Engineering e-learning in the Royal Navy – faster and better

The Requirement for Training

The Royal Navy School of Marine Engineering provides trained engineers for service in the Fleet. Trainees gain a range of qualifications depending on experience; from Modern Apprentice through to Foundation Degree. Every fortnight 24 young people join RNSME as Engineering Technicians (Marine Engineering) - ET(ME). Eighteen weeks later they leave to join ships at sea working on highly technical and potentially hazardous equipment in a dangerous environment. They must be safe and competent as soon as possible.

The Requirement for change

Trainees used to spend 22 weeks in HMS Sultan, a shore establishment at Gosport in Hampshire; and completed only a limited number of practical tasks. Engineering theory was taught in the classroom before trainees moved to practical work areas with real ship's equipment. With 440 Volt supplies this practical work is potentially hazardous and trainees must pass a safety exam and be thoroughly knowledgeable before they can enter these areas. The need is to compress the time spent in essential theory and safety training to bring in more time hands-on practical training. How was this done?

The Solution

The Royal Navy introduced the Buzzing Hub: on-line theory about all the ship's systems that young trainees learn about before qualifying as Modern Apprentices with a City and Guild qualification. The course introduces essential theory before trainees practice in a "free running" area. Trainees proceed at their own pace; their knowledge is tested. Each practical experience has the theory introduced. Trainees can re-visit the material, in the study area, in their living quarters, at any time. Many do exactly that.

The link between Buzzing Hub and the free running area.

As these pictures show there is a direct link between the e-learning and the practical area. The same instructors operate in both areas. They ensure learners have the theory and the safety knowledge before letting them loose on 440 Volt supplies. The e-learning assessment checks the theory. Instructors have more time in the classroom to get round and talk to individuals. The pre-testing requirement increases the instructors confidence that trainees are safe in the workshop and machinery area.

Improving the impact of learning technologies at work

The Theory – Buzzing Hub

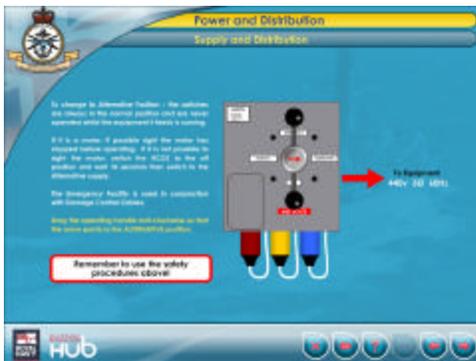## The Practice - Hands on

Electrical Distribution

The theory and safety issues of testing a electrical distribution board is covered in Buzzing Hub, the trainees apply their knowledge in the lab area.
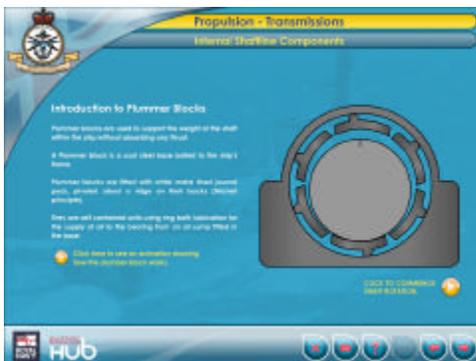
Switch Gear for Steering Motors

And operating switch gear safely

Plummer Block

How and why it lubricates a shaft

And how you might take one apart (if you ever needed to!

What do Learners think.

"You can go on ahead if you want to", "It's handy to be able to do it in the mess, you know if you need to check something"

"The thing I like in particular about buzzing hub is the element of self study."

"The multiple choice questions are a bit idiot proof, not like the A-levels I did in High School where you had to write it out by hand."

"It's a lot better than listening to an instructor."

What do The Instructors think, the good:

"Its handy with those who are slower, you can get them to look at it again later".

"The animations are really useful, you know if you try to explain, perhaps a clean water system with pipes and valves the animations really help. It grabs their attention"

"We've got the ability to set work that they can take away with them, the students have got access in the evening, they are more receptive to that kind of learning scenario than me just stood out at the front."

"We get a different sort of recruit now, some are really bright, one had got halfway through an electrical engineering degree and I'm teaching him very basic AC theory. Buzzing Hub let him go onto extra and produce his own project. He used that to demonstrate to the students who took a lot of that on board because it was one of their guys telling them."

Trainees want more practical work so the sooner they get through Buzzing Hub the better for them, of course we have to make sure they are safe before they get to the practical area."

---------------------- and the drawbacks:

It's a problem when the computers break down; not so bad when they are learning because they can share. For the exams they need their own personal computers so they can be delayed getting into the lab areas.

"Sometimes its difficult, you try and build up a picture, say of a distribution system to get trainees to appreciate what's involved in it, some of them have jumped ahead."

"Some guys early on used it like a fancy Power Point". "The older guys didn't take to it at all at first, but they are coming round"

TOWARDS MATURITY

Improving the impact of learning technologies at work

The Management View Point

Lt Grant Kelly Royal Navy "We have always had concerns about the level of safety of allowing students to use live equipment, but the new e-learning allows us to document and be sure that; yes this person has the knowledge to follow the safety procedures.

"This is not a cost saving exercise or time cutting exercise. The time we have saved in the classroom we have put to good use in command, leadership and management training, and more practical. We also have time to take them into a real warship environment.

We are going to invest more in training instructors to make the best use of the equipment, we have a better idea of the best to use it now.

When they reach their ships they are more credible and safer as Engineering Technicians.

We get Commanding Officers from ships telling us that the trainees are useful immediately, they are less of a liability and therefore they don't have to be looked after quite so closely in terms of safety and they actually can make a valuable contribution to operational capability from the moment they step on board."

Key Lessons for training Modern Apprentices

1. Train Instructors to make best use of e-learning.
2. Allow learners to proceed at different paces (but get the faster ones to do more work to help others).
3. E-learning saves time in theory that is best used with more time in practical work.
4. Learners need access at times outside formal learning, usually to revise.
5. Invest in reliability, breakdowns devalue the whole approach to e-learning.
6. Problems with logging on are one of the most frequent breakdowns.
7. E-learning design must maximise the use of animation, particularly essential for engineering subjects
8. Instructors need time and good role models before they "get with the programme".
9. NVQ procedures can be automated but more time is saved with instructional material so that should be the initial priority.