LINE and AO Foundation bring dry bones of theory to life.

Speedy and accurate classification of fracture injuries is key to effective diagnosis and medical treatment. The Gold Winner at the elearning awards 2011 for Excellence in the production of learning content – not-for-profit sector showed how Line Communications and the AO Foundation turned this 'boring' but critical subject matter, into a programme that is accurate, relevant, and interesting AND improved patient care.

The AO Foundation (The Arbeitsgemeinschaft für Osteosynthesefragen), is a Davos-based, not-for-profit organisation dedicated to improving the care of patients with musculoskeletal injuries. However, they found that their cornerstone programme, the AO Müller Fracture Classification System, was amongst the dullest and hardest for surgeons to master.

The Challenge

The Müller AO Classification of long bone fractures is the standard classification used by trauma surgeons and physicians dealing with skeletal trauma worldwide. It is at the heart of the AO training programme and the difficulty in teaching the classification system effectively has led to young medical professionals dealing with trauma patients in busy hospitals being unable to speedily and accurately describe fracture injuries to their medical colleagues. This leads to delays and confusion in treatment. Whilst training is available, skills fade was also a concern, with busy staff potentially forgetting much of what they had learned after the programme had completed.

AO Foundation approached LINE with a very specific request: turn a highly specialised subject that was perceived as boring, but incredibly important, into something that would be seen as a gold-standard example of e-learning.

The development challenges were formidable. The highly technical skills of AO and specialist surgeons had to be captured to create a suite of e-learning that would not

only be compelling and acceptable to a profession where e-learning is not commonplace, but, most importantly, would lead to quicker and more accurate diagnosis of musculoskeletal injuries. So how was it done?

The solution

The heart of the problem was the classification of fractures and the effective communication between surgical staff and their teams. In a hospital environment, if the members of staff do not all understand the common 'language' of fracture classification, there is an increased risk of human error. It was clear from the outset that the desired e-learning would demand a very intelligent design. The Müller system is deployed in trauma situations to avoid confusion and delays to treatment.

Key design considerations

It became apparent that some creative thinking would be needed that would combat the challenge presented by the 'dry' subject matter. It was also important that the whole learning experience would have to be seen as authentic by the learner, and it would need to help them continue to learn back at work.

It was agreed that the learning programme should provide:

- A means of engaging the user as to why the fracture classification system is important for communication
- An explanation of the system
- An opportunity to practice using the classification system by use of interactive drag-and-drop challenges.

The learning solution involves 4 core elements:

- Narrative
- Real-life context
- Gaming
- Performance support

Setting the context

The training begins with a series of pictures and narrative, which explain the opening scene of a real-life story: a resident in a busy A&E Department is woken up by their beeper. There has been a serious **R**oad **T**raffic **A**ccident involving a driver, passenger and pedestrian, all of whom are suffering with multiple traumas.

The pictures and narrative show a resident on the phone to an impatient Orthopaedic Consultant trying to ask advice about the first patient. This patient has a complex fracture that requires a specific treatment, and the resident is struggling

to describe it. Time is ticking away and the lack of a shared “meta-language” for classifying the fracture is clearly an issue.

At this point, the story is paused and the programme interface takes over. The learner is told that the way to prevent such incidents happening to them is by mastering the Müller/AO Fracture Classification System. The learner is then given the task of internalising the rationale, methodology and detail of the Müller/AO System in order to help the beleaguered resident to correctly describe the various fractures of the three RTA patients.

Structured learning

The course continues the narrative of the learner as senior resident dealing with the RTA in such a way that is true to both the narrative and to the logic of the content itself.

The course is subdivided into five sections; each section is further subdivided into:

- Exercise/Knowledge – where the learning content is conveyed through the narrative
- Practice – a chance for the learner to put their knowledge to the test on real-life x-rays.
- Test – the same as practice but this time against the clock!

The learning experience is enhanced by a further module, the X-ray Practice Area, which provides the learner with an extensive archive of further real-life x-rays to classify. During the Exercise/Knowledge and Practice parts of the course, learners can call up the Reference tab that provides a brief outline of every aspect of the Müller/AO System.

Design rationale

The whole design approach has ensured that the learning is not a passive experience, which just conveys the information, but is rather both interactive and engaging. This provides motivation for the learner and makes them more receptive to the learning experience.

Design principles include**:**

- Grabbing the learner’s attention

The learner’s attention is gained with an engaging introduction that clearly introduces the importance of completing the e-learning. A course introduction also establishes the key issue of the importance of communication when dealing with fractures.

- Setting the learner's expectations

The learners are informed of the learning outcomes so that they understand what they will learn and provide indications of time requirements and timings.

- Making the content meaningful and relevant

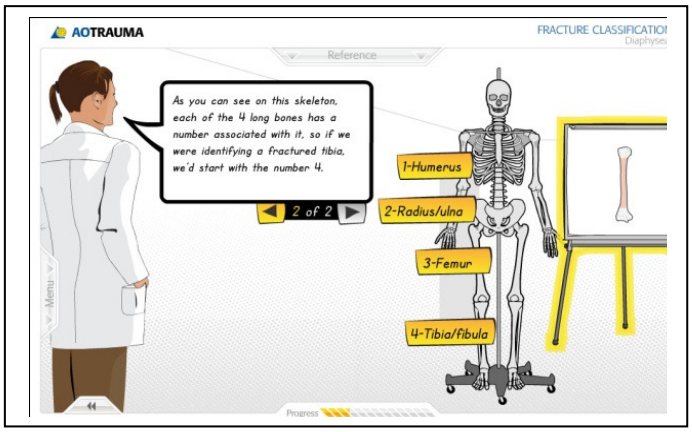
Each module is introduced with a clear indication of what the learner is going to get out of it, and why it is important to their role. The learning content is designed to emphasise the relevance of the learning, describing where learning would be used and who it would benefit.

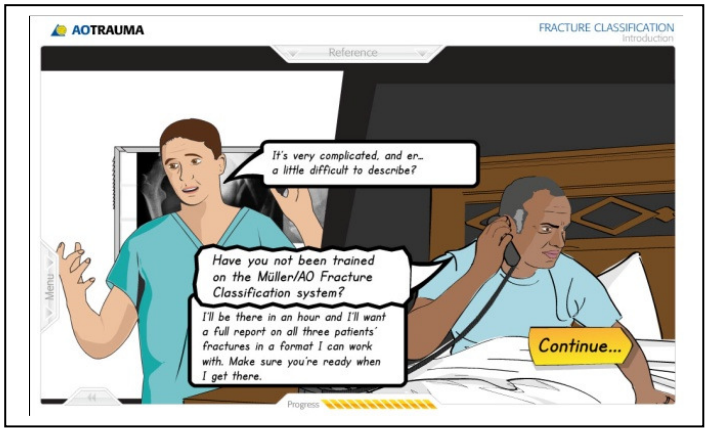
- Goal-based learning approach

Where possible a goal-based approach is used where learners are presented with realistic situations in which they typically need to resolve problems. Learning takes place when they discover what is needed to overcome the challenges presented.

- Use of gaming

Gaming style learning is used to engage the learner and add a competitive edge to the testing. By adding time related elements to identification exercises, learners are set challenges and have to strive to complete them quickly and accurately.





The learning strategy that was chosen is particularly suited to the target audience because:

- It sets the learning within a context that is recognisable to the learner
- The tasks it asks of the learner are the same tasks that learners would carry out in their working lives, making it easier to apply what they have learnt
- The element of competition appeals to a very driven and competitive target audience
- In essence, the program allows learners different routes to do what they want to do most: classify x-rays!

Maintaining authenticity using Focus groups

Key to the success was the research and testing of the narrative content to ensure that the audience was engaged, related to the story and the characters within the learning, and, therefore, saw the environment and content as 'authentic'. This subsequently enhanced the course status and importance to the learners. LINE attended the annual AO Foundation conference in December 2010 and over two days ran focus groups to test the effectiveness of the course. They also recorded the thoughts and observations of the courses target audience – junior and senior residents from three continents.

Feedback

Feedback from the primary global target group of senior and junior residents shows that the programme is being used in 3 ways:

- Junior residents are using the course to properly learn and internalise the AO/Müller classification system, working through the course narrative and then testing themselves in the X-Ray Practice Area

  The latter has proven to be particularly popular because it offers a resource of x-rays from genuine trauma incidents for learners to test themselves against often not available elsewhere

- Both junior and senior residents are using the course to refresh their knowledge, particularly using the X-Ray Practice Area
- Users are using the course as a reference tool to quickly remind themselves how to properly describe a particular fracture, especially when the fracture is more unusual

Results

The impact on speed of diagnosis and other performance outcomes is difficult to isolate due to a whole range of different factors. However, AO believe in the e-learning approach enough to build it into its syllabus for Junior Registrars.

The qualitative feedback from its international focus groups have been invariably positive, no-matter what nationality, and especially amongst younger surgeons who are the main target group for the learning. Participants felt that working through the course would enable them to master the AO/Müller System to the extent that they would be able to use it in a real-life trauma situation, something that had almost never been said of the previous learning strategy.

This course took the dry bones of theory and turned them into a living experience. Its engaging approach to design and the ongoing support and reference material

that it generated appealed to busy hands-on surgeons and ensured the project walked away with the top accolades at the e-learning awards in 2011.

7 Tips for turning dry content into stimulating learning

1. Use stories to set the scene but make sure are authentic
2. Assign learners a role in the process , setting realistic goals so that see how their actions influence results
3. Borrow gaming ideas to engage by add time related elements to exercises to create a sense of competition and urgency
4. Involve the users in design and test your ideas along the way
5. Run focus group where ever you can to raise awareness and gather feedback.
6. Keep complicated content precise and clear
7. Ensure it can be easily referenced back on the job