as active members of the departmental team and given responsibility. These points were emphasised by Interviewee six, who said: 'If you're given a bit more responsibility, you just feel that you take your job more

seriously and you pay more attention. I prefer to be proactive and be the doer and if I do something I tend to remember better than if I passively learn'.

Other interviewees identified the quality of supervision and the input of members of the departmental team as crucial to the success of clinical attachments, with some commenting that the direct one-to-one teaching they received from consultants was particularly important. There was also discussion of practical considerations surrounding clinical attachments, with some interviewees commenting that they felt placements could be devalued when they contained too many trainees or too few specialist sessions.

These views sometimes concerned newly established attachments which were needed to accommodate the increased number of trainees, but a minority of interviewees felt that this expansion impacted adversely upon their training: 'It was difficult for consultants there to understand how to treat the trainees, they were not used to having registrars so early on into their training' (Interviewee ten).

Discussion and Conclusions

It must be borne in mind that this study reflects the perceptions of training of representatives of one year group in one academy. These trainees were exposed to academy training from the outset, despite some resources such as the e-learning being far from complete. Thus a later cohort might well view things differently, as might trainees in other academies, where the training programme has been developed in an alternative fashion.

Ethical issues

The trainees were interviewed by the author (a co-lead of the radiology academy) and this raised issues both in terms of the potential veracity of interviewees' answers and the natural desire of the interviewer to be associated with a development seen as successful. Although the interviewer's position had to be acknowledged, it meant that issues raised by trainees could be discussed from an informed standpoint. The ability of the interviewer to probe areas of interest was important, and this was felt to outweigh the disadvantages of the author interviewing.

These issues were further addressed because participation in the study was entirely voluntary and critical opinions were received supportively rather than defensively. All the interviewees expressed both positive and negative views about aspects of their learning, and seemed willing to express them as 'consumers of training', utilising their right to criticise if necessary.

Continuity

It was clear that the interviewees perceived discontinuity as a major impediment to their learning, particularly when the 'week in, week out' arrangement was in place. Aside from this causing a perceived difficulty in learning practical skills, the problems trainees felt they had in building working relationships in clinical departments seemed to further exacerbate this situation. Such relationships are needed to gain the trust of those supervising procedures and, without them, the trainees felt that opportunities for them to undertake such work were reduced. These were the factors which led to the 'week in, week out' system being replaced by three days clinical training per week.

The integration of academy and clinical learning was another challenging area, and difficulties in synchronising the two contributed to the discontinuous feel of training. As a result some trainees felt that the training programme had a disorganised feel and that the material learnt in the academy did not support learning in their clinical attachments. From the outset, some of the academy's programme had been used to teach generic skills such as

ultrasound and plain film reporting which could be utilised in many clinical areas.

To some extent, this helped improve integration between the academy and hospital departments, and was extended by bringing clinical work into the academy setting. This enabled the trainees to report plain radiographs, CT and MR during supervised sessions within the academy, allowing it to act as an extension of the clinical department. This had the advantage of introducing realism and responsibility into trainees' academy sessions, although it did not help with procedural work or developing departmental working relationships.

The challenge of synchronising the academy programme of formal teaching with diverse clinical attachments will always be problematic, but if the former could be delivered in a structured and stepwise fashion, it would at least be possible for it to act as a consistent strand, despite trainees' varying clinical attachments. The combination of academy and clinical teaching resources may also be viewed as elements of a learning blend. However, overall organisation of these resources is important in order to deliver systematic learning and avoid a suboptimal, "pick and mix' approach' (2)

E-learning

Although this received a mixed reception from the trainees, the fact that this development was in its infancy at the outset, allied to initial unfamiliarity with its use, might raise hopes that usage would increase. Should this occur, it would provide another means of synchronising academy and clinical training, as trainees utilise e-learning sessions appropriate to their clinical attachment, as was originally planned.

Trainees had been allowed to decide which sessions they wished to complete, but an alternative would be to adopt a more prescriptive approach, with a mini-curriculum of core e-learning modules recommended for each clinical attachment. However, the trainees appeared to value human contact whilst in the academy, and if the majority of formal training were undertaken without trainers' input, it would not address this perceived need.

Thus another means of increasing the role of e-learning would be to increase its integration with other academy activities such as lectures and tutorials. Academy teaching led by trainers could be retained, but take the form of an introductory session, with the remainder of the topic covered by e-learning. It was clear that one of the main drivers for trainees' learning was covering material for the FRCR examination. Consequently, basing exam questions upon the e-learning's content might increase its usage, although this would turn it into the electronic textbook it was not designed to be.

Skills lab training

Ultrasound training in the skills lab was widely praised for being well supervised, realistic and offering good access to feedback. The importance of feedback is emphasised by Issenberg and Scalese, who described it as 'the single most important feature of simulation based medical education' (3). The technique was perceived as difficult to learn by several trainees, and mastering it gave them a sense of having being challenged and having learnt something worthwhile. It also had the advantage of being a generic technique linked to many of the trainees' clinical attachments.

Billett's study of learning in a mining and secondary processing plant also confirmed the importance of authenticity: 'when learning was disembedded from authentic activities and social relations it was perceived to be markedly less effective' (4). This point was reinforced by some interviewees' perceptions of other skills lab sessions, such as musculoskeletal ultrasound and biopsy, which tended to lapse afterwards as few trainees had the chance to practise them in the short term. The trainees' negative perceptions of the unsupervised use of the vascular simulator

contrasted with their view of ultrasound training. Their perceptions of the vascular simulator also illustrated the difficulty of providing clinically realistic material for the skills lab sessions, aside from those involving ultrasound.

Clinical attachments

The popularity of clinical work was perhaps not surprising bearing in mind that apprenticeship is a long established means of medical training, and was likely to have been familiar to trainees prior to their entering radiology. They all felt they should spend more time in the clinical departments and again this seemed unsurprising when this is the environment in which most will spend their careers. Mann (5) makes the point that to learn effectively trainees need to engage in authentic tasks, have the opportunity to take decisions and be able to assume increasing responsibility. Although these may be partly addressed outside the clinical environment, it is difficult to see how they can all be undertaken at the highest level away from hospital departments.

Although the trainees appeared to value clinical work more highly than time spent in the academy, the perception that good supervision was vital was common to both. The fact that some trainees felt that they were poorly supervised in some attachments suggests that clinical experience alone is not enough, and supervising consultants may need additional training. This is confirmed by a study by Cottrell et al (6) who found that trainees perceived that inadequate supervision was one of the most important problems they encountered in their relationship with their supervisors. They suggested that consultants needed more training to prepare for this role.

Conclusions

Continuity of training was perceived as one of the major issues affecting the trainees' learning, and improving integration of academy and clinical teaching must be a priority. The elements of blended learning are present, but an improvement in coordination of these resources is required in order for them to realise their full potential.

Take Home Messages

Notes On Contributors

Dr. William Ramsden is a Consultant Paediatric Radiologist at Leeds Children's Hospital and Head of The Yorkshire and The Humber School of Radiology

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Professor Miriam Zukas, Project Supervisor

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Appendices

Declarations

The author has declared that there are no conflicts of interest.

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