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# Establishing a skills and employability audit and some devices for establishing skills in the syllabus

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## Abstract

This paper looks briefly at aspects of typical skills and employability policies for undergraduate attainment, to see what we can learn from them, and how they might be implemented. It then uses a published, 'specific key skills' statement, which lists seven basic skill attributes (such as numeracy, ICT etc) on a year-on-year approach (corresponding to entry level to university and at the end of each of three years on an 'English' university programme). Possible methods of modification for GEES subjects, by the addition of a further two attributes, are then outlined. An example for one year is presented as one of four yearly lists. Assessment is then linked with the skills associated with more specific elements that are included in these nine attributes. Together, skills and assessment might form part of an audit. Ways of explicitly embedding skills in a programme, using learning designs for activities and tasks and by the identification of 'skill objects', are then explored. Skill objects can be matched to one or several of the listed skill attributes or elements. Examples are given to show how this concept might be used at a departmental level.

## Introduction

Employability is a focus for government policy for Higher Education (HE) and, hence, for HE institutions. Some perspectives can be found in recent papers by Yorke (Yorke, 2004; Yorke and Knight, 2004), Gedye and Chalkley (2006) and Moreland (2004). Accordingly, as there is a tendency for policy making to be top-down, we may have statements about employability skills (or skills and employability) with which everyone can, at least notionally, agree. The difficulty is the grass roots implementation, and a real problem is how to work out requirements at a departmental level. An audit is one way of investigating the extent to which a module or degree programme incorporates 'skills'. This paper investigates ways in which an audit might be developed and implemented.

## Skills and employability policies

It is taken it as read that there is such a policy for your institution. The following statement, from The

Queen's University of Belfast (QUB), is probably typical:

1. Key skills: 'A set of generic, transferable skills that are essential to every individual's personal development in his/her education, work and everyday life':
  - Intellectual (includes critical, analytical and creative thinking, and problem solving)
  - Communication
  - Information and communication technology (ICT) and information management
  - Numeracy
  - Improving own learning and performance
  - Working with others
2. Subject-specific skills: 'A set of skills essential to the understanding and practical application of knowledge within an academic discipline and/or a vocation/profession':
  - Defined according to national subject specifications and benchmarking criteria.
3. Employability skills: 'A set of skills which enhance achievements in learning and facilitate transition into effective performance in the workplace':
  - Management of self and others (includes effective relationships, teamwork, time management, change management and effective leadership)
  - Negotiation
  - Networking
  - Presentation
  - Career management (includes self-awareness, business/organisational awareness, action planning/job search, entrepreneurship).

Amongst other things, notice that 'presentation' occurs under 'Employability', but it could also be construed under 'Key skills'. Similarly, 'numeracy' is under 'Key skills', but employers say that they want numerate students (Archer and Davison, 2008) and so this might be included under 'Employability'. Hence, this is perhaps too broad a categorisation,

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with overlaps. Indeed, the lists of skills presented in Archer and Davison are similarly broad and, indeed, somewhat vague. The following schema is perhaps better (from QUB 'Employability and Skills Policy').

Cognitive/intellectual skills, which include being able to:

- Identify, analyse and solve problems by prioritising tasks, coping with complexity, setting achievable goals and taking action
- Work with information and handle a mass of diverse data, assess risk and draw conclusions (analysis, attention to detail, judgment)
- Apply subject knowledge and understanding from the degree pathway.

Professional attributes/attitudes, which include:

- Possessing high level transferable key skills, such as the ability to work with others in a team, to communicate (both orally and in writing), influence, negotiate and resolve conflict
- Displaying interpersonal sensitivity, global and cultural awareness, moral and ethical awareness and being able to adjust behaviour accordingly
- Having the ability and desire to learn for oneself and improve one's self-awareness and performance, to uphold the values of lifelong learning and demonstrate emotional intelligence
- Demonstrating confidence and motivation to start and to finish the job, adaptability/flexibility, creativity, initiative, leadership, decision-making, negotiating and the ability to cope with stress

Technical skills which include being able to:

- Demonstrate the knowledge and experience of working with relevant modern technology
- Apply and exploit information technology

Business and organisational skills, which include being able to:

- Appreciate and understand how businesses operate, for example, through having had experience of the workplace
- Be aware of organisational culture, policies and processes
- Develop the ability to communicate (orally and in writing) within a business context
- Understand basic financial and commercial principles
- Appreciate and demonstrate enterprise and innovation

This is more helpful than the former list, but it's still a top-down approach. Further, and like most terminologies, it includes actual or potential overlap and does not actually bring together similar skills. It also has to be said that the lists are a little

vague. These broad groupings of skills are usefully termed (skills) attributes. Rather than show the detail that would be required to deliver a skill in a learning design, or produce as a learning task, it just makes a list. It is all very well to have a Skills and Employability policy, but what does that policy actually say? How is it to be delivered at a programme or module level? For such lists to be effective, they also need to be associated with Learning Objectives and, in some way, integrated with assessment procedures.

## Audit procedures

Washer (2007) has recently discussed and reviewed some of the issues mentioned above, and they have been elaborated upon with respect to the nature of a GEES degree by Whalley (2008). Here, modified versions of Washer's original year-by-year expectations are presented in the light of GEES-related issues and benchmarking. Washer divided up the key skills into sections (attributes) related to: Communication, Working with others, Problem solving, Numeracy, ICT, Learning how to learn and Personal and professional development. Within each of these, there is further division into skill 'elements', with a representation of how he considers the skills might be implemented at each of four levels (stages or years). These levels are: Entry to university, End of Level 1, End of Level 2, and at Graduation. This is helpful, as the scheme can be used to show progression over the undergraduate period. It also links to PDP by suggesting the skills at entry and at the end of the year, thereby indicating things to be done within of a department's PDP programme.

Here, then, is one audit that can be set up directly. However, from a GEES perspective, there are other attributes beyond the seven Washer suggested. I have added two further attributes, 'Graphicacy' and 'World skills'. The first is obvious, and uses a term which, if inelegant, has been in the literature for some time, as argued by Balchin and Coleman (1966) and Wilmot (1999). By 'world skills' I mean more than general knowledge, but a spatial appreciation of world finance and globalisation, ethics, information and knowledge sharing and flow, and the media, and incorporating some of the ideas of Gardner (2007). Of course, all of the topics could be argued about, for inclusion or exclusion. However, the list is useful as a first approximation. Further, it can be used to audit a programme, year/level/stage or an individual module. Figure 1 is the 'Modified Washer' (nine attribute) scheme for the end of year 1. To aid implementation, a code for each of the nine attributes (Communication etc) has been provided. Skill elements can be added, relocated or removed as needed. For example,

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I moved 'Possession of a CV' from Washer's Graduation Level to Level 1, as it is part of our (QUB Geography) PDP programme.

On the basis that for something to be done effectively by students, then it should be assessed, two columns for assessment have been added. This allows a module design to look at what it says it will do in terms of skills delivery, and relates these to assessment processes. At QUB we specify if a skill is taught, practised or assessed. A module specification can, thus, be examined for skills provision and associated assessment type or method. Including assessment types is appropriate by providing, or checking, constructive alignment (Biggs, 2003). Publishing such a list makes skills provision transparent to students, employers and external assessors. Collating individual modules and assessing the year or programme can then be used to determine if there are skills which are not being covered. Although presented in spreadsheet format, the material included could be used in a database for more rigorous checking. Of course, not all attributes need to be covered in any one module. It would be hoped, however, that the majority of these specific skills (elements) and attributes could be included to show coverage over a year, and help identify areas that need to be taught, practised and/or assessed. Practise could come in a succeeding year, perhaps as part of a related skill attribute or component. In any event, the skills listed may have to be brought down to an even more specific level than the listed elements. An example and linkage to assessment follows.

### Skill Objects and assessment issues

Even the items are quite broad and beg the question of what is considered to be 'simple' or 'complex', let alone the year of study. Learning Outcomes are often poorly specified here. So we might further subdivide and provide increased detail (or decreased 'granularity' in the jargon) and look at what we might have as a skill object for this skill type or element. The skill, therefore, might, in the terminology of Beetham (2007, p.26), relate to a task (required of students by the syllabus). The skill object would then correspond to a learning activity (engaged in by students, in response to the demands of tasks).

A 'skill object' is the name given here to a 'learning object' (or 'educational object') related to skills. A skill object is: 'an entity that encapsulates and demonstrates a specific skill in a learning context (that is, useful to an educator)'. It could be the implementation of part or whole of a skill topic or element (as above). The following example takes one basic skill from the above audit list and then

illustrates the need for more specific and detailed delimitation of skills, and incorporates a skill object.

Having made a direct linkage between skills attributes and assessment, there comes the problem of what forms of assessment are, or might be, appropriate. Although not all need (or should) be assessed, some imagination may be required to place skills in the educational programme in an appropriate manner. (Is it appropriate for skills to be assessed by an 'essay'? An essay might be used to examine a skill but is hardly more than self-referential when it comes to practising or assessing skills and their achievement.)

End Level 1 (taught/practise/revise)

N2 Carry out calculations involving two or more steps and numbers of any size, including the use of formulae

End Level 2 (practise and extend use)

N1 Select and use numerical information and methods appropriate to the discipline

(Which might also include N2, Carry out multi-stage calculations, including use of a large data set.)

The Learning Outcomes of a module might, therefore, include a statement: 'Practise technical skills which include being able to demonstrate the knowledge and experience of working with relevant modern technology, such as *Use a spreadsheet effectively*'.

N1a Be able to set out a spreadsheet to perform statistical operations on simple data sets

N1b Be able to create graphs and diagrams from complex numerical data

N1c Be able to do simple modelling on a spreadsheet

In practice, these can be used to set out a task and activity as a skill object, for example:

*Task:* Be able to do simple sensitivity analysis modelling on a spreadsheet, using Manning's equation.

*Activity:* Set up a spreadsheet to produce results for the parameter  $v$  (in  $m^3s^{-1}$ ) by evaluating the expression  $v = R^{0.66} s^{0.5}/n$  for values of  $R = 1$  to  $5m$  and  $s = 0.1$  to  $0.5$  radians, with a value of  $n$  of  $0.04$ .

Investigate the sensitivity of this expression to values of  $s$  (stream surface slope) and

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R (stream hydraulic radius) within the boundaries given and plot your results on an appropriate graph.

Notice that the activity, as written, is not fully specified in one sense, as a spreadsheet rather than (calculator) is mentioned, but this activity could also be done, at least as effectively, in Mathcad, Matlab or Minitab, or programmed in FORTRAN or BASIC etc. This extra specification may, or may not matter; it depends partly upon the level and the subject matter and level. The skill object, therefore, may be more fully specified at a higher granularity than the activity. For example, the above activity could be set in, say, Level 2 as part of a geomorphology or skills modules, but at Level 3, by stipulating Matlab as an exercise in a hydrology modelling module. Notice, too, that the skill object is, at least potentially, transferable between disciplines as well as levels.

This amount of detail is required when we actually set up things for students to do (activities). Hence, we can specify skill objects to a specific subject areas, modules or stages. The above activity could be incorporated into a physical geography, geology, civil engineering, computer engineering or even mathematics module. As such, we can trade skill objects and place them in repositories as we might do for learning objects in general (Bannan-Ritland et al., 2002) (Littlejohn and Pegler, 2006). As skill objects may be used in a variety of subject contexts, and at different student levels, then the amount of assistance and support may be varied. In effect, this is metadata for the object.

### Ascribing Skill Objects to a learning design or framework

We can also use one or more devices to help construct the activity/skill object according to the type of learning design related to learning outcomes. Following Boud and Prosser (2002) and Oliver *et al* (2007):

- Learner engagement - considering learners' prior knowledge and building on their own wishes and expectations
- Acknowledgement of learning context - consideration of learning design implementation and its position within the broad programme for the learner
- Learner challenge - seeking active participation of learners, encouraging them to be self-critical and supportive
- Provision of practice

And the following, to set out learning design resources and support required (Oliver and

Herrington (2001); Oliver *et al.* 2007):

- Rule based - requires learners to apply standard procedures and rules for the activity
- Incident based - activity is based around learners' exposure to and participation in events (authentic and as real as possible), requires learners to reflect and make decisions on the actions and events.
- Strategy based - learning based around tasks that require strategic planning and activity
- Role based - learning achieved through participation as players in a setting that models real world applications. Learners apply judgments and make decisions related to real-time scenarios

The skill object example (spreadsheet use and sensitivity analysis), outlined above, would fall within the rule-based framework of learning design, e.g. Figure 2.

This type of diagram can help set up the practicalities of the activity and skill object, in terms of the project specification, links to formal lectures, types of assistance assessment type and relationship to feedback etc. The type and nature of any e-learning component can, thus, be specified – although e-learning is not a pre-requisite for the specification of any activity. Problems associated with the provision of knowledge to turn tacit into explicit and the identification of 'sticking points' (Whalley and Taylor, 2008) will depend on the Skill object, rather than on the learning design (e.g. Figure 2).

### Other examples of Skill Objects

Skill objects may be appropriate to specific categories. Two examples are outlined to provide the context and employability skills aspects. They could be expanded in practice in a variety of ways, according to context etc. The two given here, rather briefly, do not (necessarily) need any e-learning involved in the activity.

*Committee Procedures* (suggested Level 2 - W2, W3, W4):

- Students in groups (4-5 for preference).
- given instruction in basic committee structure and minute-taking techniques and procedures.
- Formal agendas, minutes, action points recorded.
- Presence of members is also covered.
- Any written statements are submitted as an essential part of the practical/ coursework assessment, e.g as a report appendix.

Research Project Bid (suggested Level 3 – C1, C4, P1, P2, WS1):

- Team/individual write research proposal to be submitted by deadline, specified length etc.
- Proposal to include realistic estimates of money/personnel/equipment required in appropriate context to academic nature of the problem.

## Resources

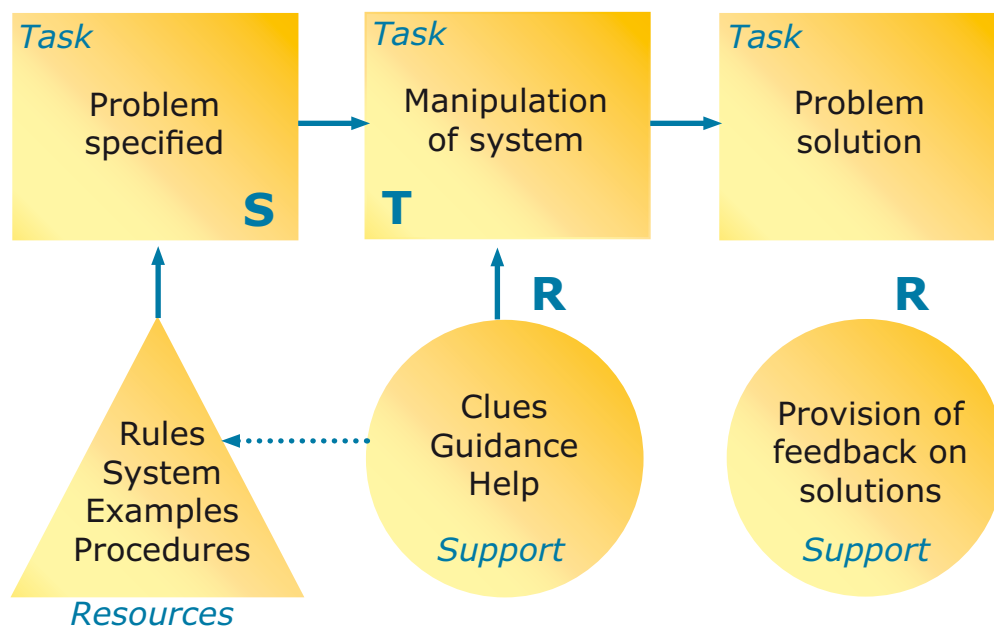
There are plenty of resources available to help departments, individuals and students. An important one for GEES practitioners is, indeed, the GEES website ([www.gees.ac.uk](http://www.gees.ac.uk)) and this is perhaps the most useful way to explore these resources. The GEES employability website/wiki (<http://gees.pbwiki.com/Employability,+Entrepreneurship+and+Enterprise>) is one specific locality, and is where the spreadsheet workbook mentioned as part of the auditing tool used here, is located.

The HEA Centre for Bioscience also has good resources ([www.bioscience.heacademy.ac.uk/resources/employability/](http://www.bioscience.heacademy.ac.uk/resources/employability/)) and its e-journal, (<http://www.bioscience.heacademy.ac.uk/journal/>) contains

relevant articles, including an employability audit tool (<http://www.bioscience.heacademy.ac.uk/ftp/employability/empaudit.pdf>) and a tool for mapping research tools in undergraduate curricula (Fraser *et al*, 2007). The latter also includes assessment and feedback in the on-line audit. I have started to place some skill objects on my own website and these may also be linked to the GEES employability wiki. I look forward to a 'trade' in skill objects.

## Summary and conclusions

The auditing tool presented here as a modification of Washer's (2007) original, provides a first step in examining skills provision and skill related to employability. It can be modified and adjusted, but can be looked on as a progressive provision of skills for a module or a complete programme. Even then, the level of granularity may be too large to specify what students need to do. The idea of a skill object is introduced as a useful way of matching a student activity to a stated skill at a practical level in a module, and of associating skill elements with assessment.



T Tacit knowledge required  
 S Sticking point(s) likely  
 R Remarks

Figure 2. Example of rule-based activity after Oliver *et al*. (2007). The letters R,S and T have been added by this author to help identify the positions in which Tacit knowledge (T) addition might need to be added, the identification of educational 'sticking points' (S) and the addition of Remarks or Marks R by the tutor and associated with a criterion-referenced mark scheme.

<b>At end of year 1</b>	<b>Students should be able to:</b>	<i>Specific (methods) 1</i>	<i>Specific (methods) 2</i>	<i>Assessment</i>
<i>Communications skills</i>				
C1	Communicate effectively in writing in an appropriate format using a suitable structure and style and correct punctuation and grammar			
C2	Select relevant reading material from different sources, analyse it and summarise information / arguments			
C3	Make a short oral presentation (as part of team in front of a class			
<i>Working with others</i>				
W1	Help move discussions forward			
W2	Identify group objectives and plan what needs to be done to achieve these			
W3	Clarify responsibilities and meet obligations to others (eg. tutors, peers, colleagues)			
W4	Exchange information on progress and agree ways of improving working with others			
<i>Problem solving</i>				
P1	Independently identify the issue and potential options for approaching / solving it			
P2	Compare and choose appropriate tools / methods for its resolution (and be able to justify that choice			
P3	Try out options, seek feedback and support and adapt behaviour to solving problems where needed			
P4	Apply and analyse given basic methods / tools / materials and information to check if the problem problems has been solved			
P5	Explain and evaluate their approach to problems / situations			
<i>Numeracy</i>				
N1	Select numerical methods appropriate to the discipline and to the task			
N2	Carry out calculations involving two or more steps and numbers of any size, including the use of formulae			
N3	Select ways to present their findings (including visual means) and describe and explain their methods and results			
<i>Graphicacy</i>				
G1	Use basic sketching principles			
G2	Plan use of text and graphs in reports, notebooks, etc.			
G3	Draw illustrative graphs			
<i>The use of ICT</i>				
I1	Carry out effective simple searches and select relevant information (databases, electronic journals)			
I2	Explore and develop appropriate information collected from a range of sources			
I3	Use a range of methods to explore, develop and exchange information			
I4	Observe copyright laws			
I5	Be able to reduce the risk of viruses and associated computer hazards			
<i>Learning how to learn</i>				
L1	Take responsibility for completion of tasks in work or study with appropriate support			
L2	Undertake simple research tasks with external guidance			
L3	Set up short-term targets and plan how these will be met			
L4	Review progress, identify evidence of achievements and evaluate own strengths and weaknesses			
L5	Use learning styles to help in learning tasks and in awareness of accessibility issues			
<i>Personal and professional development</i>				
PDP1	Set aims, establish priorities and plan action to do with exploring potential careers			
PDP2	Set up a skills portfolio and include an electronically stored CV			
<i>World skills</i>				
WS1	Use knowledge in geographical debates and issues			

Figure 1. Spreadsheet version of a modified implementation of Washer's (2007) summary of skills for a university student at the end of their first year. Note that attributes added to Washer's original are in italic and that individual skill statements added are denoted by a preceding ! (Washer's originals by •).

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## References

- Archer, W., and Davison, J. (2008).** *Graduate employability: what do employers think and want?* London: The Council for Industry and Higher Education.
- Balchin, W. G. V., and Coleman, A. M. (1966).** Graphicacy should be the fourth ace in the pack. *Cartographica: The International Journal for Geographic Information and Geovisualization* 3: 23-28.
- Bannan-Ritland, B., Dabbagh, N., and Murphy, K. (2002).** Learning object systems as constructivist learning environments: Related assumptions, theories, and applications. In *The Instructional Use of Learning Objects*. (D. A. Wiley, Ed.). Bloomington, IN: Agency for Instructional technology (AIT) 61-98.
- Beetham, H. (2007).** An approach to learning activity design. In *Rethinking Pedagogy for a Digital Age: Designing and Delivering E-learning*. (H. Beetham, and R. Sharpe, Eds.). London: Routledge 26-40.
- Biggs, J. (2003).** *Teaching for quality learning at university*. Buckingham: Open University Press.
- Boud, D., and Prosser, M. (2002).** Appraising new technologies for learning: a framework for development. *Educational Media International* 39: 237-245.
- Fraser, G. A., Crook, A. C., and Park, J. R. (2007).** A tool for mapping research skills in undergraduate curricula. *Bioscience Education Journal* 9: [www.bioscience.heacademy.ac.uk/journal/vol9/beej-9-1.aspx](http://www.bioscience.heacademy.ac.uk/journal/vol9/beej-9-1.aspx).
- Gardner, H. (2007).** *Five minds for the future*. Boston, Mass: Harvard Business School Press.
- Gedye, S., and Chalkley, B. (2006).** *Employability within Geography, Earth and Environmental Science*. Plymouth: The Higher Education Academy Subject Centre for Geography, Earth and Environmental Sciences.
- Littlejohn, A., and Pegler, C. (2006).** *Preparing for blended e-learning*. London: Routledge.
- Moreland, N. (2004).** Entrepreneurship and higher education: an employability perspective. In "Learning and Employability." 16. Learning and Teaching Support Network (LTSN) (Higher Education Authority), York.
- Oliver, R., Harper, B., Wills, S., Agostinho, S., and Hedberg, J. (2007).** Describing ICT-based learning designs that promote quality learning outcomes. In *Rethinking Pedagogy for a Digital Age: Designing and Delivering E-learning*. (H. Beetham, and R. Sharpe, Eds.). London: Routledge 64-80.
- Oliver, R., and Herrington, J. (2001).** *Teaching and learning online: a beginner's guide to e-learning and e-teaching in Higher Education*. Edith Cowan University, Mt. Lawley, Western Australia.
- Washer, P. (2007).** Revisiting Key Skills: A Practical Framework for Higher Education. *Quality in Higher Education* 13: 57-67.
- Whalley, W. B. (2008).** What should a (Geography) degree for the 21st century be like? *Planet* 19: 36-41.
- Whalley, W. B., and Taylor, L. (2008).** Using criterion-referenced assessment and 'preflights' to enhance education in practical assignments. *Planet* 20: 29-36.
- Wilmot, P. D. (1999).** Graphicacy as a form of communication. *South African Geographical Journal* 8: 91-95.
- Yorke, M. (2004).** Employability in the Undergraduate Curriculum: some student perspectives. *European Journal of Education* 39: 409-427.
- Yorke, M., and Knight, P. (2004).** Embedding employability into the curriculum. In "Learning and Employability." (M. Yorke, Ed.). 24. Learning and Teaching Support Network (LTSN) (Higher Education Authority), York.

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