

Teaching and learning strategies



Introduction to the Students and Teaching Environment.

I am currently a Lecturer in the Communications Electronics Technical Block (CETB) at Royal Air Force (RAF) Cosford, The No1 School of Technical Training. I am teaching new entry students AC (Air Craft's man), course number 1932 and SAC (Senior Air Craft's man) course numbers 1946 and 1951. The students age range is 17 – 30 years. I am responsible for delivering training in the subject areas Micro Electronics, Digital Electronics and Information Technology.

The courses range from 90 to 130 hours.

- SAC's 1946 16 hours Information technology and 115 hours Computer technology for the.
- AC's 1932. 16 hours Information technology and 74 hours Micro Electronics for the

The students who come to RAF Cosford are not typical of those who would go to a college of further education. They are sent by the RAF for either initial or further training in their specialisation.

The learning environment

The room layouts do vary however the majority of rooms are set out in a traditional manor. (see plan)

The labs are arranged differently with the student's desks arranged around the walls.

E. g.(Room F008)

The class rooms have a roller White board, P. C. and T. V. monitor, some class rooms have windows to the outside but not all. Lighting is via fluorescent tubes and heating is via radiators.

The learning environment cont.

The laboratory's have a White board, P. C. and LCD projector. Most have opening windows. Lighting is via fluorescent tubes and heating is via radiators. The desk is set out with a PC and Digiac workstation, a 6502 and 80286i microprocessor boards, in addition there are a collection of supporting boards.

Teaching Styles and Learning Strategies.

Teacher Talk

A large part of the course is via teacher talk, this allows for large chunks of information to be covered in a much shorter space of time. The reason this method is chosen is due to the shear pace at which the course has to be delivered. The course is equivalent to a BTec Electronics course, taking approximately two years at a college of further education, however the RAF students have to cover nearly the same amount of material in just six months. Teacher talk is not the best method of imparting information to students as they can very quickly lose interest and it is difficult to assess how much information the students have taken in. To alleviate this situation the teacher talk is broken up with questioning secessions. The questioning secessions help the teacher to assess if the students have understood if learning has taken place, this also gives the students an opportunity to play an active role in the learning process. These methods promote individual

involvement, encouragement, reward and a sense of achievement to students of all abilities

The questions are directed by the teacher, nominating a student to answer, this is known as; “ Pose Pause Pounce” this technique is used throughout RAF’s training and is one of the main tools used to promote learning. The teacher talk is also begun with a recap of the previous session, sometimes the recap will be at the end of the lesson. This re affirms the students understood. The level of knowledge can be assessed, allowing the teacher to continue knowing that the students understand.

Reading

The students are given course notes in a printed form showing both pictures and diagrams as well as explanations. These notes form the back bone of the course material. They contain the Aims and Objectives for that section of the course, Information relevant to the course and a summary of the books main points. The book can be used as a reference to during the teacher talk. It can be used to illustrate a point, show other examples and reduce the amount of complex diagrams that need to be drawn on the white board.

In addition the book has a separate set of questions which the students are encourage to read. When they have read the book they can answer the questions, this promotes further reading.

If they do not understand or cannot answer the questions then this should promote them to ask the teacher for further explanation. The questions are designed to reinforce the theory taught in class and promote greater understanding of the subject.

Practice by Doing.

The first thirty hours or so of the course are mainly teacher talk, reading and working through examples on the white board, however once the underlying terminology and theories have been taught the emphasis of the learning style changes dramatically. The location of the teaching now moves to the laboratory where the students are given a brief introduction to an exercise, they then work through the exercise at their own pace and in their own way using their knowledge.

The students follow the exercise answering questions as they go. The questions are designed to point the students in the right direction, if however they are unable to proceed, the teacher is close at hand to guide them, this is achieved by questioning the student and trying to get them to identify the solution for themselves. If the teacher identifies that the class as a whole do not understand then they can bring the class back together to solve the problem. The teacher may need to give further guidance to the students to allow them to complete the exercise.

This process is learning by doing and in completing the exercise the student will hopefully be able to relate this experience to the theory section of the course thus underpinning their theoretical knowledge with practical experience.

Demonstration

This method of teaching can be used during the theory stage. The teacher could show real components to allow the students to become more familiar with them, seeing what they look like or by working through examples of how to perform a specific task.

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Demonstration can also be effectively used during the exercise phase of the course. This is very useful when trying to impart complex information to the students. An example might be when an exercise requires additional circuit boards to be used or components that have not yet been used.

In these situations a demonstration of the exercise can be given by the teacher. This will allow the teacher to identify any areas of special interest and point out any areas that the students might otherwise miss or perhaps not think about.

In addition it is by far the best way for the teacher to show how things are to be accomplished.

i. e. showing how to connect up a system, what parts are required etc. The demonstration also allows the students to question the teacher about parts of the exercise they do not understand. The student can say “ so you mean this >>>>> ” ; the teacher can then be sure that the students fully understand what is required.

Visual

Visual methods of teaching are available, though the preferred method is power point which the students despise and therefore is not used frequently by myself. However it can be a very useful tool for explaining difficult subject material, particularly when the diagram requires motion i. e. information been transferred around a computer system. This would be very difficult to illustrate on the white board as the teacher would need to continually re draw the diagram to show the movement, however using power point allows animation of the drawing which the students can see, thus reinforcing the

idea. It can also be re run to allow the students to follow the process until they are confident that they understand. Questioning can be used to check the understanding. The teacher can run the PowerPoint and ask the students to tell him what is happening and why.

Alternative Methods of Teaching and Learning Strategies.

Discussion

This method is not very appropriate as the subject is technical and requires some underpinning knowledge. Opinions are not normally expressed as the material is factual. However this method could be used at the end of an exercise or at the end of the course. In fact the course does use this method is used to evaluate the feelings of the students and considers any recommendations that they may make as a class. However the course must run in a clearly defined way as laid down by the sponsor the Ministry of Defence.(MOD RAF)

Teaching others

Teaching others is not generally used as the students would be required to fully understand the subject before they could teach someone else. As it is most likely the first time they have seen this subject material it would be difficult for them to explain it to a colleague. Although a similar technique is used by the teacher when they ask the student to explain how something works, this method of telling the teacher shows that the student understands fully, also any omissions or errors can be corrected by the teacher.

Choice of methods

Teacher talk The main reason for using this technique is to cover a large amount of theory over a very short time, a lot of information must be

imparted very quickly. This method does not have a good retention rate approximately 5% however when coupled with questioning technique, and a recap of the subject at the end or prior to the starting the next section, it improves the retention as well as checking the students understanding.

ReadingAs with Teacher Talk the students are expected to cover a large quantity of information very quickly. However this method has a poor retention rate approximately 10%, but when coupled with questions for each book it reinforces the knowledge, this can then be checked during a class session. This method is used due to the short time available, students are expected to read the material they cover in class as part of their learning process. This is done during there own time i. e. out of class hours. The questions should identify to the student whether or not they understand, thus prompting them to request addition information or clarification from the teacher at the beginning of the next lesson.

Practice by doingThis method is much better with approximately 75% retention rate. It is used due to the practical nature of the job (hands on). However it can only be used after the under pinning knowledge has been taught and understood. The students can apply the knowledge they have learnt to the practical exercise. The other reason for using this method is due to the nature of the subject. Example It is impossible to show the students the internal workings of a micro processor , therefore the operation is illustrated by performing tasks with the micro processor to prove that it functions in a particular way. The students have to relate this to the theorectial phase of the course, in doing so they should fully understand the operation of the Micro Processor.

Demonstration This method has a reasonable retention rate around 30%. It is used to show the more complex aspects of the course, “ a picture paints a thousand words”. The teacher can use this method to impart complex instructions to the students, the students can ask the teacher questions confirming their understanding, checking and correcting as they go.

Visual This method has a retention rate of around 20%. This method is tied up with demonstration as the students will be watching the teacher perform a task. Learning how to perform the task requires knowledge, understanding and the skills to complete that task. The visual method is instant feed back to the student, they can see how a task is accomplished. This is an important method of teaching as their job will involve watching someone perform a task and then doing the task for themselves to the required standard.

Summary

The various methods of teaching are effective, the reason for this assumption is that the majority of students go on to the next phase of their training, and eventually into a post within the RAF. In addition I have spoken to students that I have taught who have remarked on the course and its content, most all of them say it was a very good grounding for their trade training.