CHAPTER 9

TEACHING PRACTICAL SKILLS

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INTRODUCTION

Teaching practical skills is very different from teaching knowledge or theory and it requires some special considerations. Within an educational institution, the learning of practical skills is most often associated with workshops and laboratories, specialist materials and equipment, smaller class sizes and, frequently, longer blocks of time for practice or rehearsal. For the open and distance learning (ODL) environment, the teaching of practical skills poses considerably more difficulties than the teaching of knowledge and theory.

The first question asked by the teacher who faces the challenge of teaching practical skills via ODL is "How do I do it?" This chapter addresses a number of successful approaches that have recently emerged to answer this question.

Note: For the purpose of this discussion, "practical skills" means skills performed by hand (as in separating the white and yolk of an egg) or with human intervention using equipment, tools or technology requiring guidance, force or movement (as in welding a joint). Practical skills primarily require physical dexterity, although an understanding of principles, processes and sequences is also essential, especially for more complex practical skills.

In many learning environments, the word "competency" has replaced the term "practical skill." The terms are not entirely interchangeable as competencies can also include the application of knowledge and theory not associated with practical skills. But in general, the demonstration of a practical skill can also be described as demonstrating competency.

BASIC CONSIDERATIONS

The environment of teaching practical skills

Generally both equipment and people are required for the development and assessment of practical skills. The problem is that we often limit our thinking in relation to both of these elements.

First, purpose-built facilities, usually established at enormous expense, have been designed to accommodate the specific requirements of the development, practice and application of practical skills. Multiple sets of equipment or tools required for classroom groupings are expensive to establish and maintain. With the increased use of technology and built-in obsolescence, the shelf life of tools and equipment is reducing and creating enormous pressures on the education budget — a budget that in most places cannot keep up with the expanding demands.

Second, the people within the educational environment have most frequently focused on education and training occurring in institutions with specialist teachers or trainers. This has been particularly so in the development of practical skills. The training of specialist staff remains a focus of teacher training, and industry recruitments into the educational sector have strong affiliations with their particular sector of the industry. As a result the engineering staff haven't ventured into the commercial cookery facilities, for example, and the plumbers certainly have not ventured into the music suites.

The creation of specialist training people and facilities has limited our thinking and practice. We need to look to other models that allow us to move in different directions. By creating new models of practice we grant our learners greater flexibility and increased opportunities while reducing the barriers to their learning.

Learning practical skills

Teaching practical skills requires using very precise instructions to enable the learner to follow the process and to repeat the skill. Most often this involves using both visual clues and text or audio prompts. It certainly requires special skills in an instructor if there are no visuals. For open and distance learners, the most frequently used method for teaching practical skills is using print-based illustrations of step-by-step procedures. This method still has its shortcomings, of course, and so alternatives are sought.

Diversity in approaches to learning

A major consideration when teaching practical skills is the diversity in the preferred learning styles of learners. Experiential learners become frustrated sitting through a lengthy explanation of a process; they just want to go and try it out. Theorists need to understand everything in minute detail before they embark on the practical application. Other learners will ask the "what if" questions, and still others will always want to know "why."

Recognising different learning styles is an important factor in assisting learners to develop practical skills. Catering to the different needs is critical for success.

LEARNING MATERIALS

As mentioned above, print-based materials are a valuable tool in providing instruction for the development of practical skills. Other modes that have more recently overtaken print materials in ODL include video and interactive multimedia on CD-ROM.

Video

While slides and film have been used in the past, more recently video has been the preferred medium. With portable video cameras being readily available and not

requiring special lighting or huge production facilities, video is a viable option for many educational institutions. As well, the quality of this technology continues to improve, and the emergence of home video editing suites has reduced its cost. Video editing is a relatively simple process and staff with limited experience can produce a short video without difficulty. While it is not broadcast quality (which remains an expensive business), it is good enough to clearly demonstrate the steps and stages for the processes required to perform the practical skill. It is relatively low cost and can be produced fairly quickly and easily.

Video is a successful medium because it links the audio and the visual together to provide a multisensory experience for the learner. The benefits of video are the ability for the learner to play, replay, pause and rewind to specific sections of the tape. Because practice and rehearsal is so important in developing competency, video is particularly well placed.

One of the great dangers in using video is that the instructor may decide to include too much information, which can confuse the learner. Learners of practical skills must receive clear and concise directions. The KISS rule (keep it short and simple) is an important first principle to remember with video. A video programme with a maximum length of 10 minutes with several shorter segments is much more useful from the learner's perspective. In fact, recent research with young adults in trade-based courses suggests that segments of less than three minutes are ideal.

Lecturers often struggle with this concept at first as their role in education has been primarily to extend the knowledge of learners by providing explanations and examples. But the longer explanations are best left for a face-to-face setting and not stored on video. The medium dramatically changes the style of educational delivery.

While videotapes can be purchased readily in 120- or 180-minute lengths, for educational purposes it is a good idea to avoid these. The longer tapes reduce postal costs and logistical issues relating to storage and control, but frustrate learners who are forever searching for the section they require. The use of 10- or 15-minute tapes is proving to be a very learner-friendly approach.

CD-ROM

CD-ROMs have the capacity to store a very large amount of information in a variety of formats including text, animations, video, audio, and graphics including photographs, diagrams and drawings. Increasingly three-dimensional representation and simulations are a feature of this technology.

The educational design of CDs is an important feature. It can range from a very basic design, much like a book on screen with page-turning functionality, through to a completely interactive experience. The most critical feature is that the product be learner-friendly and not leave the learner feeling insecure or lost.

Clearly, CDs cannot be developed without significant technical skills, and to optimise the learning effectiveness a team approach incorporating a computer programmer, graphic artist, content specialist and instructional designer is the ideal. This raises the issue of cost of development. The most effective option is to buy an already-developed product rather than go into full-scale production. Economies of scale are important.

By using the range of media available, learners can have their learning supported and reinforced in a number of different formats. For example, learners might first view a video, which provides an overview both visually and audibly of the practical skill they are acquiring. The video could be followed by clear digital photographs of the step-by-step procedure with either text prompts or a voice-over to provide additional explanation. An overview of the complete process could occur in an animation, and then the whole process summarised in dot points using text. This multifaceted approach is particularly attractive because it meets the needs of a variety of different learning styles.

The benefits of the CD-ROM format are its capacity to store enormous amounts of information, the range of multimedia that can be incorporated and the cost and ease of replication, distribution and storage. Obviously the technology required to support this approach to teaching practical skills is more advanced and not as readily available as video in most instances.

Online

Online learning is, of course, another creative use of technology in the educational environment. However, this approach needs careful consideration for the teaching and application of practical skills. Extremely good infrastructure is required to enable the use of streaming audio and video, which at present cannot be replicated to the standard established on CD.

Many technical and vocational education and training (TVET) systems are now establishing database-driven clearinghouses to record the availability of learning materials suited to ODL. This enables searches for suitable materials to be conducted more simply. This is particularly important given the proliferation of new materials. Additionally the cost to produce materials is extremely high and it is foolish to undertake such projects if suitable material already exists. While customisation may be required for some particular cultural or technical reason, it is often better to approach the existing developer rather than try to replicate or customise the resource at great expense.

LEARNING ENVIRONMENTS

In taking a broad look at international developments within ODL, there are a number of trends in learning environments that can be easily adapted to most settings. Consider, for example, self-paced packages for study at home, at work or in community learning environments, as well as the significant move to workplace training. Additionally the emphasis of on-the-job training is on the increase. The focus in all of these approaches is clearly on the learner and his or her learning. It removes the emphasis from the people, facilities and tools, although these are still a major consideration.

The development of learning communities or learning partnerships is another significant move in many parts of the world. Based on the concept of lifelong learning, together with the acknowledgement that everyone is a learner and a teacher, exciting new developments enable learning to occur in many different settings. From this perspective, both the community and the workplace are suitable environments to support the teaching and learning of practical skills.

Another trend has been the establishment of mobile classrooms or workshops which allow the movement of facilities, equipment and specialist staff to different locations, although it is restricted to venues linked by suitable transport infrastructure. It allows

the teaching of practical skills followed by the assessment of these skills at some future date after practice in the intervening weeks or months.

Australian mobile classrooms

Mobile classrooms that service regional and remote communities have been established for a number of Australian institutes. The facilities, often built on the back of a large truck, include all the requirements for skills training along with the infrastructure to support them. For example, they all include a generator for electricity, toilet and washroom facilities and some include staff accommodation. Learners are provided with intensive skill development for a short period of time and then given the opportunity of practising the skills within their communities. While some are assessed then and there, many will be assessed by the instructor during the next visit by the mobile workshop.

An alternative model is the use of shipping containers that are modified and delivered for a longer period of time to different locations and then moved on a rotating basis.

Learning centres

The development of learning centres (also known as learning commons or information gardens) are an important development in TVET. A community can benefit by supporting a joint educational facility that supports a range of learning outcomes. This may result in a primary and secondary school, technical institute and university combining resources with a local government body to jointly fund a local facility for extended hours of use. In some examples, local industry also accesses the technological infrastructure on a fee-for-service basis to support their own enterprise or small business. This has been particularly successful in close-knit remote rural communities. A co-ordinator facilitates the learning and the use of the facility and oversees the maintenance and upgrades as necessary.

Partnerships with industry and community

Increasingly partnerships have become a critical feature of the TVET sector, driven by the reforms within the sector that demand closer ties to ensure graduates are employable at the conclusion of their study and that the training is relevant to the industry sector. As highlighted earlier, the increasing cost associated with capital infrastructure, the short shelf life of software, hardware and technology-driven equipment, the diversity in the range of machinery, the variation in processes in competing industries or enterprises and the escalating cost of establishing and maintaining workshops and laboratories are all factors strengthening the need to find new ways of providing training. These include workplace training, on-job training, work-based learning, work experience and the adoption of technology to support self-paced learning in a range of environments. (See chapter 7 for more details on alternative strategies for educational delivery.)

Viticulture in South Australia

Since the mid-1990s, the wine industry has grown dramatically in Australia, and the demand for training seasonal workers for pruning, harvesting and vintage has matched this growth. The infrastructure and resources required to train the staff is enormous. A Viticulture and Wine Studies training programme is provided by the viticulture team across the region by the Onkaparinga and South East Institutes of Technical and Further Education (TAFE). It is only through joint partnerships between industry and providers that the staff required are adequately trained within the specific timeframes.

Theory components are often offered in classroom settings or through self-paced materials in print form or on CD-ROM. However the only real way of learning to hand prune a vine, for example, is by going to a vineyard, applying the knowledge and practising. This is where industry provides the setting, infrastructure and often a supervisor and workplace assessor to assess the learner. This allows particular local variations to be incorporated into the training programme.

The most significant benefits in this model are that the trainee gains employment and the employer gets staff trained to the specific requirements of the vineyard. Clearly it also saves the logistical problems of the training institution of having adequate facilities on which to enable the trainees to learn and practice their skills.

ASSESSMENT

It is always important to consider the role of assessment in the learning process. Both formative and summative assessment are critical elements that need careful consideration in the development and design of any learning experience, but never is the design so important as in ODL modes of delivery. In the teaching of practical skills, the assessment must measure the performance of the skill to predetermined standards.

Too often a written assessment is devised to test the learner. Clearly there are some styles of questions that will enable a learner to describe their knowledge and skills in relation to practical skills. Most frequently, however, a learner must demonstrate competence by successfully performing the practical skill. How, then, is this done effectively and efficiently in the ODL environment?

Formative assessment

Formative assessment relates to the practice or rehearsal of the skill. Clearly this requires time for the learner to master more complex skills, especially if a range of performance criteria are a feature of the assessment process. However, many learners are capable of self-assessment during this period if provided with clear guidelines, which limits the role

of assessment and increases the role of mentoring during this phase of development. Assessing competence is, therefore, conducted after a period of rehearsal.

Summative assessment

The summative assessment relies on the learner's ability to provide evidence of his or her ability to perform the skills. This assessment may have certain performance criteria attributed to it and therefore speed, degree of accuracy, application under certain circumstances or to predetermined tolerances may be a feature. The learner has to demonstrate his or her ability; however there can be a number of people or environments in which this can occur.

Gathering evidence

Evidence of capacity to perform a practical skill can be gathered in many different ways. Again it is valuable to think beyond the traditional learner-teacher relationship and reflect on using key people and tools associated with the learner. By clearly defining the skill to be performed, learners themselves can give some consideration to how they might provide evidence of their ability.

Sometimes viewing an end product created by learners assesses the demonstration of competency. Without applying the skill it would be impossible for them to complete the task. Alternatively they could record their capability on video by demonstrating the practical skill. This method requires additional human and physical resources and is not always feasible or practical. Other examples use validators to verify that learners in an industry or community setting display the skill. Feedback from an employer, supervisor, customer or peer is a useful measure in gathering evidence.

Widespread learning for community health

The Community Services and Health Program of the Spencer Institute of TAFE, based in regional South Australia with branches in Queensland and Adelaide, has many part-time learners in regional areas, thousands of kilometres away from the lecturer. To support them, the institute has developed excellent print-based materials that are posted to learners' homes. The lecturers provide excellent support by fax, phone and e-mail and have extensive resources that learners may borrow through Learning Resource Centres. These include reference books, videos and audiotapes.

Many of the modules include the development of practical skills. These are usually demonstrated for the learners on videotapes, but to show competence, all learners must arrange to attend a campus of the training provider, which has suitable equipment to enable the assessment to occur.

Where there are a number of practical skills required to complete a module, they will all be assessed at the one time if practicable. For some courses where there is a compulsory face-to-face induction workshop to commence the programme, many practical skills are taught and assessed as a part of this initial activity.

An alternative to workplace assessment that supports learning at home or in the workplace is the approach that allows the learner to learn in an environment that suits his or her needs and then requires him or her to attend an assessment centre. This may be a local venue, technical institution or other community facility which has a suitably qualified assessor as well as the equipment required to enable the learners to demonstrate their practical skills.

Workplace trainers and assessors

One approach gaining wide acceptance is the use of workplace trainers and workplace assessors. Many individuals will have both qualifications while others may only concentrate on the assessment role. Workplace trainers and assessors are most often existing employees with higher level skills who oversee the learning of staff in the workplace. They are frequently the supervisors of employees who are developing or upgrading their skills base. Workplace trainers and assessors must complete a training programme to understand the essential elements of learning and assessment. Once qualified, they support learners and the learning process within the workplace.

Workplace trainers and assessors perform their tasks on behalf of the certifying training organisation. Maintenance of standards and quality assurance issues therefore remain the responsibility of the certifying body, which is important to preserve the integrity of the qualifications being issued.

With this model there is a major investment required in human capital, course development and training for the implementation of a model based on workplace training and assessment. However this approach does have many benefits in terms of building a strong training culture within industry and in reducing the replication of expensive public education facilities and infrastructure.

Recognition of current competence

The recognition of current competence (RCC), otherwise known as the recognition of prior learning (RPL), is a feature around which entire pre-assessment centres are now being established. This approach acknowledges that many learners come to a course of study with existing knowledge or skills. For others, their life or work experiences may have provided them with all the skills required for certification at one or more levels, yet they may have been denied the opportunity for formal study and recognition of their skill base.

RCC is a useful tool to acknowledge the skill base in a community or workplace and establishes the credibility of skilled individuals, who may have formerly been untrained or unqualified, to provide a supervisory or validatory role in the learning experience. It requires the demonstration or evidence of practical skills in some form for assessment purposes.

CONCLUSION

In considering the role of teaching practical skill development in ODL, there are a number of issues that must be carefully considered. Clearly there is a need for learners to follow instruction, to practise and to demonstrate their competence where the learning of practical skills is involved. This will always require the support of skilled people and

a range of tools or equipment to enable the skill development. However, more and more creative approaches to practical skills development are emerging and most can be adapted to local settings.

The emergence of new models for educational delivery and assessment is increasing the learning opportunities. These more flexible approaches frequently involve joint partnerships with industry or community entities, but the benefits for the learner, the employer and the training provider generally outweigh the complexity of the arrangements.

Considerable thought must go into the adoption of many of these models as the initial set-up requires considerable capital investment. What is not frequently understood is the need for ongoing capital as technology is a consumable because of its built-in obsolescence.

The use of public funds to encourage a training culture within industry and a collaborative approach to the use of industry standard equipment and facilities, which reduces demand for public resources to duplicate workplace environments, are fundamental issues to be addressed when considering limited education budgets. The movement of resources to empower different people and facilities to be accessible for training opportunities is a feature which needs careful consideration by policy-makers.

Without a doubt, the commitment to educational resources, especially educational technology to support ODL, must also be a high priority. The strategic use of these resources is a major consideration and a closer analysis of the particular options is critical. By focusing on the learner and the learning outcomes, educationalists can significantly reduce the barriers and increase the opportunities and flexibility offered to their customers.