



Skill sets: an approach to embed employability in course design

Sharon Cox and David King

*Department of Computing and Information,
University of Central England in Birmingham, Birmingham, UK*

Abstract

Purpose – The purpose of this article is to demonstrate an innovative approach to embedding employability in the design of a university degree scheme using skill sets.

Design/methodology/approach – The paper looks at conventional approaches to course design, which begin with the resources already available within the higher education institute. The skill sets approach, however, begins with employers because they are the ultimate arbiters of employability. Employers working with the academic design team define coherent portfolios of skills: definitions which are then used to provide shape and form to the new degree scheme.

Findings – The paper finds that employers can identify skill sets that relate to long-term employability as opposed to short-term employment. These definitions can usefully inform the design of a degree scheme.

Practical implications – The approach of this paper may benefit the design of degree schemes that aim to educate a graduate to fulfil an identifiable role in industry. This approach is based on defining the continuing intellectual and critical thinking skills that enable a graduate to fulfil a role, rather than the immediate task-related skills that enable a graduate to fulfil a job. The involvement of employers in formulating a portfolio of graduate skills can be applied to the design of other schemes.

Originality/value – This paper presents a new approach to making employability the priority when developing a new degree scheme.

Keywords Employment, Education, Universities, Curriculum development

Paper type Case study

Introduction

Employability, the ability of a graduate to gain employment appropriate to their educational standard, was the focus of the Dearing Inquiry (Dearing, 1997) into higher education (HE) in Britain. Although the practical details of achieving “employability” in a university curriculum were not set out, the report represented a shift in the priorities in HE. Traditionally, universities have had two functions: “to prepare the élite to govern and . . . provide an institutional basis for research” (Jarvis, 2000). However, universities now need to focus on employability, preparing students for work. This paper proposes an approach to implementing employability as a priority into the design of a new undergraduate course and reports its application in a case study.

The paper begins by considering what is meant by employability for the different stakeholders, and how it affects the offerings of HE institutes. The different perspectives of stakeholders are then used briefly to review a previous undergraduate degree scheme in the Department of Computing and Information at the University of Central England in Birmingham. An approach to embedding employability to meet the



general concerns of stakeholders using skill sets is then outlined. The definition and use of skill sets to shape the design of a new undergraduate degree scheme in the Department is discussed, demonstrating the application of the approach. The paper concludes by reflecting on the suitability of skill sets in course design.

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The stakeholders in employability

Employability was highlighted as a concern for employers, and was the focus in a major study (Harvey *et al.*, 1997) that was used to inform the Dearing Inquiry into graduate education. This meant employability became an issue for the providers of graduate education, and so also an issue to those who should be the prime beneficiaries of being employable, the graduates themselves. The UK Industry and Parliament Trust's Study Group on employability reported that "employers are not satisfied with the quality of young people and graduates coming into the labour market" and that "this challenge can only be met through a partnership involving individuals, parents/guardians, educators, employers and government" (Clarke, 1997).

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Employability for students

Employability is an issue of direct concern to students. The prime motivation in attending university for the majority of students is not to study a particular subject in depth, but to enhance their employment prospects (Stewart and Knowles, 2000). Reinforcing this attitude in the UK is the government's move away from grants to loans as a means of financing a degree. A student's decision to continue in education instead of joining the work force means not only foregoing potential income that could be earned for the duration of their course, but also incurring additional costs. This can only be seen as a rational decision in the expectation of enhanced earnings later (Woodley, 2001). To assist in their choice of university, parents/guardians and students are using the published destination tables as a measure of a university's success in achieving employable graduates, so making employability an issue for universities.

Employability for universities

The success of a university's graduates in finding work translates into better destination table results. This can mean attracting the more able prospective students, who, with everything else being equal, should be more employable owing to their greater innate abilities. Thus, a university could initiate a virtuous circle, to the benefit of all three interested parties: themselves, students and employers.

Employability for employers

Employability is not the same as employment, just as education is not the same as training:

To be employed is to be at risk, to be employable is to be secure (Hawkins, 1999).

In this context, employability means that a person possesses the capability to acquire the skills to do the required work, not necessarily that they can do the work immediately and without further training.

Employers are looking for a more flexible, adaptable workforce (Clarke, 1997; Bennett, 2002) as they themselves seek to transform their companies into being more flexible and adaptable in response to changing market needs. As part of this flexibility,

companies also seek to hire and fire their employees more readily. Many of the implications of these changes were first postulated by Handy (1984) and while the patterns of change have not been equal across the economy (Nolan and Wood, 2003) there is the perception of the end of “jobs for life”. Employers no longer offer that degree of long-term job security to their employees and it is expected that employees may have a number of careers during their working life.

This highlights two aspects of employability for a graduate to offer a potential employer:

- (1) transferable skills – those applicable throughout a working life; and
- (2) subject skills – those more relevant to each career.

Employability as transferable skills

Harvey *et al.* (1997) showed that supplementing a graduate’s education in a subject specific discipline with a range of key skills, such as communication and teamwork, was beneficial to a graduate’s job placement. This research was used in the Dearing Inquiry, which recommended there was a need to incorporate “graduate skill proficiency” into the curriculum (Dearing, 1997). Dearing thus set the agenda for employability, since when it has become largely synonymous with transferable skills.

The idea of employability as transferable skills has been reinforced by changes in employment patterns since 1997. As companies down-size they require staff to attend to a wider range of tasks than hitherto, as well as looking to be more flexible in meeting the needs of their customers. This requirement is reinforced by the changing pattern in graduate recruitment, which sees more graduates employed by small and medium-sized enterprises (Stewart and Knowles, 2000). These firms do not offer the same training and development opportunities as do the larger, traditional employers of graduates. The notion of first jobs in which graduates could develop their “employability” skills at an employers’ expense is disappearing (Davies, 2000). Dench (1997) summarises this as graduates are sought who possess work-related skills in addition to their subject specific skills.

Employability as subject-specific skills

Possession of transferable skills alone, however, does not guarantee employability for graduates. They still require subject-specific skills. Nabi (2003) shows it is the portfolio of skills a graduate could offer an employer that is the differentiator not just in gaining employment, but between employment and underemployment – the distinction being whether the job is appropriate to the graduate’s educational achievement.

Students usually leave university with a good appreciation of their chosen subject as they have studied it intensively for the previous few years (Cottrell, 2003). However, the individual subject skills may still not fully meet employer requirements, as there is a tension between formal education and vocational training (Foley *et al.*, 2004). While both are seeking to impart “skills”, there is no clear, formal and universally accepted distinction made between skills acquired through education and those acquired through training (Bennett, 2002). Yet these “skills” have differing consequences for a person’s development needs and employability.

Education at graduate level, with the emphasis on developing critical and analytical thinking in a student rather than didactic knowledge, develops a student’s general employability rather than enhancing their prospects for direct employment in a specific

job. Training, in contrast, focuses on providing the skills to accomplish a specific task. As general policy puts the emphasis on the individual to acquire the skills they need for “employability”, so the lack of common terminology creates problems (Skinner *et al.*, 2004), with students, tutors and employers having different priorities. However, the ultimate arbiters of employability remain employers.

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Embedding employability in courses

Neumann and Banghart (2001) describe the relationship between industry and academia as a “gap to be bridged”. This gap has been reported in a variety of domains including human resource management (Thacker, 2002), retail (Nicholson and Cushman, 2000) and textiles (Wright *et al.*, 2002). HE institutes use a variety of methods to attempt to bridge this gap by involving employers in the design, delivery and assessment of courses.

Collaboration in course design

An Australian company contributed to course design by setting the learning and development outcomes for the courses on which it placed its apprentices (Davis, 2004). Garrick *et al.* (2004) highlighted the value that academe could bring to such ventures, which was mainly through encouraging reflective thinking, and thereby ensuring that the work-place experience was converted into learning with longer term benefits to the company. However, a danger of this method of involving employers is that the learning outcomes are too closely tied to the specific employer, that the programmes become that of a “technical school” or lack the affective skills needed or long-term success in the profession (Wright *et al.*, 2002).

Collaboration in course delivery

When the educational institute is the instigator for the co-operation, employability is often embedded into the curriculum through work-based exercises and learning. These are achieved either by employers visiting the institute as a guest speaker or with students having a small placement with an employer. McHardy and Allan (2000) suggest that students need to develop the ability to learn the way practitioners do. Role-play simulations provide students with the opportunity to undertake problem-solving tasks in a “real world” situation. Similar experiences are reported in different fields by Mathiassen and Purao (2002) and Neumann and Banghart (2001) where “real” companies act a clients in requirements gathering exercises.

Collaboration in course assessment

Some institutions involve employers further in course assessments. In the UK, Freeman (2000) documented problems of businesses for students to research. Students then presented their findings directly to the clients who found the assimilated information and recommendations from the students useful. In addition to helping students to develop their problem-solving skill, both students and employers reported an improved understanding of each other’s perspective (Freeman, 2000).

The importance of employability and the potential benefits of engaging employers especially with regard to employability were factors considered when the Department of Computing and Information at the University of Central England began to consider re-designing the Department’s core undergraduate scheme.

Background to the re-design: the core degree scheme

The University of Central England in Birmingham is a large, urban university focused on delivering vocational education. The Department of Computing and Information core degree scheme, BSc Computer Science and Information Management was due for its second revalidation. Although the scheme still enjoyed buoyant recruitment, the economic downturn raised concerns about graduate employment across the sector. The revalidation was taken as an opportunity to redesign the course to enhance students' employment prospects and embed employability into the course.

The existing degree scheme was based on modules that were sized to align with semesters. This offered advantages and disadvantages.

From the student's perspective, students liked modules as they made it practical for them to swap modes of study and to achieve interim awards, important for those unable to continue their studies for the three years required to achieve a full degree. Modules also permitted the students' great flexibility within the course; they could study the topics that interested them, and change course altogether within the scheme should they so choose. However, this also led to the loss of a sense of community as this approach meant that students did not form coherent groups progressing together for the duration of the course. This absence of mutual support networks exacerbated problems in maintaining engagement and progression rates.

From the department's perspective, modules and semesters meant that the Department could offer a February intake, which was popular with overseas students (many of whom have an academic year aligned with the calendar year) and HND students transferring into the second/third year of the degree scheme. Although modules permitted freedom of choice to the students, they were not without problems. While academic flexibility was achieved, it became difficult to track students' progress as each formed their individual programmes of study.

From the employer's perspective, giving students as free a choice in their programmes of study as possible meant there was a proliferation of degree titles and awards. This is in common with other local institutions, one of which offered 37 combinations of titles within their computing degree scheme. In extreme cases, a student's award could only be deduced in retrospect, by tracking which modules had been studied and awarding a title accordingly. The various titles, and underlying module combinations, meant it was not always clear to a prospective employer exactly what had been studied.

The re-validation of the programme was an opportunity to address these issues. The following section presents the skill sets approach that was used to embed employability into the design of the new course: Computing, Business E-systems and Technology.

Skill sets approach

To accompany the development of a new course with employability as a priority, a new method of course development was adopted. The design of previous courses had been resource-driven, developed based on exploiting existing teaching materials and tutor specialisms. However, to ensure that employability was given pre-eminence in the course design an employer-driven approach was adopted based on what happens to students after, rather than during, their time in HE. Thus the starting point for the redesign was with employers and not academic staff.

Interviews with previous recruiters of the Department's graduates and placement organisations were undertaken to attain direct feedback on what employers considered was required for student "employability". The feedback supported the view that in addition to relevant technical skills, a student requires a general appreciation of computing and information systems in business, and of soft skills such as teamworking and communication. These findings were used as the basis for the definition of subject specific, domain specific and transferable skills to be included in the new course, the learning outcomes by which they would be assessed, and the route a student would take through the course.

The identification of skills sets

From the interviews, four subject skill sets were identified, broadly based on the systems development life-cycle of analysis, design and development, shown in Table I. These four skill sets approximate the established industry roles of business analyst, systems analyst/designer, systems developer and software engineer respectively. Thus, a vocational focus could be assigned to each skill set in line with the university's mission. The new undergraduate scheme, from the viewpoint of the Department, would be one logical entity to best exploit the overlap in requirements, rather than be run as four totally, separate degree schemes.

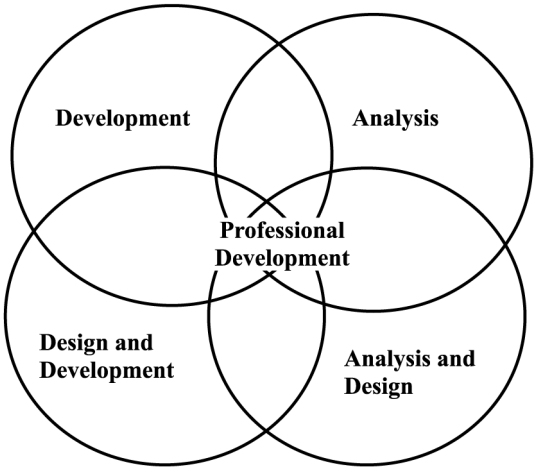
The four skill sets do not exist in isolation. The interviews identified that employers expect their computing staff to have a broad understanding of the domain skills needed in systems development, of the wider context of computing in general and its role in business. This suggested the need for a common set of core modules. The breadth of the foundation in general computing sought by employers led to the development of a common first year, with the specialisation of subject specific skills only applying in the second and third years.

Employers also expected students to possess transferable skills. In discussion with employers, a sub-set of soft skills was identified that included communication, analysis, design, evaluation, ethics, project and process management skills. These professional skills were applicable across all four skills sets and could be incorporated in a common core to the course. These transferable skills remained as common modules delivered to all graduates throughout the three years of the course. This is shown in Figure 1.

Skill set	Description	Role	Pathway
Analysis	Conceptual modelling of a business problem	Business analyst	Information systems
Analysis and design	Logical modelling of a design	Systems analyst/designer	Business information technology
Design and development	Physical modelling of a solution	Systems developer	Computing
Development	Technical modelling of an application	Software engineer	Software engineering

Table I.
Skills sets by role

Figure 1.
Inter-relationship of skill
sets



Delivering skill sets in the course: three layers

The interviews also demonstrated that employers sought a depth of understanding in the Department’s graduates. This concept was encapsulated as three layers: theory, tools and application (Figure 2). As the course comprises the equivalent of three years of full-time study these layers were used to define each year’s study. Year 1 provides the theoretical foundation of the course. Year 2 facilitates learning of the tools required in each skill set. Year 3 provides the opportunity to apply the tools from year 2 and the theory from year 1 in a specialised context.

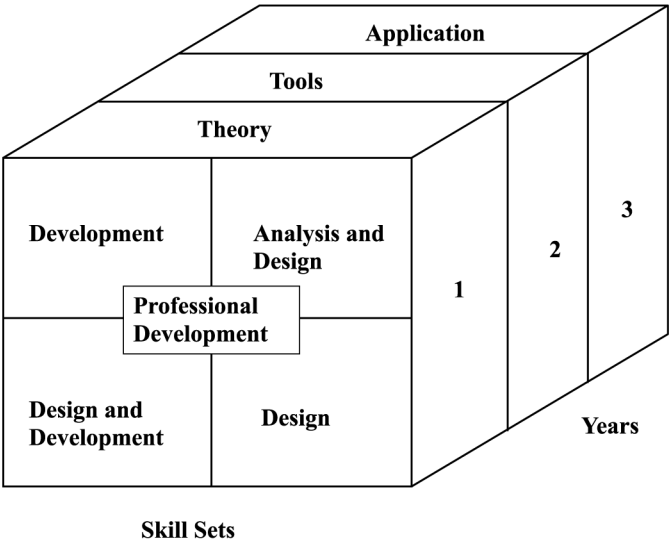


Figure 2.
The four skills sets
mapped across three
layers

Shaping each layer of the course: overlapping sets

Year 1 modules are compulsory for all students and so meets industry's need for students to have a common understanding of the complete systems development process and the associated skills. In addition, the common first year provides students with the opportunity to experience each skill set and identify their personal strengths and career paths. Year 1 consists of five modules; one module which provides the theoretical foundation for each skill set; the fifth module provides students with the opportunity to integrate skills from each skill set through a workshop based activity promoting the development of professional skills.

At the end of year 1, students choose which direction they wish to pursue in the following years of the course. The first year professional development module provides students with guidance on evaluating their personal skills and interests to help them choose the direction they wish to pursue in year 2. There was considerable debate as to whether in years 2 and 3, core modules existed within only one set or in the intersection between two sets. It was agreed that core modules in year 2 are determined by the overlap of two skill sets in which they may later specialise. Optional modules are chosen from the related skill sets and professional development is a core module across all skill sets. Hence, the second year module "Databases for Business" is a core module on the Information Systems pathway, and an optional one on the Business Information Technology pathway; whereas, "Database Application Development" is a core module on the Business Information Technology pathway, and an optional one on the Computing pathway. Students were thus constrained to study logical combinations of modules (see Figure 3).

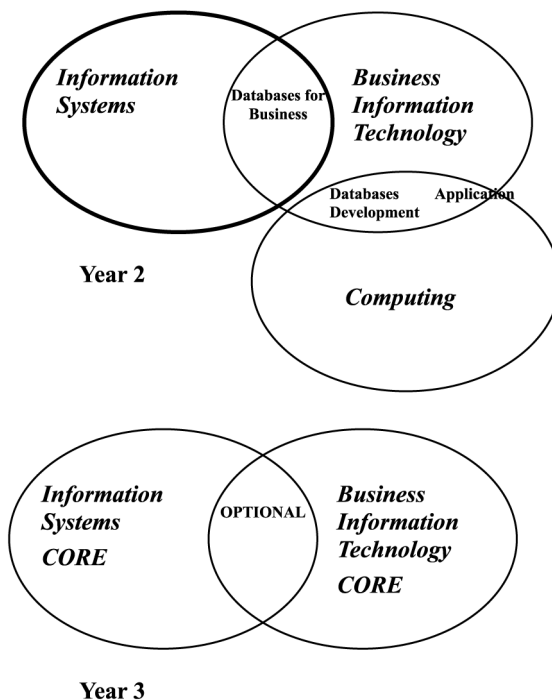


Figure 3.
Shaping years with skill
sets

Year 3 provides students with the opportunity to specialise fully in their chosen skill set and apply the tools and theory from earlier years. Core modules are positioned entirely within one skill set; optional modules may be selected from related skill sets included in the intersections. In addition, students must successfully complete a project in their related skill set. This enables the course to be extended to incorporate degree minors. Minors can easily be incorporated by the addition of one module in a relevant skill sets and an associated project in that area.

The Department's perspective: delivering pathways

The skill sets model addressed the issues of ensuring a student possessed a coherent skill set, a breadth of understanding of the computing and information systems, and developed professional non-subject specific work skills. In translating the model into practice, issues surrounding modularisation arose. The standard 15-week single module did not allow sufficient time to develop and explore ideas. This was particularly true for modules where reflective thinking was required. Consideration was given towards moving back to a yearly-based delivery; however, this would have meant a loss in operational flexibility and the loss of second semester entry to the programme. There had been a few double modules in the previous scheme and these had worked well, recognising that a double module need not mean double the content, but rather double the intellectual challenge. Thus, in the first year double modules allowed for greater time to read and develop basic knowledge, whereas in the third year the time was available for evaluation and reflection. The use of double modules was adopted as the norm and single modules became the exception.

The student's perspective: specialist pathways

The skills sets were translated into four routes to be studied in the second and third years. These routes were specifically not modular, but focused pathways leading to a major award (Table I). Each pathway included an explicit statement of the career objectives and potential job titles to assist the students when choosing their pathway.

Skill sets constrained student choice and ensured that students could no longer select an inappropriate mix of modules. As students followed a supportable, guided path in their studies, the sense of community could be created among the student cohort studying each skill set.

The link between pathways and career objectives provided a clear anchor to the course designers when considering which technical skills each pathway had to include. This focus also facilitated more effective collaboration with industry, particularly when inviting guest speakers.

The option of a sandwich placement was retained from the previous scheme. Students who had completed a placement were known to be more successful in gaining employment after graduation. The pathway approach gives more focus when matching placements to students.

Closing the loop: employers

Employers fulfilled a pivotal role in the development of this course. Employers' views formed the basis of the redesign, identifying the skills sets and the layers. The success of involving employers with the course redesign was in large part due to the adoption of skill sets. Feedback from employers showed that the skill sets provided a coherent

model for discussions: the language used to describe the skill sets was comprehensible to businesses.

Employer involvement did not end with the initial interviews; several became members of an employers' forum. Through this forum, the views of employers are regularly sought in evaluating the course and maintain focus on the fundamental question: "If we equip our graduates with these skills, would you employ them?"

The skill sets approach, while involving employers, avoided the problem of defining a set of learning outcomes too specific to a particular employer. The approach also avoided the problem of demanding an unrealistic commitment from employers. Skill sets represent a pragmatic compromise in terms of investment of employer time in developing the course to best meet their needs of prospective graduate employees.

This liaison proved beneficial in establishing confidence in the new course design and ensured that employability issues were being successfully addressed. The meetings and interviews were a means of eliciting effective feedback on the evolving course design, a process made easier by the mutually comprehensible language of skill sets.

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Reflecting on the approach

The defined skill sets provided a simple model with which to communicate the nature of the course to all stakeholders. The course validation panel received this model positively as both academics from outside the department and industry representatives were able to understand the underlying philosophy of the course quickly.

A potential weakness of using skill sets is that they are based on a static snapshot of employers' opinions. Yet, employability has such a high profile because we live and work in a dynamic world: flexible, adaptable workers are required in response to the continuing changes faced by employers.

Skill sets can develop flexible, adaptable workers if the emphasis remains on education, not training. The learning outcomes are based on acquiring higher intellectual skills focused on particular roles in industry, rather than on the specific knowledge and understanding of selected tools that a person in that role might use. This addresses the relatively minor problem of roles evolving in organisations, and new job titles emerging. The graduate should have the transferable skills to manage this change, and sufficient subject skills to adapt to the new technical demands.

A more serious problem is the development of totally new roles in industry, for the skill sets are necessarily tied to current needs more than to future ones. In defining the skill sets with employers, emphasis was placed on broad skills rather than immediate job vacancies. There was some discussion on this topic in the interviews, and the demand for multi-media and web specialists was accommodated by the inclusion of a degree minor. The increasing demand for security specialists and e-learning specialists may also be addressed by the development of minor options instead of dedicated pathways. There is, however, a natural constraint to developing speculative pathways: students will not register for unfamiliar offerings.

The approach adopted to address these concerns with skill sets is to maintain the involvement of employers. This means the act of "closing the loop" cannot be a one off event, but rather a continuing process with further interviews and discussions through the employers' forum to keep abreast of their changing demands.

Next steps

Initial feedback from students is favourable as to the content and style of the modules, however, as the first cohort has not yet completed the programme the impact on their destination results is not yet known. However, feedback from organisations involved in placements and initial recruitment enquiries has been positive.

The vocational skills sets approach, with involvement of relevant employers, has also been used to re-design the Department's post-graduate computing offerings. The analysis identified three skill sets, which owing to differences in the student cohort are offered as separate degrees with common modules.

The skill sets approach has proven applicable within the Department, and will be used to assist in the re-validation and design of further courses. At a lower level of granularity, skill sets underpin the design of the e-skills programme, which integrates "guru" lectures as part of the curriculum.

Conclusions

Skills sets embed employability into the course design. In this case, the identification of skills sets in conjunction with relevant employers has informed the design both of the overall course and of the individual modules that comprise the undergraduate degree scheme.

From the Department's perspective, skill sets provide a clear model with which to explain the degree scheme to parents/guardian and prospective students and ensures that students pursue a coherent pathway in the degree scheme.

From the student's perspective, they follow a programme that constrains and guides them to achieve a coherent, employable skill set. The students achieve this by developing key skills and knowledge in line with the skill set model: common core competencies with specialist pathway knowledge. This gives students a clear focus in what they are to do, and how it will relate to their career after university. This leads to the ultimate goal of achieving qualifications aligned with roles in industry.

From the employer's perspective, subject specific, domain specific and transferable skills are developed within a coherent and visible programme of study.

This paper has shown that employability can be used to inform the design of a course through translating employability into skills sets. Experience in redesigning the Department's core degree scheme demonstrated success through using employability as the starting point for the redesign, rather than as a checklist to be referenced once design had begun. This was achieved with the direct involvement of employers to identify skill sets. Further, as employers are the ultimate arbiters of employability they remained involved throughout the design process, but the design itself remained owned by the course tutors. Skills sets have been used in the same manner to redesign the Department's post-graduate degrees.

The skill sets approach focuses on jobs and their matching skills; hence, the approach should be applicable to other disciplines, particularly those with a strong vocational element, where graduate jobs can be defined. The approach goes beyond transferable skills, often considered synonymous with employability, to encompass the full range of skills, technical and non-technical, that a graduate will require to be considered employable, and does so in terms that employers understand.

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Corresponding author

Sharon Cox is the corresponding author and can be contacted at: sharon.cox@uce.ac.uk