

Developing An IT-Based Pre-Course Balancing Programme For Aviation Students

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Professional practice

In line with Government targets to widen access to higher education in the UK (Clark, 2003; DfES, 2003), the Centre for Civil Aviation [CCA] at London Metropolitan University developed a Foundation Degree in Aviation Management & Operations, which was launched in September 2002. The course was the first of its kind and attracted a diverse group of students (see figure 1). While such diversity was good for Government targets on widening access, it highlighted potential implications vis-à-vis teaching and learning practice, especially in terms of balancing the ability of such diversity in the early stages of the course.

Figure 1. Foundation Degree in Aviation Management and Operations, 2002

Of the 45 students admitted to the course in 2002:

- The average age of the students was 25 years old
- 70% of the students were mature students (over 21 years old)
- 21% of the students were direct school leavers
- 19% of the students already held higher education qualifications
- 42% of the students were already working in the aviation industry at varying levels of experience and responsibility
- 16 different nationalities were represented

Using action-research methodology (see Cousin, 2001; Denscombe, 1998; Kember, 2000; Kember and Kelly, 1993 for discussion on action-research methodology), a balancing programme was developed in the form of an IT-based set of pre-course materials (a CD-ROM). The electronically disseminated set of pre-course materials was initially developed as a means to facilitate subject-specific orientation. However, they were later re-developed in order to incorporate an opportunity for students to continually develop generic key skills. This meant that the pre-course materials were

supportive of the two areas of activity that were brought into focus in the UK by the Dearing Report (NCIHE, 1997): the use of information technology (IT) for teaching and learning in higher education and the incorporation of undergraduate key skills programmes.

The following paper summarises how the IT-based set of pre-course materials were planned, implemented and evaluated.

Research and strategic planning

The use of IT

Aviation is an industry that is heavily reliant on the rapid development of new technologies and CCA staff wanted to incorporate new technologies into their teaching and learning style. Figure 2 provides an outline of the tool that was chosen.

Figure 2. The pre-course CD [1]

A CD-ROM was chosen as the tool for delivering a pre-course balancing programme. The CD-ROM would contain pre-course materials that students from a wide range of backgrounds could study. Students would receive their own copy of the CD-ROM prior to joining the course and the CD-ROM would provide a flexible study option that allows students to practice flexible and independent, resource-based learning. Students would be empowered by being able to study where they like and when they like.

The CD-ROM would be used as a subject-specific orientation tool, introducing students to the concept of the aviation system and the many technical terms that are used in aviation. Having worked their way through the CD-ROM before joining the course, students will have achieved a basic level of knowledge and understanding of aviation systems philosophy and aviation terminology, all of which links into the opening aviation-specific module in the first semester of the Foundation Degree, VA100 Aviation Systems.

Some of the advantages of using IT/CD-ROM's are often discussed (Kulik & Kulik, 1991; O'Hagen, 1997; Race & Brown, 1998) and include that they are: easy to generate, maintain and update; usually require a low work load; are relatively familiar to students; can be enjoyable to work through, can be interactive and non-linear; can prove to be cost-effective (after the initial investment); and, promote flexible and independent study.

The disadvantages of using IT/CD-ROM's are also discussed (Whalley, 1995; White, 1999). For example, White (1999) warns that IT is often concerned solely with

content (e.g. presenting information in text or graphics) and is unlikely to produce a rich learning experience.

White's analysis influenced the strategic planning stages of the pre-course CD. It was felt that the core content and hyperlinks that are provided would deal with the presentation of content while the way in which it is used and the way in which staff facilitate its use will promote more active and meaningful learning (see figure 3).

Figure 3. Promoting more active and meaningful learning

- **PRESENTATION:** A core text known as the 'Flight' (a story that introduces students to the concept of the aviation system). The core text shall be no more than 20 pages long and will include hyperlinks to information boxes and relevant Web sites.
- **COLLECTION:** Students will be given an assessment during induction week that will provide feedback on their knowledge, understanding and recall.
- **INTERACTION:** Discursive workshop sessions during induction week will enable the learner to explain and understand what they have learned.
- **PRODUCTION:** Students will complete a case study exercise that encourages them to produce new resources by using computer-based tools.
- **COMMUNICATION:** Students and staff will enter into dialogue through face-to-face tutorials and a feedback and evaluation session.

Resource-based learning

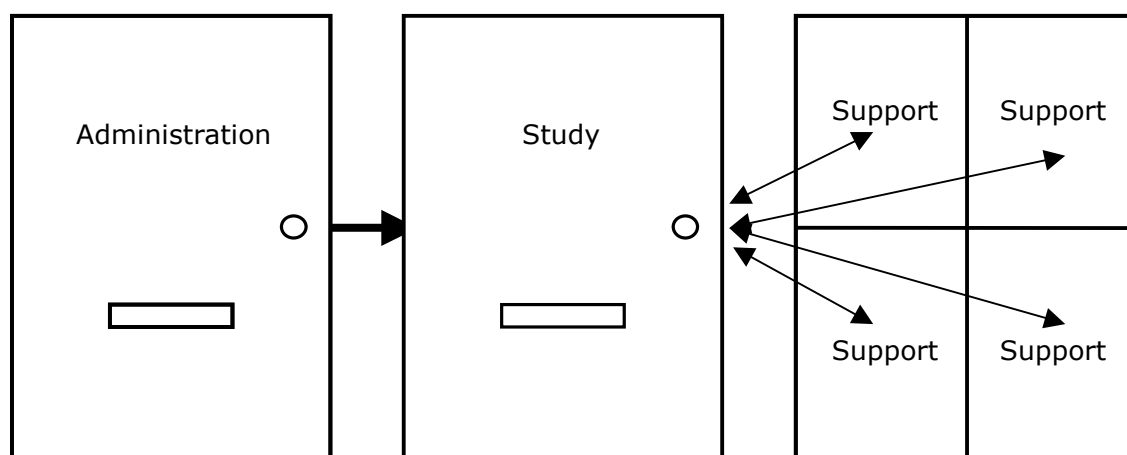
In 1989, the British government began to reduce the unit of resource available to higher education (SSES, 1991). Indeed, by 1999 the money spent on each student was barely 60% of its 1989 level (CESC, 2001; Thompson, 2001). In response, many Universities have developed projects in resource-based learning in order to make more efficient use of their resources and in order to incorporate more flexible and independent learning into the curriculum (Arnold et al., 1994; Creanor et al., 1995; Hilton, 2002; O'Hagen, 2003).

Lisewski & Settle (1996) claim that resource-based learning is underpinned by the philosophical assumption that allowing the learner to achieve learning outcomes in a more flexible and independent manner is inherently better than traditional learning methodology such as the "banking" concept of education, criticised by Friere (1972), in which prescribed knowledge is transmitted to students. However, this assumption does not consider whether the learner (or even the facilitator) is in a position to decide whether such empowerment will prove to be effective.

Despite having such confidence in their students' enthusiasm for the subject area, CCA staff had to be realistic in their assessment of the effectiveness of empowerment and had to consider means of supporting empowerment. This is where the 'structure' and design of an 'appropriate' learning environment (as opposed to the delivery medium *per se*) are suggested as ways of integrating learning technology effectively (Harrison, 1994; Laurillard, 1993; Lisewski & Settle, 1996). This is further emphasised by Rowntree who argues that, "even with most everyday media.....you need to teach your learners how to learn from the medium before you can teach them anything else with it" (Rowntree, 1992; p100). This is where the concept of doorways and windows to learning took prominence.

The concept of doorways and windows to learning (see figure 4) was based upon the theory that essential information in Higher Education is transmitted in an organised stock of knowledge (Lyotard, 1979). The different stocks of knowledge were organised into layers of learning space, something that has proven successful in developing Internet courseware for students at the University of Sunderland (Mansfield & Roberts, 1996).

Figure 4. Doorways and windows to learning



The idea is that students are initially faced with an administration doorway (or route) that provides basic directions for use and highlights the aim and learning outcomes of the pre-course CD.

After students have completed the administration doorway they may progress to the study doorway which basically consists of the core study section known as the 'Flight'. While working through the contents of the study doorway, students are provided with an opportunity to visit support windows by clicking on hyperlinks to information boxes or Web sites. These windows enable students to adopt a non-linear approach to their studies and also enable students to investigate particular subjects of interest in more detail without adding to the text of the core study section.

Implementation

Having been developed by exhaustive, multi-discipline consultation within CCA, the pre-course CD was then deployed to the first in-take of students in the summer of 2002 along with an explanatory cover letter. During induction week, students were provided with further opportunities to go through the pre-course CD before being given an assessment that provided feedback on their knowledge, understanding and recall. A discursive workshop session was held in order to enable students to explain and understand what they have learned. A case study exercise was used to encourage students to produce a report based on what they had learned. Finally, students and staff entered into dialogue through face-to-face tutorials and a feedback and evaluation session.

Evaluation

Lisewski & Settle (1996) suggest that research-based learning innovations should undergo critical evaluation. In line with the research methodology for this particular project, Parlett & Hamilton (1977) recommend an action-research perspective in the form of an illuminative evaluation, the primary aims of which should be to describe and interpret what happens within the learning environment rather than trying to measure and predict objective learning outcomes. This means that an evaluation of the pre-course CD should primarily aim to describe and interpret what has happened in the learning environment.

Despite attempts to design a structured and appropriate learning environment, many students found it difficult to work through the pre-course CD before joining the University for induction week. However, staff and students found that a structured programme during induction week, where progress and learning could be facilitated by staff, led to vastly improved effectiveness.

Staff and students also felt that the materials could provide an even more effective and meaningful learning environment if they were integrated into the curriculum. For this reason, staff and students will be advised on how they can make use of the pre-course CD throughout the course and a study skills handbook (Learning Development Unit, 2003) has been loaded onto the CD-ROM as an appendix. This additional focus means that the pre-course CD has moved from being used purely as a pre-course balancing programme (to facilitate pre-course subject-specific orientation) to being used as a more continuous learning tool, which incorporates the development of undergraduate key skills.

Incorporating a study skills handbook and the opportunity for students to continually develop generic key skills is considered to provide added value to the pre-course CD. However, it is also recognised that the effectiveness of the pre-course CD may well diminish with size and such impacts will be monitored by subsequent evaluations.

Conclusion

Widening access to UK universities will undoubtedly increase the diversity of student backgrounds and their ability to learn. Such change will have major implications on teaching and learning practice in higher education that must be implemented at the earliest possible stage of a course.

This study has shown how one IT and resource-based learning tool, a CD-ROM can be utilised effectively but also identifies some of the limitations of such a tool. When deployed for 'pre-course' usage, much reliance is placed on empowering the student. Although active and non-linear design of such materials has been recommended as a way of improving the effectiveness of empowerment, it does not teach people how to learn from the tool before they actually learn.

This project has shown that 'learning how to learn from a tool before learning' can be achieved by focusing primarily on the structure and appropriateness of the learning environment (as opposed to a 'purely' content-focused approach). However, in order to promote more active and meaningful learning, the learning materials and their medium of delivery should be integrated into an induction programme and the course curriculum in general – they should not replace contact time, they should support it.

End note

[1] Information on the Centre for Civil Aviation and the latest version of the Pre-Course CD (2004) can be viewed at the following Web page:

http://www.londonmet.ac.uk/depts/bssm/aviation/aviation_home.cfm

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