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1. EXECUTIVE SUMMARY

To question, examine and recognise the exact requirements of roles in the environmental sciences is vital. Doing so will allow Bachelor of Science and Environmental Science graduates to target and directly develop these skills and attributes, and realise the ones that they already possess. Such skills are also referred to as generic skills, capabilities or key competencies (Department of Education Science and Training, 2006) To understand these requirements, representatives from three potential employers in this field (Conservation Volunteers Australia, National Parks and Wildlife Services and University of Wollongong Earth and Environmental Sciences) were interviewed and asked a series of questions. This report divides the research into three components: Recruitment, Attributes, and Qualifications and Experience.

It was found that there was a strong correlation between the UOW Graduate Attributes list and the desired characteristics for employees. Graduates were commonly found to be lacking in experience and practical knowledge. Suggestions to improve this were to undertake voluntary and paid work experience and additional training through organisations such as TAFE. UOW Science degrees were highly regarded, but university qualifications were not seen as essential for all positions.

2. INTRODUCTION

2.1 FOCUS OF OUR RESEARCH

In the highly competitive field of Environmental Science, the marketability of University of Wollongong (UOW) Science graduates to prospective employers needs to be identified and utilised. This cannot be fully achieved without the recognition of exactly what attributes employers in these fields require, what



attributes UOW graduates already have, and a thorough knowledge of the recruitment process. Doing so will allow students and graduates to target and directly develop these skills with the confidence that they are doing so to their benefit, as well as to that of their employer and the community in the years to come.

2.2 APPROACH

Three organisations who would be both realistic and desired employers of environmentally orientated science graduates were interviewed: Conservation Volunteers Australia (CVA), University of Wollongong Environmental Sciences, and the National Parks and Wildlife Services (New South Wales division) (NPWS). These organisations share the environment as their common focus while differing in scope, approach and activity: from education to land management, private non-governmental to public, government run, and wetlands to bushland. It was this broad coverage of the field along with the organisation's respect within it that presided over the selection of these particular employers. Additionally this selection aimed to reflect the future employment desires of a large proportion of science students, thus making the study more directly relevant to a wider section of the university community.

To assist the employers in communicating their knowledge with students as well as allowing the above areas to be studied, this investigation was divided into three subsections: Recruitment, Attributes, and Qualifications and Experience. Fourteen questions were devised which centred on these subsections (Appendix 1). Recruitment focused on the organisations employment process. Attributes examined what the organisations were looking for in employees and compared the UOW's set of nine graduate attributes to these qualities. Qualifications and Experience considered



training, academic performance and credentials. While each question was subtly tailored to be relevant to each employer, the core of the questions remained the same for each of the three interviews. This report is similarly structured around the above three subsections.

2.3 COMMUNICATION

Two of the employer representatives were questioned in a face-to-face discussion, while the third was interviewed over the phone due to work commitments. Prior to this, the contacts and meetings were established via phone and e-mail. In a similar manner, group meetings as well as phone and e-mail connections between team members were necessary to effectively confer our ideas, research and results for the Graduate Attributes Challenge.

3. RECRUITMENT

3.1 POSITION ADVERTISEMENT

Generally for employers, the most widespread source of job publishing is also the most effective, especially those from the environmental fields. In terms of human resources, the competitiveness of this sector ensures that there is no need for an employer to settle for less than the best, consequently the more applicants the better. A combination of both print and electronic job advertising enables an effective employee search. Commonly, state wide newspapers such as the Sydney Morning Herald and major online networks take precedence as this allows access to the greatest audience. In the case of government environmental jobs such as with the National Parks and Wildlife Service, it is policy that the positions are advertised in this manner, thereby not excluding or biasing any particular region or group.



3.2 RECRUITMENT STAFF

The high popularity of jobs in the environmental sciences means that the recruitment process is vital. One may assume that there would be an assigned recruitment officer for such positions. However, due to the thorough employment process and the professions desirable nature there is rarely a high frequency of openings, leading to senior employees often taking on this responsibility. Of the organisations and institutions interviewed, only the nationwide Conservation Volunteers Australia had a recruitment officer, and this was based in their national office.

3.3 THE INTERVIEW

“The interview is essentially make or break” (Joanne Edney, NPWS). This view was agreed upon by all employers interviewed, without discrepancy. Furthermore it was of common opinion that the interview was the final, narrowing stage of the recruitment process. The applications act simply to acknowledge the criteria set out by company or organisation. The interview sets apart the candidates. This is especially so in the environmental industry whereby an individual's personal suitability to a role is pivotal to their success.

4. ATTRIBUTES

4.1 DESIRED EMPLOYEE ATTRIBUTES

Desired employee attributes generally depended on the position available and the organization involved, making it difficult in some cases for the employers to be specific. However, relevant education and the ability to work as an individual and as part of a group (particularly in a supervisory and facilitating role) were distinguished key characteristics across the board. Employers further looked for a combination of personal and professional skills, financial and administration management skills, computer literacy, sound



communication skills, and work experience. All of which are distinguished as 'transferable skills' (Graduate Careers Australia, 2006). As a more defined institution, CVA were able to create a broad list of key attributes looked for in all employees. These included specialized knowledge of Natural Resource Management issues, familiarity with NSW legislation, fire management and bush regeneration skills, and experience in conservation project management.

4.2 UOW GRADUATES AND EMPLOYABILITY

Graduates from UOW Science and Environmental Science degrees were described by the employers as having sound knowledge of specific current knowledge such as Natural Resource Management issues, as well as being well-rounded in interpersonal communication, computer and information literacy and management skills. Employers pointed out that these attributes were particularly strong with UOW Environmental Science graduates, though this did not necessarily stem directly from their University education. Multiple UOW graduates were employed by each of the organisations interviewed. Employers generally found that extra-curriculum qualifications such as an Occupational Health and Safety certificate and work experience were lacking in UOW (and other university) graduates.

4.3 CORRELATION BETWEEN UOW GRADUATE ATTRIBUTES AND DESIRED EMPLOYEE ATTRIBUTES

Overall, employers found that the list of UOW graduate attributes correlated well with their own list of key employee attributes regardless of the differing positions available. Attributes pertaining to the capacity for group and individual work, enthusiasm and flexibility were most relevant to the employers. They were joined by initiative, work experience and practical skills. Theoretical and analytical knowledge tended to be less relevant.



Further, the UOW graduate attributes correlated well with the specific attributes of an Environmental Science graduate (see Table 1). This was emphasized by Professor John Morrison who saw Environmental Science graduates excelling beyond the normal graduate due to the ‘industry’ work experience of the 4th year honours program. This key attribute helps the graduate to be more employable and signals to potential employers that they are able to work on a large project with little supervision.

Number	Environmental Science Attribute Description	Related UOW Graduate Attributes	
		Number	Description
1	Ability to think	1, 8	Critical evaluation
2	A strong science background	2	Specialized knowledge
3	A good understanding of environmental issues	2	Specialized knowledge
4	Understanding of legal and policy framework	2	Specialized knowledge
5	Present material verbally in a clear manner	3	Verbal expression ability
6	Work in a multidisciplinary team	4	Team work
7	Able to Solve problems	5	Evaluation and interpretation skills
8	Able to communicate with other professionals	6	Cultural and Intellectual diversity
9	Write well presented reports	7	Computer and information literacy
10	Meet work completion deadlines	9	Individual responsibility
11	Work independently with minimum supervision	9, 1	Individual responsibility
12	Work experience in 'Industry'	unique	No equivalent

Table 1. Correlating Environmental Science graduate attributes with the UOW graduate attributes. Information about the Environmental Science graduate attributes was obtained from Professor John Morrison, School of Earth and Environmental Sciences.

4.4 RANKING THE UOW GRADUATE ATTRIBUTES

Ranking the UOW graduate attributes in order of importance (with ten being the most important, and one the least) was done by the CVA and NPWS representatives (see Figure 1). Attribute 4 (teamwork), 2 (professional knowledge) and 3 (Oral and written communication skills) were scored the highest by potential employers. Attributes 5 (Evaluation and interpretation skills), 7 (Computer and information literacy) and 9 (individual responsibility) were amongst the lowest scoring attributes. There was much variation between the two organizations in respect to the scores given for the attributes.



The representative from the School of Earth and Environmental Sciences saw ranking or even grading the attributes inappropriate because all attributes are needed to make up a graduate as a whole. The broad UOW graduate attributes could also be differently ordered for each separate job offered by the school, the representative argued.

Ranking of UOW Graduate Attributes by Employers

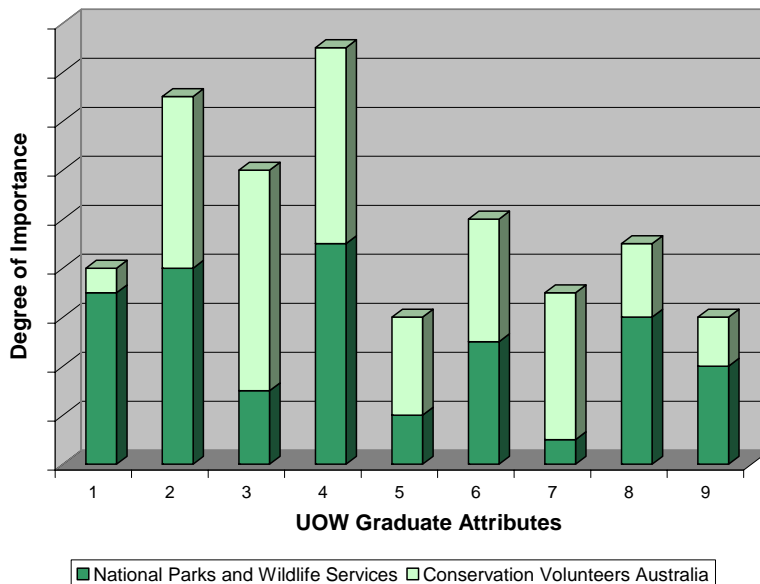


Figure 1. Ranking of UOW Graduate Attributes by Employers representing the National Parks and Wildlife Services and Conservation Volunteers Australia. The results show relative importance on a scale of 1 to 10, with 10 the most important. Scores from both organizations were added to represent the overall degree of importance of each attribute.

4.5 ATTRIBUTE SUGGESTIONS FROM EMPLOYERS

The most commonly suggested attribute lacking in the UOW graduate attributes list, and from graduates in general, was the development of professional skills gained via work experience and practical work. Specialized experience such as practical field survey skills, ecological survey and monitoring, plant recognition, and project management skills are often required of employees and, in many cases, are not covered by a bachelor



degree. Teamwork in practical fields was also seen to be lacking from the UOW list.

5. QUALIFICATIONS AND EXPERIENCE

5.1 IMPORTANCE OF A SCIENCE DEGREE

Jobs in the environmental sciences are varied and often demand more than just the attributes and knowledge that a graduate boasts. Additional post-graduate experience looms as the highest priority for the potential employers. A degree by itself is in few cases sufficient to obtain a position with these organisations. Roles for graduates specifically are often confined to those within tertiary institutions such as post-graduate teaching and research work.

A UOW degree proved to be highly regarded by the interviewed employers. This was reflected by the fact that all have had, or currently do have a UOW graduate in employment. The emphasis placed upon work experience and practicality ensures UOW graduates are held in such high esteem among the environmental community. Skills obtained in these workings contribute to the well-rounded nature of the graduates. The confidence gained by acquiring a practical base of skills provides the basis for further learning and development. This attribute was commonly identified by the employers as the distinguishing factor endorsing a UOW graduate. However, the geographical situation, in that all interviewed employers were from the Illawarra region, may also contribute to this phenomenon.

5.2 ACADEMIC RESULTS

Given the scenario of two applicants vying for a position having vastly different academic results (High Distinction average versus a Pass average), all employers responded that both would still be strongly considered. John



Morrison noted that a good academic record may indicate a graduate's aptitude or ability in this field, but other factors such as experience, personality and capability in field work are critically important for their employment. CVA and NPWS representatives both saw passion and initiative as more important qualities, that is, employers favour applicants that possess a variety of general workplace skills (Monash University, 2006).

5.3 EXPERIENCE AND FURTHER TRAINING

Experience is an attribute that all respondents cited as key to employment in the environmental science field, but a quality that many graduates lack. All suggested volunteer work with a variety of agencies such as CVA, particularly taking on a leadership role within their projects. Other avenues are initiating work experience, academic program internships, summer vacation positions, TAFE and weekend training course. In general, evidence that the graduate has been proactive and shown initiative in gathering experience further than that garnered via University studies.

In order to differentiate between applicants, employers identify the core skills or competencies a person must have to fulfil the role (University of Technology Sydney, 2006). As a means of obtaining practical qualities of use in the workplace, the three interviewees recommended that further training would be necessary for positions in the environmental science field, be it on equipment and maintenance, defensive driving, OH&S, plant recognition or first aid. It was further noted that further on-the-job training for recent graduates would be a common feature throughout most disciplines.

6. CONCLUSIONS

The most common way for positions to be advertised was via newspapers and online sites, without designated recruitment staff. The interview was regarded as the most critical part of the process. The UOW Graduate



Attributes list corresponded well to the desired characteristics of the interviewed employers. Teamwork, professional knowledge and communication skills were regarded as the most important graduate attributes. Graduates (and the list) were found to be most significantly lacking in experience, with voluntary and paid work experience as well as alternative training programs suggested to remedy this shortfall. UOW graduates were highly regarded in the workplace; however science degrees were not necessary in all cases for employment in the environmental field. In all, experience was the most valued attribute for potential employees to have.

7. REFERENCES

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APPENDIX 1: INTERVIEW QUESTIONS

RECRUITMENT

1. How do you advertise for positions vacant at your work, for example by newspaper or online?
2. Is there a designated recruitment officer?
3. How important is the interview?
4. To your knowledge, has your organisation/work ever advertised specifically for graduates?
5. Have you or your organisation/company/council ever employed a graduate from UOW? If yes, what set them apart from other candidates?

ATTRIBUTES

6. What are the key attributes that you look for in employees/colleagues?
7. In your experience, have a high percentage of graduates demonstrated all these key attributes? If no, what qualities have you found to be lacking?
8. Did you find a strong correlation between the list of UOW graduate attributes and these qualities that you look for in employees/colleagues?
9. Are there any attributes that the university has missed which you feel are too important to leave out?



10. Rank the UOW graduate attributes in order of importance

QUALIFICATIONS AND EXPERIENCE

11. As there are alternative qualifications such as through TAFE, how highly regarded is a science degree in terms of employability in this field?

12. If there are two people with distinctly different academic results, one with a high distinction average and the other a pass average, would you still strongly consider the second candidate?

13. Experience is a quality often required for jobs in science and environment related fields but one that many new graduates lack. How would you recommend future graduates go about gaining in experience?

14. Have you had any cases where you have had to provide further training for graduates because of lack of knowledge?



APPENDIX 2: UOW GRADUATE ATTRIBUTES

Attributes of a Wollongong Graduate (UOW, 2006)

Attribute 1		A commitment to continued and independent learning, intellectual development, critical analysis and creativity.
Attribute 2		Coherent and extensive knowledge in a discipline, appropriate ethical standards and, where appropriate, defined professional skills.
Attribute 3		Self confidence combined with oral and written skills of a high level.
Attribute 4		A capacity for, and understanding of, teamwork.
Attribute 5		An ability to logically analyse issues, evaluate different options and viewpoints, and implement decisions.
Attribute 6		An appreciation and valuing of cultural and intellectual diversity and the ability to function in a multi-cultural or global environment.
Attribute 7		A basic understanding of information literacy and specific skills in acquiring, organising and presenting information, particularly through computer-based activity.
Attribute 8		A desire to continually seek improved solutions and to initiate, and participate in, organisational, social and cultural change.
Attribute 9		An acknowledgement and acceptance of individual responsibilities and obligations and of the assertion of the rights of the individual and the community.