

VirRAD — a virtual learning resource for Radiopharmacy and Nuclear Medicine

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VirRAD is a virtual learning community which although originally developed specifically for radiopharmacy could ultimately be used not only for radiopharmacy but for nuclear medicine and other related fields.

The radiopharmacy community is very disparate, widespread community and encompasses many different types of people, ranging from those very new to the field — undergraduates first coming into pharmacy or chemistry — ranging through to people doing post graduate degrees and up to eminent professors. It also includes people coming from many different backgrounds, such as pharmacists, chemists, technologists and medical doctors and other professions. The ultimate recipients of our care of course are the general public and therefore the lay public as well, probably also have an interest in the way our community works.

The different types of people in the community have different types of learning needs. Some people require the ability to perform tasks well, so they require particular skill competencies and it is also important that they perform these in the right way, so they need to perform safely. But in order to do that task effectively they also need to understand the theoretical basis for the work which they are doing. They therefore need to understand the science as well, and increasingly these days they need to understand the legal framework within which they are working so that they keep to the rules. At the same time, we have people new to the field, who need to learn these things at the introductory level, but we also have people who have been in this business for a long time who have more advanced learning needs.

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In Europe we already have a variety of different radiopharmacy programs. Within the EANM we set up the European Specialisation Certificate in Radiopharmacy a few years ago and we now have a number of courses teaching this syllabus in Germany, Switzerland, France and Slovenia. Our colleagues in the United States of course also have a number of courses, particularly Certificate courses run by Purdue University and also a recently developed on-line teaching resource at the University of Arkansas in New Mexico.

However, although such courses do exist, the problem is that they don't really meet the need. Many places still don't have access to courses, and many regions have no provision at all. Those people who are able to attend the courses suffer from the fact that they have to pay quite high course fees, they have to travel to wherever the course is being held, and while they are there they have to pay their accommodation costs. During this time they have to leave their work, so they are not available to do their work at the time and therefore employers, in particular, are often somewhat reluctant to let them go. One of the particular problems is that these courses are very intense. When you take people away from their work and put them somewhere for two weeks, there is an inclination to try and get as much information into their brains as possible and it is very difficult to absorb that information when you are sitting in front of a lecturer for seven hours a day. There are also language difficulties because we teach the courses mostly in English and that is not many people's native language. In particular the provision doesn't really match the requirements. I referred above to the requirement for learning skill competencies; the courses that we have, although they teach the theoretical basis, they don't really teach the skill competencies very well. So — we need a better way.

So why do we need VirRAD? We need it because radiopharmacy is a very specialized field and there are relatively few radiopharmaceutical scientists in any one location. This means that there is very limited peer contact. If you have a problem, there isn't anybody just down the corridor who can normally solve the problem for you. There is limited resource to local expertise; you need to get that from outside. And because the numbers of people are small it's very difficult to organize local and regional training courses, the number of students are small, the number of teachers are even smaller and that's why we have the situation where there are limited training opportunities. We also have a situation where we have difficulties in recruitment. Radiopharmacy is a developing

and expanding field, particularly in the area of PET — there's a big need in particular for PET radiochemists and radiopharmacists and so we do need to be training more people to work in the field.

So what we hope VirRAD will provide for its users is a system of communication. Communication which will be from peer-to-peer, so that if you have a problem, and you want somebody to help you with that problem, there will be somebody to turn to. There will be a learner-to-expert communication, so that students can have access to teachers easily, and also person-to-community communications so that people will feel a part of this global community and won't feel so isolated in their small hospital, wherever that may be. We want VirRAD to provide a system to give us access to rich multimedia learning material, including a variety of different types of multimedia, plus simulation and Virtual Reality. We also want it to provide support for self-learning for continuing professional development, particularly through the learner modeling and the self-assessment and personal academic record that the system is going to provide, but at the same time give support for people running external teaching programs. So if people want to run a course in radiopharmacy, they don't have to pay lots of money to get teachers to come from all around the world in order to do the teaching. They can just turn to VirRAD for the learning resource. We would also hope that VirRAD will ultimately be THE place in the world, THE place on the internet, where people go when they want to find out anything about radiopharmacy. Any sort of technical, specialized information to do with radiopharmacy, we hope that people will initially come to look around the site to get it.

However, VirRAD should be for everyone, not just for the people working in radiopharmacy specifically, but also people working in nuclear medicine as a whole and we hope that it will be seen like that and used by everybody. What we want to do in particular with VirRAD is to make our radiopharmacy learning more accessible so that people can learn at any time and in any place. We want it to be more universal so wherever you live around the world you have access to the same level of learning and there are no poor neighbours as far as access to learning resources is concerned. We would like to make it more effective than the teaching we have at the moment. We want it to be less intensive so people don't have to cram as much into their brain as quickly as they do at the moment. We want it to be more involving so instead of the students just sitting in a lecture hall listening to the lecturers speaking, we want to involve them in the learning process and in doing so hopefully make it more fun. We want to make the learning more relevant for both the employer and the student so that the employer and the student can choose the learning which is appropriate for them either, as students or for them as employers. By making it accessible on the world wide web, we hope it will be cheaper since people won't need to travel to do their learning and they won't need to pay for expensive accommodation.

At the same time, it's important that we do make the learning still a shared experience. One of the big advantages that classroom teaching has over distance learning, is the fact that it brings everybody together and people can share in the learning process. Somehow, we have to make sure that when the student is sitting on their own in front of a computer, they don't feel alone, but still feel part of a learning community, and they should hopefully remain in that community for their entire working life. It's not just something that they are going to do before they qualify. Once

they qualify and get into practice, hopefully they will continue to learn for the rest of their working life.

At the beginning of 2002, the European Commission gave us a grant of three million euros to develop VirRAD but not just to produce a radiopharmacy learning program; the European Commission are primarily interested in moving the boundaries for using the internet for learning. They want internet learning to be more effective and more enjoyable in ways that I have already described and therefore VirRAD is not just a development program but a platform for research into the use of the internet as a learning tool and in particular for learning within a virtual community. For this reason, the pedagogical or educational framework, within which VirRAD is developed is very important

Learning is the construction of knowledge—rather like building a house. In order to build a house you need a number of different resources. You need the materials to build a house and in the case of learning the materials are the pieces of information that need to be learned. To build a house you also need a plan and it's becoming increasingly clear that for effective learning you also need a plan. You will learn more effectively and retain that information for longer if you approach learning in a logical and organized manner. Building a house will go on a lot quicker if you work as a team, rather than as an individual, and that's true in education and learning as well. You learn more quickly and effectively if you learn within a team rather than on your own. And finally, when you're building a house, you can't build a house without tools and certainly as far as distance learning is concerned, you can't learn without tools as well, the prime tool being the computer and the software behind the computer.

Since you can't use tools effectively until you have actually learned how to use those tools one of the important things that we need to build into VirRAD is a system that enables people to learn how to use the tools that they are going to be using for learning. Gilly Salmon has developed the five different stages of e-learning that students go through in order to learn effectively on the computer. The first stage is that of simply accessing the tools, accessing the computer and the internet — getting comfortable with using the tools you are going to use for your learning. At the same time it is important to motivate the student to actually use these tools effectively. It does take effort to use a computer for learning and a student needs to be stimulated to make that effort. Once the student becomes familiar with the tools they are using, then they need to start a process of on-line socialization to get over this feeling of isolation, so that they feel they are part of a team. It's just like being in a classroom again, but it's just that this classroom is scattered around the world. Only when people start to feel comfortable within this social environment, do they actually start to exchange and acquire the information which are the building blocks for the learning process itself. However, once these building blocks start to be exchanged, then people start to put them together to actually create knowledge within their own mind. They start to build a house of knowledge within their mind. Finally, once they have built that knowledge and built that house, or in the case of radiopharmacy, built their radiopharmacy knowledge, then they can start to apply the knowledge, and start to develop and build on it within their own minds.

This is the process that we have to try and reproduce effectively within VirRAD. It is easy to assume that people will simply go

to the computer, switch it on and they will log into VirRAD and start learning, but it's not really so simple.

One of the other pedagogical bases is this concept of mindful learning, where we are hopefully going to explore some of these myths and see whether by adopting them we can see whether the learning will be more effective. There is also the learner modeling, that I mentioned. This is basically the extent to which we can actually use the computer to help the student to learn. So the student can interact with the computer because they will basically, to a large extent, be on their own, they don't get as much feedback from the teacher, for example if they were sitting in a classroom. So what we want to see is whether the computer can provide some of this feedback on the learning that teacher would normally do in a classroom-learning situation.

So how will it work? Well, VirRAD can be divided into three main areas:

- the virtual learning community;
- a multimedia learning resource containing the courseware;
- the virtual radiopharmacy laboratory.

However, these three components of VirRAD cannot work effectively independently but need to come together and be integrated in order to work successfully.

The community is basically a collection of communication tools. The aim is to try and reproduce the different types of communication that take place in a real classroom. There is communication between students, between students and teachers and between individuals and the community as a whole. Somehow we need to make communication in this environment as easy and as natural as it is in real life.

The courseware that we use will be composed of several different types of multimedia, including video, text, diagrams and animations and we hope that by using a variety of different types of multimedia to provide the learning material, it will provide sufficient novelty within the learning situation to engage the students' interest. As well as the courseware itself, we have to develop a user-friendly system that will allow us to put the courseware into

VirRAD. There is an enormous amount of learning material out there in the world and somehow we have to find a way of getting it into VirRAD as efficiently as possible. We don't want to have to re-invent everything ourselves, we don't want to have to go and re-write text books in radiopharmacy in order to put it on the system ourselves. We are aiming to develop an authoring tool which hopefully will allow anybody in the world to upload learning material into the system. All of this courseware however needs to be divided into modules and categorized so that people can find the information they want as easily as possible.

The final component of VirRAD is the virtual radiopharmacy laboratory where people can actually try and get some hands-on experience to get an idea of what goes on in a radiopharmacy. We recognize that it is not going to be exactly the same as actually working in the radiopharmacy but at least it will give them a good idea, so when they do finally go into a radiopharmacy it won't be quite as alien as it might be at the moment.

The concept of our radiopharmacy laboratory is that it will operate in a number of different ways. People will be able to enter the laboratory on their own and play around with bits of equipment and manipulate syringes and kits and the rest of it, and simply play on their own, or they will be able to go in with a teacher, or with another student, and up to six students will be able to go in together with a teacher, and the teacher will be able to teach them the type of skill competencies that they need to learn.

So, what is the current status of the project? It started in March 2002, began testing in May 2003 and the first prototype was launched in September of 2003. At the time of writing, the prototype is being assessed and evaluated and the results of this evaluation will feed into the design of the second prototype in Summer of 2004. The period of funding by the European Commission ends in February 2005 but we very much hope that that won't be the end of VirRAD, we want this to carry on for some years beyond, in order that it will be useful to the radiopharmacy community, and one our tasks for the next year, is to find additional sources of support to make sure that happens.