

'Passengers don't learn!'

eLearn Expo Conferences in Paris, Vienna, Amsterdam, Hong Kong 2001-2002

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Overview

One of the temptations when moving traditional content and training course material to *on-line* delivery is to take the quick route and create an electronic 'book'.

Faced with such an experience, the learner quickly becomes bored with reading text, watching videos and turning pages. If their memory is good, they may well be able to recall facts and score well, even in a poorly designed test of acquired knowledge.

But if the learning objective is to *apply a skill* or to *use judgement*, memory alone is not enough. Anyone who makes a car journey as a passenger and is then asked to drive the same route alone the next day will discover just how little they have learned - even though they shared the same experience. The act of *taking control* helps to cement learning and acquired skills.

This presentation explored a range of techniques which can prevent learners from becoming passengers, including:

- structuring content to encourage the learner to 'dig for gems'
- inviting learners to 'take the wheel' and try tasks for themselves
- providing opportunities to alter controls/settings and to witness outcomes
- building solutions interactively with a 'Lego set' and receiving feedback
- interactive interviews

Each technique was supported by a live demonstration, based on the company's 10 years experience of developing interactive training programs.

1. How do we learn?

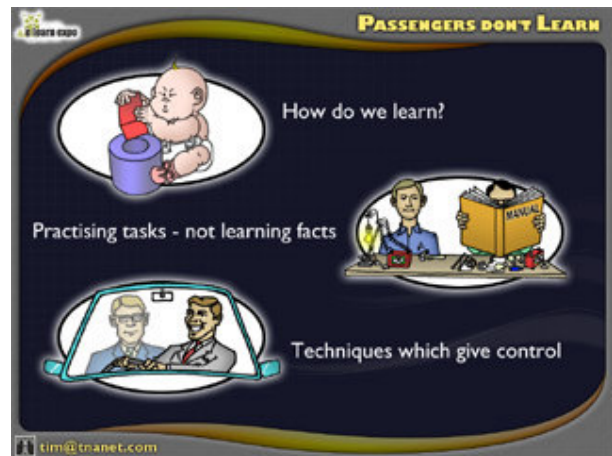
From the moment we enter the world, our minds are empty but hungry. We learn by experimenting . . . we mimic, we explore, we fail, we try again. Whatever the task, we are driven to try things out for ourselves rather than simply watching while others show us what to do.

Of course, a crucial requirement of this 'learning through failing' process is that we should have some form of 'safety net'. When we continually fail at something we need to be shown the right way or we simply get frustrated and give up.

As learners at home or in the classroom we have parents, peers and teachers to provide that help. But what about learning *alone*, at the screen of a computer? How can we most effectively enable the learner - no matter what their background - to acquire new knowledge and skills with confidence?

Traditional Computer Based Training

Most training materials produced for delivery on CD-ROM or on-line require little real involvement on the part of the learner.

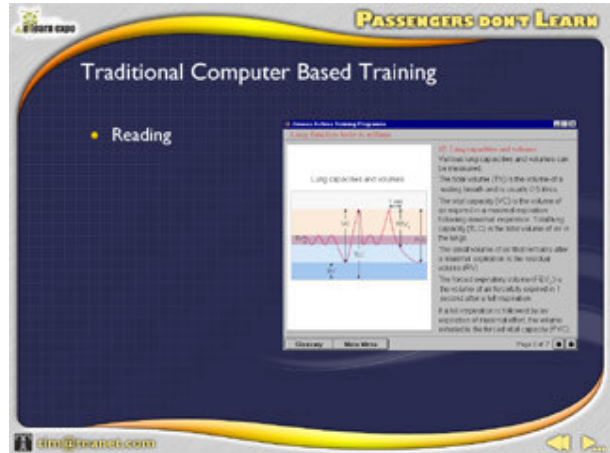


In most cases, the experience could be generously described as passive, and in the worst cases as simply 'sheep dipping' . . . making staff work through every page of a program in order to claim that they have all been trained on, for example, a procedure or an industry code of practice.

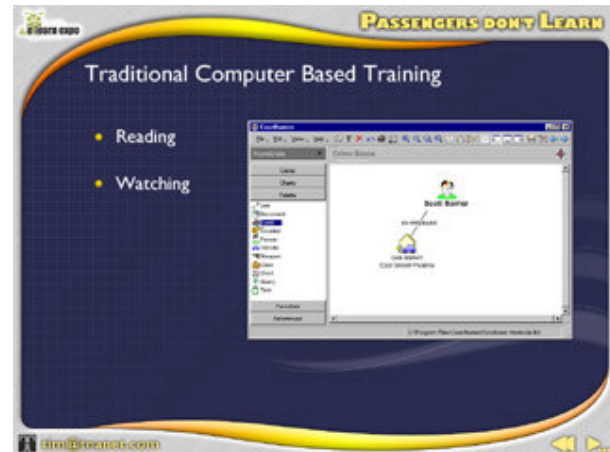
This type of training presents facts, figures and concepts for the learner to absorb and later recall. The activities these learners will be involved in are:

- a) **Reading** - bullet point text, large text passages, explanations, definitions, etc.

Presenting and explaining fundamental information in this way will always be necessary in a training program but the question should be "How much?" and "When?".



- b) **Watching** - photos, graphics, graphs/charts and animations. Again, these are often essential and possibly entertaining training illustrations but the act is still one of *passive observation*.

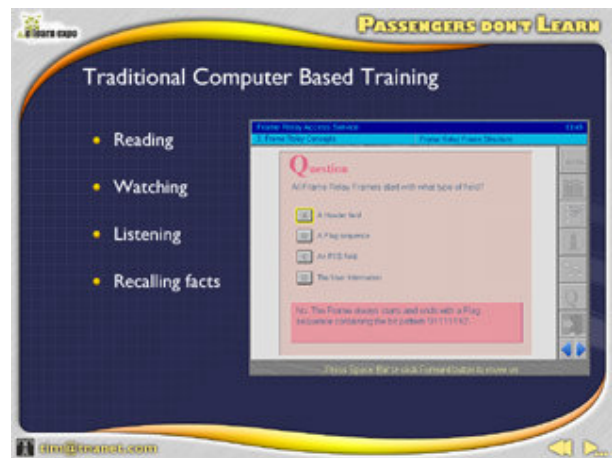


- c) **Listening** - to audio and video interviews, watching video sequences of a task correctly performed, etc.

Colourful multimedia content which certainly adds interest to content but which is again entirely passive.



- d) **Recalling facts** - after working through the training material we are then asked to *remember* what we have seen and heard by answering quiz questions.

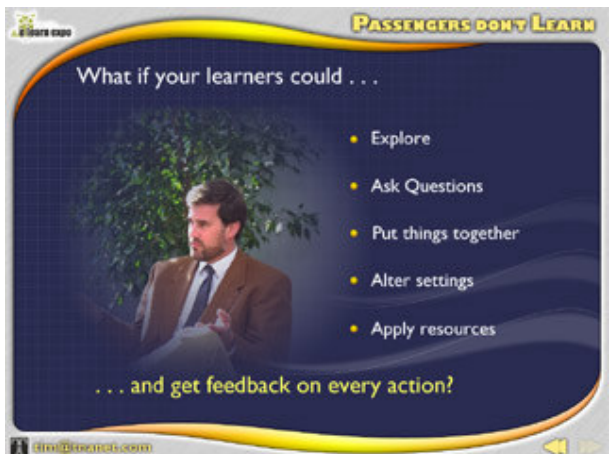


In this kind of passive training, learners go exactly where we tell them. They are in effect *passengers* during the journey, seeing what we want them to see and hoping that good memory will serve them well when the time comes to test their knowledge.

How much more effective would the learning session be if we allowed our learners to take a far more active role? What if the training program included not only the necessary introduction to facts and concepts but also intriguing opportunities to:

- Explore
- Ask questions
- Put things together
- Alter settings & apply resources
- See the outcome of their actions?

Surely then our learners would get the chance to *take control* of what they see and do and cement not only individual facts in their minds but - more importantly - the understanding of how to successfully *apply* knowledge and understanding to perform complete tasks.



2. Practising tasks - not learning facts

2.1 Fact-based eLearning

Traditional eLearning programs follow a linear structure which leads the learner through:

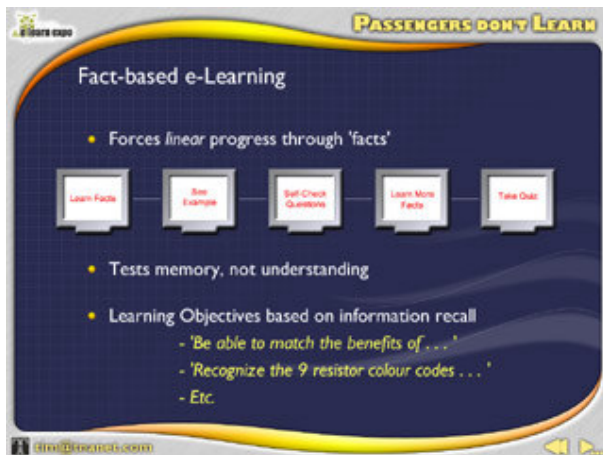
- studying facts
- seeing examples
- testing their memory so far with self-test questions
- studying more facts
- more examples etc.
- A final Quiz to test their memory for all the material they have been exposed to

The major drawback of this type of training is that there is little or no opportunity for a learner to apply accumulated facts and insights to carry out a *task*. The training is geared simply to learning discreet units of information and this weakness is usually clearly reflected in the vocabulary of the learning objectives for a training program . . .

Eg: By the end of this module you will be able to:

- "**Match** the benefits of the Series 2000 with our customers' needs"
- "**Recognise** the nine different resistor colour codes"
- "**Identify** the major reasons for equipment failure"
- "**Recall** the correct sequence of assembly for the Type 22 shaft"

For a learning objective to be valid it must be *achievable* (ie: within the content of the program) and it must be *measurable*. It follows that if learning objectives such as those listed above are to be met then the our options for measuring their achievement will be limited to tests of information recall: Multi-choice, List Matching, True/False and typed entry.



But stop for a moment and think about what you are training your staff to be able to do.

Do we measure the performance of a service engineer on the ability to 'recognise and identify the coloured stripes on the body of a resistor' or on their ability to 'diagnose a failed circuit board and replace it within 30 minutes?' Most importantly, how would your *customer* measure their competence?

This is the nub of the problem with conventional eLearning - we find ourselves prevented from using the sort of learning objectives which are perfectly achievable in the classroom. Learning objectives based on verbs such as 'understand', 'demonstrate' and 'apply' can be proved easily in front of a trainer but not by using passive learning methods and simple quizzes.

2.2 Task-based eLearning

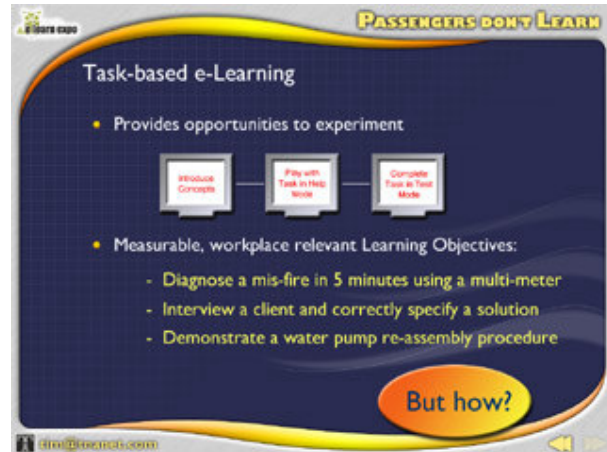
If you accept the premise that the content of any effective training program must always be driven by achievable learning objectives, then this will have a dramatic effect on your approach to interactive design.

A training program which enables learners to play unhindered with facts, resources and tools and to see the outcome of their actions will equip them with far more than just knowledge - they will actually have performed a task relevant to their job.

Before 'play' starts they will still need to work through fundamental information to set the scene. When they start practising the task, they will need support in the form of:

- **Information** (leading to reference data, procedures, technical manuals, etc.)
- **Help** (examples and models of solutions/approaches, guidance on completing out the task, perhaps providing successively more help if the learner is repeatedly failing)

There ideally needs to be a 'panic' button where the learner says 'OK - I give up. How do I do it?' . . . the eLearning equivalent of raising a hand in class. The program should then show them and invite them to try again.



When the learner feels confident enough with the task they can then run the same routine but in 'competence mode', where their sequence of actions and the time taken can be tracked, logged to a database and recalled for a supervisor to review. In its most useful form this could include replaying the learner's session to see exactly what they did and when.

Automatic scoring can also be built into the program to provide feedback to both learner and supervisor. This could direct the learner to revise specific topics, practise the task again and then re-take it in test mode.

Interactive exercises like this can be created for many types of training including soft skills, business procedures, technical support, sales, etc. Just think of the kind of measurable, workplace-relevant learning objectives you could at last set for your eTraining:

Eg: By the end of this module you will be able to:

"Diagnose a misfire in 5 minutes using a multi-meter"

"Interview a client and correctly specify a solution"

"Demonstrate a water pump re-assembly procedure"

"Predict the outcome of a client interview"

So how do you achieve this?

3 Techniques which give control

To stop learners sitting back and remaining passengers, we need to take every opportunity to let them *take control*. This can take many forms, from the most trivial 'I' button to reveal information to complex simulations.

The paper demonstrated several techniques:

3.1 Making navigation fun

The traditional method of navigation is for the learner click on menu buttons or options listed on a menu panel. But choosing *where* to go in a training program can take many other forms, such as the 360 degree, virtual reality photo demonstrated. The learner can pan around and zoom in using mouse and keyboard controls and click on options embedded in the scene, for example, on the number plates on vehicles in a showroom. Once selected, the program then jumps to a pre-determined section.

The same technique can be applied to interactive exercises such as clickable equipment in a control room. Eg: 'You have 2 minutes to enter this control room and select the shutdown controls in the correct sequence to disable reactor number 3.' Go!



3.2 Digging for gems

In designing the content of a training program, keep the key messages as simple, bulleted text at the top level. Then invite the learner to 'dig for gems' whenever they wish. In this way you are respecting the fact that each person has a different level of prior knowledge and each has a personal preference for learning. The analytical character will welcome (and expect) the chance to examine detailed background rationale or reports. Structure this information on one or possibly two layers beneath the top level.

Make sure that when the learner digs for more (or 'drills down') the information is presented in such a way that they do not become disorientated. This is best achieved by nesting these deeper layers in smaller panels within the main screen, retaining the frame and navigation of the program and providing a clear 'close' button to remove it and resume the main track. Taking the learner to a completely different screen (eg: to a new Browser window) can become very irritating.

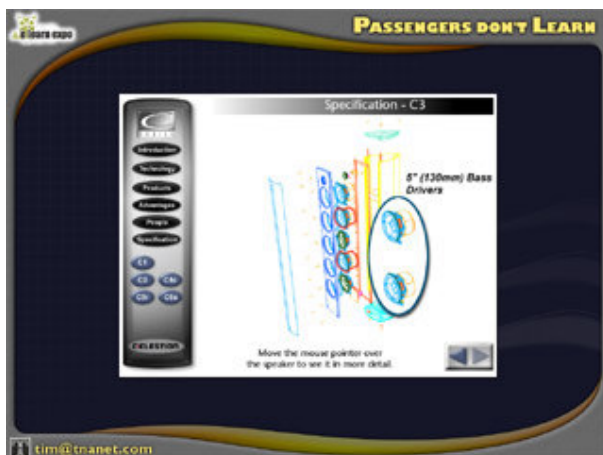


The example used in the paper is taken from an on-line training program on Psychometric Testing, developed by TNA Ltd. for PA Consulting Group (Cubiks).

3.3 Dynamic pictures

The same rules apply to presenting graphical information - show overview imagery and then invite the learner to explore. This example is taken from a CD-ROM produced by TNA Ltd. for Celestion loudspeakers. As the cursor moves over areas of interest, more detailed illustrations pop up.

And these need not simply be additional *pictures* which appear . . . they could also be audio/video/animated explanations which start playing, scrolling text panels, etc.



3.4 Interactive Music Centre

The first of the example tasks presented is an interactive music centre simulation, produced by TNA Ltd. for a nettrain Ltd. program for training car showroom sales staff.

On the right side is a panel which lists the tasks to be completed, starting with turning the radio on and selecting FM. As each task is successfully carried out, the task is automatically ticked.

All controls behave exactly as they do in a real music centre, including Mute, Bass, Volume and the pre-set Channel buttons. Pre-recorded audio samples (News, current affairs, rock music, etc.) play when each station is frequency is reached.



The interactive 'play areas'

The following three interactive examples are intended as simple illustrations of what can be achieved.

Numerous additional facilities could be added such as progressive help/guidance (tips which automatically pop up after a certain number of incorrect/unsuccessful actions), further information resources, directed revision pop-ups, 'show me the correct way', etc.

The examples are catalysts for thought. How could you apply these principles to *your* training?

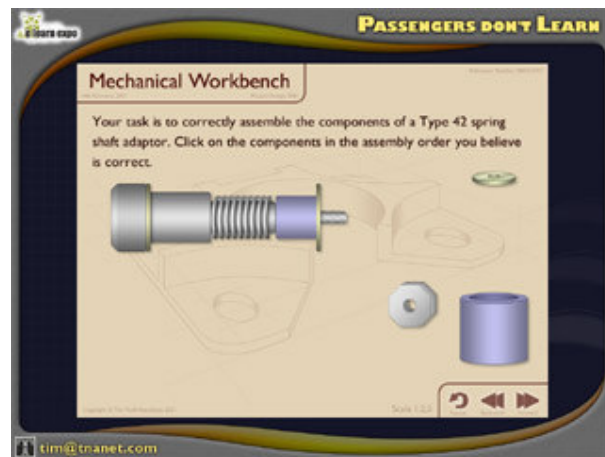
3.5 The Mechanical Workbench

This simple task is to assemble the components onto the shaft in the correct order. Appropriate sound effects accompany each item as it snaps into place.

Hints are available which show the learner a correct, animated step before inviting them to continue from that point on.

We could also provide many more items than they actually need (eg: spurious components), provide a micrometer for them to measure diameters of selected items, flip components over and try them again and so on.

The technique shown here could also be applied to putting *processes* or *procedures* into a correct sequence such as the correct sequence of actions to be taken in the event of an emergency.



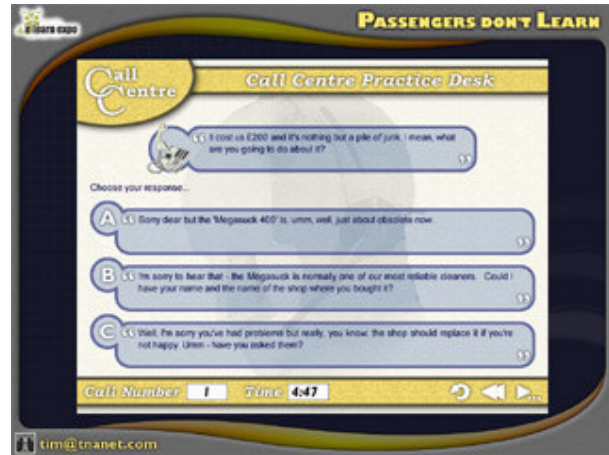
3.6 The Unhappy Customer

This example demonstrates a technique which is already in use for training call centre staff. It can also be used to give practice at interviewing skills, sales canvassing and any application where threads of 'question and response' can be modeled. This method allows us to start to test 'judgment' in a way that is impossible with traditional questioning methods.

In our example, an irate customer calls to complain about a faulty vacuum cleaner. We hear her opening tirade and must respond to her opening demand: "So what are you going to do about it?"

The learner then chooses one of three possible responses, each has a different customer reaction built into the program, which automatically plays. Further responses have to be selected until either the customer becomes so angry that she hangs up in disgust or the conversation ends with a satisfactory solution.

There are dozen of possible paths through this simulation and although the example is deliberately exaggerated, the technique is highly effective and engaging to use. Additional facilities could include the ability to transfer the call to someone else and to use video clips instead of audio (but probably not via a modem connection). It would also be useful for the learner to see the *ideal* sequence of responses, either initially (as a model of best practice) or as on-demand Help.

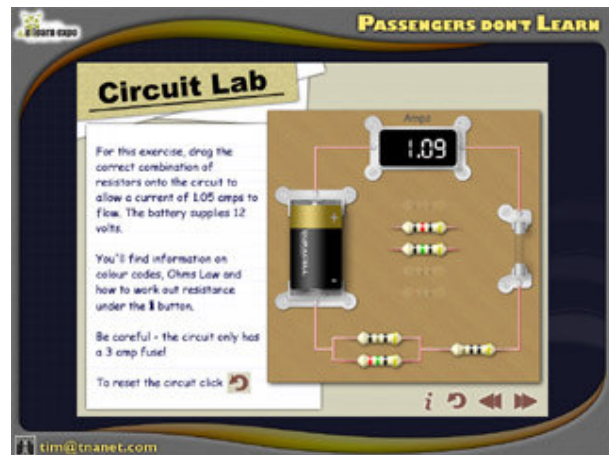


3.7 Ohms Law in action

The conventional approach to teaching 'rule-based' skills involves reading and learning facts and formulae. Our example, whilst still requiring some preliminary introduction to electrical circuits, resistance and Ohms Law, gives the learner the chance to apply this knowledge to a *real* circuit and to witness the outcome of their actions.

Several skills are covered in this integrated simulation:

1. Not just remembering but *applying* Ohms Law ($I = V/R$) to calculate the resistance required to achieve a given current.
2. Recognising and selecting ceramic resistors by interpreting their colour coded bands.
3. Calculating the effective overall resistance of two resistors in parallel and resistors in series.



Help is available on all these areas by clicking the '?' button at any time. As each resistor is placed in the circuit, the current flowing is calculated and displayed by the ammeter. If the overall resistance inserted is so low that the current exceeds 3 amps, the fuse blows with a 'pop' and the simulation must be reset. After each failure (ie: fuse blown) the 'Help' panel suggests increasingly informative tips.

Further refinements could include:

- a larger range of resistors
- a random positioning of resistors every time the simulation runs
- different values for voltage, resistance, fuse rating and target current for each session

As for all these simulations, in 'competence assessment' mode the program could track, record and dynamically replay every action for a specific session and learner as well as displaying the time they took.

3.8 Interactive Health & Safety exercise

This simple exercise presents the learner with a 'QuickTimeVR' scene of a food packaging machine in which a number of health or safety hazards are present.

The learner may move dynamically around the image and zoom into any area to inspect it more closely. When they think they have spotted a hazard they click on it. Correctly identified items are logged and displayed. When they have found all five hazards they receive congratulations. There are also many other 'clickable' items (red herrings) which are *not* hazards.

This type of practice exercise benefits from continual gentle guidance and hints to keep the learner motivated. For example, if after say five clicks they have not found a hazard then the program could highlight one of them or perhaps provide a clue.

The beauty of this type of exercise is that every action taken, every hint given, the total time spent and so on are all logged and may be passed back to a Learning Management System for analysis and reporting. The intelligence gathered provides a far richer indication of competence than is possible from a conventional quiz.

