

Mapping the shape of contemporary Australian archaeology: Implications for archaeology teaching and learning

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The following is not intended as a systematic or exhaustive report ...

(Beck and Head 1990:39).

On the basis of a brief and not definitive review ...

(Hope 1993:180).

Although we have no figures ...

(Beck and Head 1990:40).

Abstract

Results from the largest survey of professional Australian archaeologists ever undertaken are considered in the context of teaching and learning issues. The survey asked questions about the composition of the archaeological workforce, professional activities of archaeologists, skills and qualifications needed to work in archaeology, and opinions on university learning and professional training. Data about the discipline are a basic requirement for informed decision-making on archaeology teaching and learning, but few useful datasets are available. While results generally confirm anecdotal evidence and findings of previous surveys, the large sample size (n=301) enables more detailed characterisation of important aspects of the contemporary archaeological workplace. An analysis of self-assessed skill sets and skill gaps indicates that the training of many professionals left significant gaps in several core skill and knowledge areas which are remarkably consistent across various industry sectors. These findings can be used to inform curriculum development and the exploration of new archaeology teaching and learning models that are more attuned to the contemporary Australian archaeological workplace.

Introduction

Professional archaeology in Australia has changed profoundly over the last four decades. A dramatic expansion of the cultural heritage management sector has occurred at the same time as significant restructuring of the university and museum sectors. Data collected in the 'Australian Archaeology in Profile' survey support this continuing trend with high confidence expressed for employment expansion in the private sector (across Indigenous, historical and maritime sectors) and comparatively low confidence for increased staff levels in the government and university sectors (Table 1).

Despite these changes, there are very few data documenting the basic profile of the discipline in Australia. The usefulness of previous surveys is often limited by small

Sector	Yes		No	
	n	%	n	%
Government	22	37	38	63
University	30	45	36	55
Museum	7	64	4	36
Private	78	60	53	40
Average		51		49

Table 1 Do you expect your business/company/school/department/section/business unit to employ any new archaeologists in the next 12 months (i.e. during 2005)?

sample sizes, limited geographic scope or limited employment sector focus (see Colley 2003; Feary 1994; Frankel 1980; Truscott and Smith 1993). Several studies sourcing data from membership records of major associations (e.g. Australian Archaeological Association) also present problems owing to the high levels of avocational membership and the difficulty of assessing the representativeness of the records (e.g. Beck and Head 1990) while others have employed generic data for the higher education sector which is not archaeology-specific (e.g. Beck 1994). Many of the most useful data sets were assembled to examine aspects of gender participation rates and were published in the proceedings of the 'Women in Archaeology' conference series (Balme and Beck 1995; Casey et al. 1998; du Cros and Smith 1993). Again, these data were gathered to create specific indices rather than to characterise the broader discipline. Lydon's (2002) detailed study of archaeology in the workplace is an exception, although the broad application of its results is limited by its focus on the cultural heritage management sector, low response rate and concentration on Victoria. Similarly, Colley's (2004) and Gibbs et al.'s (2005) analyses of written responses to questions posed at the 2003 Redfern National Archaeology Teaching and Learning Workshop and 2002 Townsville Teaching and Learning Session at the Land and Sea Joint Conference respectively were limited by sample size and the unstructured nature of the collection instruments.

Limitations of available data were discussed at length at the 2003 Redfern National Archaeology Teaching and Learning Workshop. The need for baseline data about the discipline was acknowledged as a basic requirement for informed decision-making on archaeology teaching and learning issues. This concern was represented in one of the five key resolutions of the Workshop (the Redfern Archaeology Teaching Charter) (Colley 2004:201) as a commitment to gathering reliable data for benchmarking of a variety of archaeology activities similar to UK survey instrument.

The 'Australian Archaeology in Profile: A Survey of

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Working Archaeologists 2005' project described here was an attempt to contribute to this goal, with the aims of (1) building a basic profile of professional archaeology in Australia and (2) defining key archaeology learning and training issues.

Methods

The 'Australian Archaeology in Profile: A Survey of Working Archaeologists 2005' project was carried out under the auspices of the Australian Joint Interim Standing Committee on Archaeology Teaching and Learning (JISCATL), which includes representatives from Australian universities teaching archaeology, professional associations, Indigenous groups, industry groups and public sector employers. Although it was originally intended to base the survey instrument on those employed in similar exercises in the United Kingdom (Aitchison and Edwards 2003) and United States (Association Research Inc. 2005; Zeder 1997), a review demonstrated that these studies had only limited relevance to the Australian scene and to the investigation of teaching and learning issues. For example, owing to the very different structure and scale of the archaeology profession in the United Kingdom, the 2002/2003 'Archaeology Labour Market Intelligence' survey was directed at organisations employing archaeologists and focused on employment conditions, standards, union membership, leave, overtime etc (Aitchison and Edwards 2003). Similarly, the 1994 Society for American Archaeology Census (Zeder 1997) had a strong focus on demographic information and workplace roles rather than on archaeology teaching and learning issues.

A survey questionnaire was therefore developed modelled loosely on the more generic questions included in UK and US surveys and the recently conducted survey of Native Title practitioners by the Australian Anthropological Association (Martin 2004). The instrument was developed over a six month period using a broad consultative process including the membership of the JISCATL, a poster presented at the 2004 Australian Archaeological Association Annual Conference in Armidale and a small pilot project with representatives from different industry sectors. The final questionnaire contained 38 questions in four sections: demographic profile; employment information; professional activities; and learning and training issues.

As the aim of the survey was to build a profile of professional archaeology in Australia, eligibility to complete the survey was limited to anyone who:

- used archaeological skills in *paid* employment during 2004; and
- works in Australia, or is based in Australia and works overseas.

With the cooperation of the major archaeological associations in Australia, the questionnaire was mailed to the individual memberships (i.e. not institutional) of the Australian Archaeological Association (AAA); Australasian Society for Historical Archaeology (ASHA); Australasian Institute for Maritime Archaeology (AIMA) and Australian Association of Consulting Archaeologists Inc. (AACAI). In total, 1152 surveys were distributed to these associations. In addition, 33 surveys were mailed to classics and ancient history staff identified from university

websites as having interests in archaeology and 66 surveys were distributed at the 2005 Sydney Historical Archaeology Practitioners Workshop. The survey was also made available for download from the internet and advertised widely on archaeology-related listservers (AUSARCH-L; ASHA; AIMAMEMBERS; AQUALIST; AACAI; WAC) and in the electronic newsletters of the major associations (ASHA; AACAI; AIMA; WAC; AASV). A reply paid envelope was provided for anonymous return of completed surveys and to maximise return rates.

Classical archaeology is likely to be underrepresented in the respondent dataset. We attempted to circumvent this by direct mailing classics and ancient history academics and contacting major associations, including the Australian Archaeological Institute at Athens. We also note that the memberships of AAA, ASHA and AIMA contain a large proportion of avocational and student members who may not be working in the discipline and therefore ineligible to complete the survey. Some respondents also suggested that recent graduates and international archaeologists employed as casuals may be underrepresented. We agree with the latter, but the high proportion of student membership of AAA suggests that this pattern of membership would be similar for early career graduates.

Results

By the 1 July 2005 deadline, 301 valid responses had been received, including over 10,000 words of qualitative comments, most focussed on teaching and learning issues. A small number of completed surveys were excluded where respondents had not earned income from archaeology during 2004. Survey response rates are difficult to assess as it is unclear what proportion of those who received surveys were eligible to complete the survey and also how many were downloaded from the website or otherwise obtained (e.g. as a photocopy or email attachment). As a simple proportion of those physically mailed, the completed surveys indicate a return rate of around 25%. Although the survey covers many facets of the profession, the sections below focus on data of core relevance to teaching and learning issues, including access and participation rates, the archaeological workplace, qualifications and experience, skill sets and skill gaps, responsibility for teaching and learning and accreditation and benchmarking. Where available, results are compared with findings of previous studies and some overseas comparisons are drawn.

Access and participation

Various estimates have been proposed for the size of the professional archaeological community in Australia. Du Cros (2002:5), for example, estimated 470 full-time archaeologists while Hope (1992 cited in Lydon 2002:131) estimated a maximum paid community of 355. The current survey demonstrates that there is a minimum of 301 people working as paid archaeologists. Overall gender participation rates appear to be equitable with 52% male respondents and 48% female (Fig. 1). These rates have changed little since the early 1990s, which suggests a stabilisation of the trends towards increasing participation of women noted in previous studies (see Beck 1994:211; Hope 1993:187). These gender participation rates demonstrate that, compared with the US (64% male:36% female) (Zeder 1997:9) and UK (64% male:36% female) (Aitchison and Edwards 2003:xi) nearly as many women as men are employed in archaeology in

Australia. Women are overrepresented in the youngest age cohort and men in the oldest. Although the high representation of women in younger age cohorts has been noted in international studies, the virtual parity of men and women in older age brackets appears to be a unique feature of the Australian archaeological workplace (cf. Zeder 1997:11-12).

Results indicate a relatively young age profile, with 57.2% of respondents younger than 45 years old. Beck (1994:211) has linked the relatively high proportion of young

people in the discipline with its 'newness'. This argument is supported by the somewhat surprising results that nearly one-third (32%) of respondents were born overseas (compared to around 22% of the general population – Australian Bureau of Statistics 2005) and that the overseas-born dominate the workforce for those aged over 55 years of age (Fig. 2). Hope (1993:179) has commented on very similar figures from a small sample of archaeological staff working for the New South Wales National Parks and Wildlife Service in 1991 and linked it to the limited availability of undergraduate training

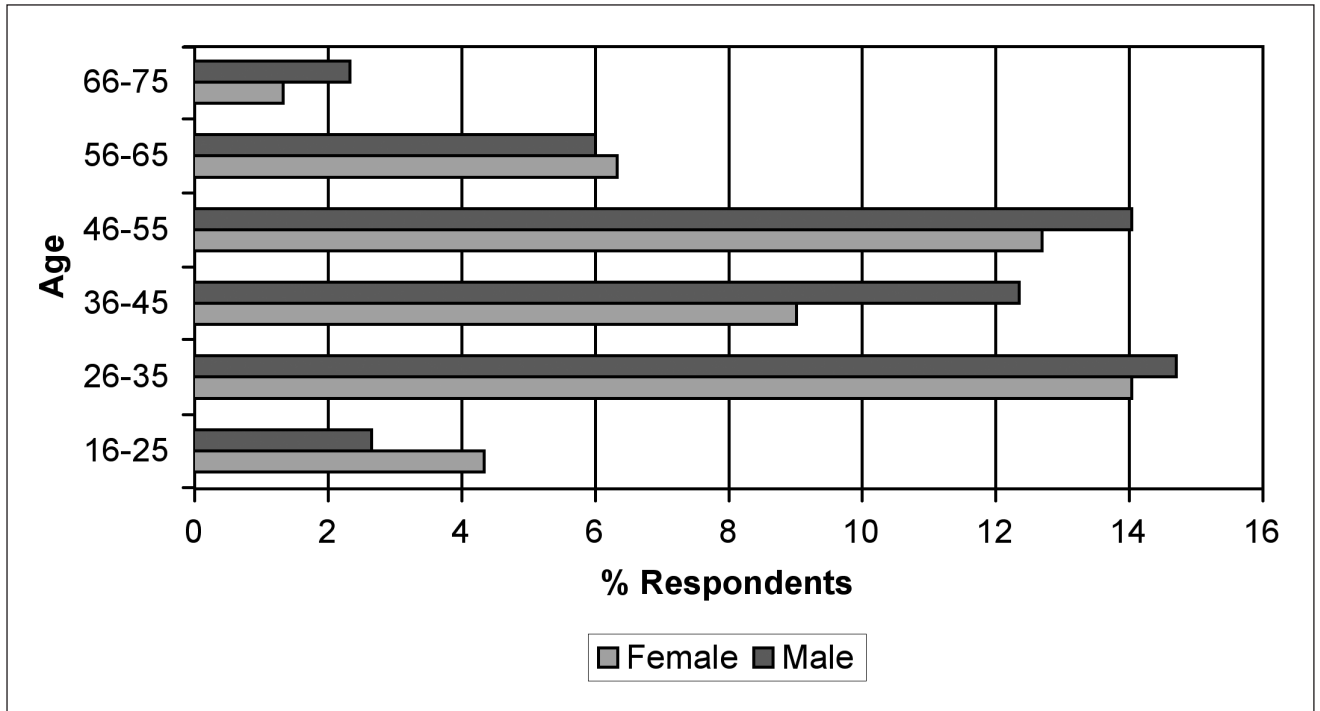


Figure 1 Respondents by age and gender (n=299). Note that the number of respondents indicated on graphs does not always equal the maximum number of respondents to the survey (n=301) where some questions were left unanswered or where a subset of data is employed.

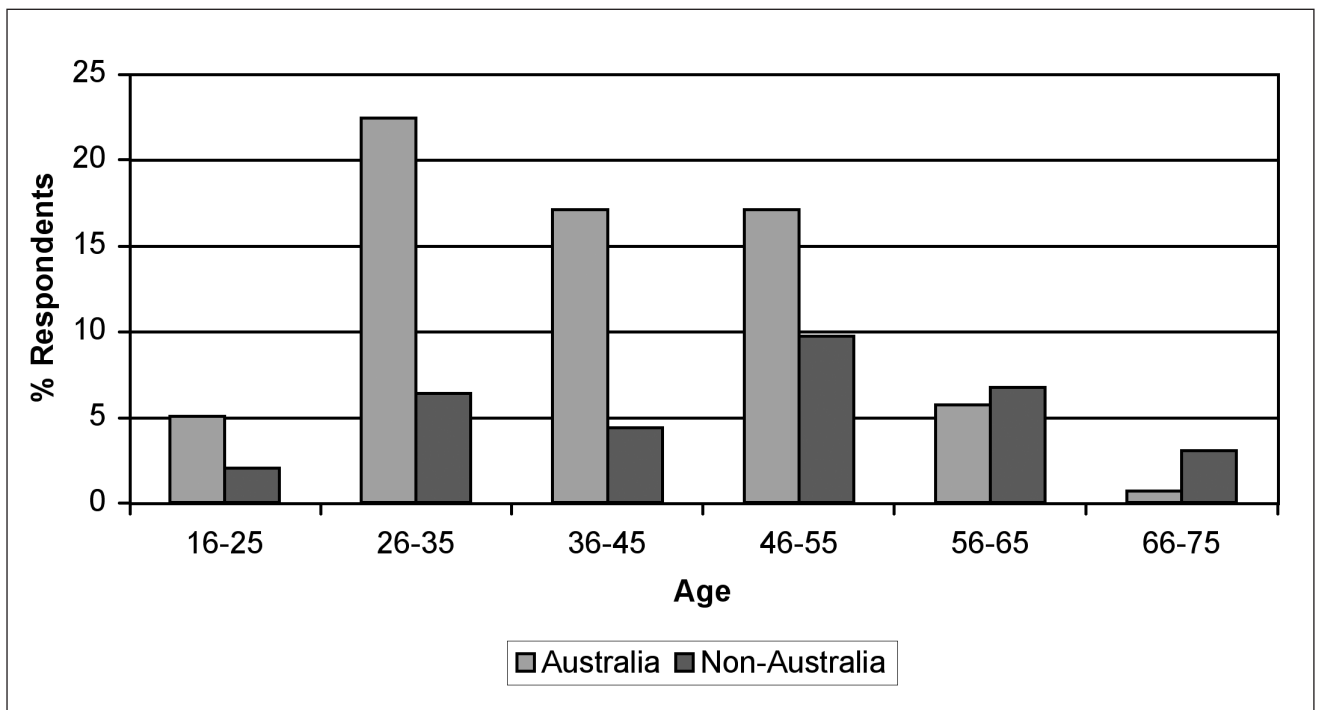


Figure 2 Australian-born vs non-Australian-born respondents (n=299).

in archaeology before the mid-1970s (see also Colley 2002: 3-4).

The participation rates of Indigenous Australians in professional archaeology in Australia (2.3%) is high compared to the United States, where Native Americans comprised fewer than 1% of respondents to the 1994 Society for American Archaeology Census (Zeder 1997:13).

The archaeological workplace

Three-quarters of Australian archaeologists are based in the eastern mainland states (Fig. 3), with 75% of respondents based in capital cities, 17% in regional centres, 5% in rural areas and 3% in remote areas.

Figure 4 shows the distribution of respondents by primary subject focus and gender. The Australian archaeological workplace is conventionally divided into

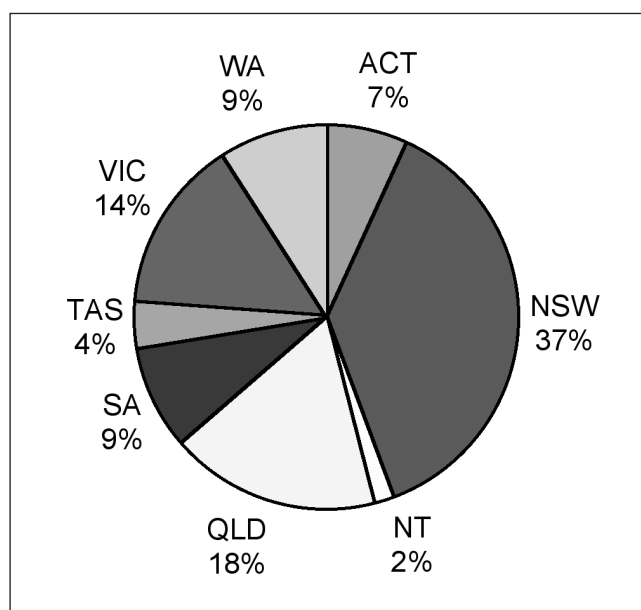


Figure 3 Respondents based in Australia by state (n=292).

three main foci: Indigenous, historical and maritime. Specialisations such as industrial archaeology are often viewed as a subset of one or more of these areas (Colley 2002:16). The ‘other’ category includes people who identified their primary subject focus as all of the above (particularly academics teaching across a broad range of fields), cultural heritage management, contact archaeology, classical archaeology, prehistoric archaeology and occasional other fields, such as Egyptology and European Iron Age archaeology.

Respondents primarily engaged in Indigenous archaeology dominate (52.2%), followed by historical archaeology (27.8%). The balance of respondents nominated maritime archaeology (6.6%) and ‘other’ (13.4%) as their primary subject focus. Over 35% of historical archaeologists nominated Indigenous archaeology as a secondary subject focus, while over 49% of professionals engaged in Indigenous archaeology nominated historical archaeology as a secondary subject focus, indicating a high level of fluidity across the two fields. Women are represented relatively equally across both historical (49.4%) and Indigenous (48%) fields but make up only about one-fifth (21.1%) of maritime archaeologists.

Burke and Smith (2004:xvii), among others, have noted that the main employment opportunities for archaeologists in Australia ‘come from universities, museums, government departments and consulting’. Figure 5 shows almost the exact reverse of this order, with 47.9% employed in the private sector, 25.1% in universities, 22.7% in government agencies and only 4.3% in museums. These data document the trend over the last decade towards growth of the private sector and reduction or stasis in the university sector when compared with Truscott and Smith’s 1993 finding that 36.9% of archaeologists in permanent positions were in academic roles. There is also a common view expressed in the literature that the cultural heritage management sector is dominated by women. For example, Beck (1994:213) noted that ‘the overall picture in Australian archaeology is one where there may be

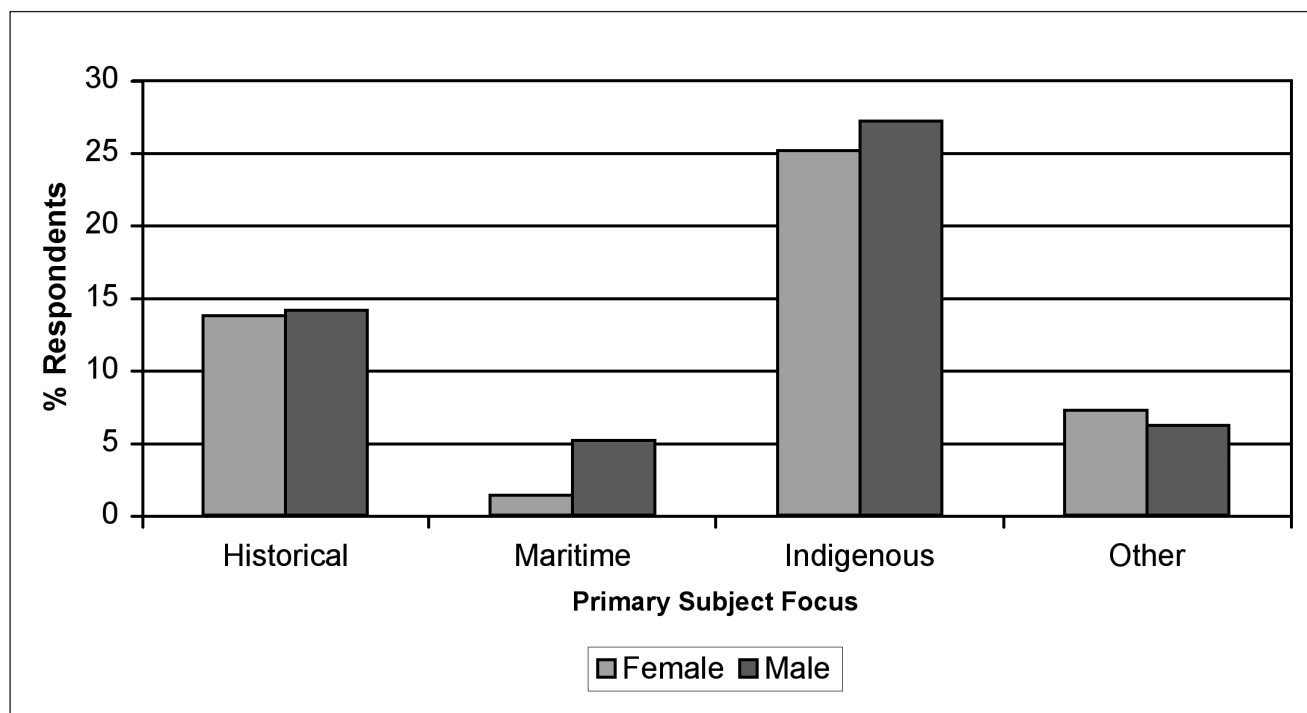


Figure 4 Distribution of respondents by primary subject focus and gender (n=291).

concentrations (“ghettos”) of women in CRM and consulting and a few women obtaining the Ph.D. degrees necessary for careers in universities’. Beck and Head (1990) estimated that 17-28% of academic archaeologists are women. A marked over-representation of men in the academic sector and of women in the cultural resource management sector is not borne out by the survey results. There are only slightly more men (4.3%) in university positions and slightly more women (1.1%) in the private sector, with the gender participation rates in the other sector primarily concerned with cultural heritage management – government – virtually even (11.5% male: 11.2% female).

Only 11.7% of respondents indicated that the primary geographical focus of their work was outside Australia. This finding is at odds with the focus of university courses which are evenly distributed between Australian and non-Australian archaeology (see Colley 2004:191). Although this figure is probably depressed by the low representation of classical archaeologists in the survey, the small size of the classical archaeology sector in Australia would not dramatically change the result. This outcome is also reflected in other data such as the low ratio of fieldwork days conducted annually by all respondents overseas compared to that undertaken in

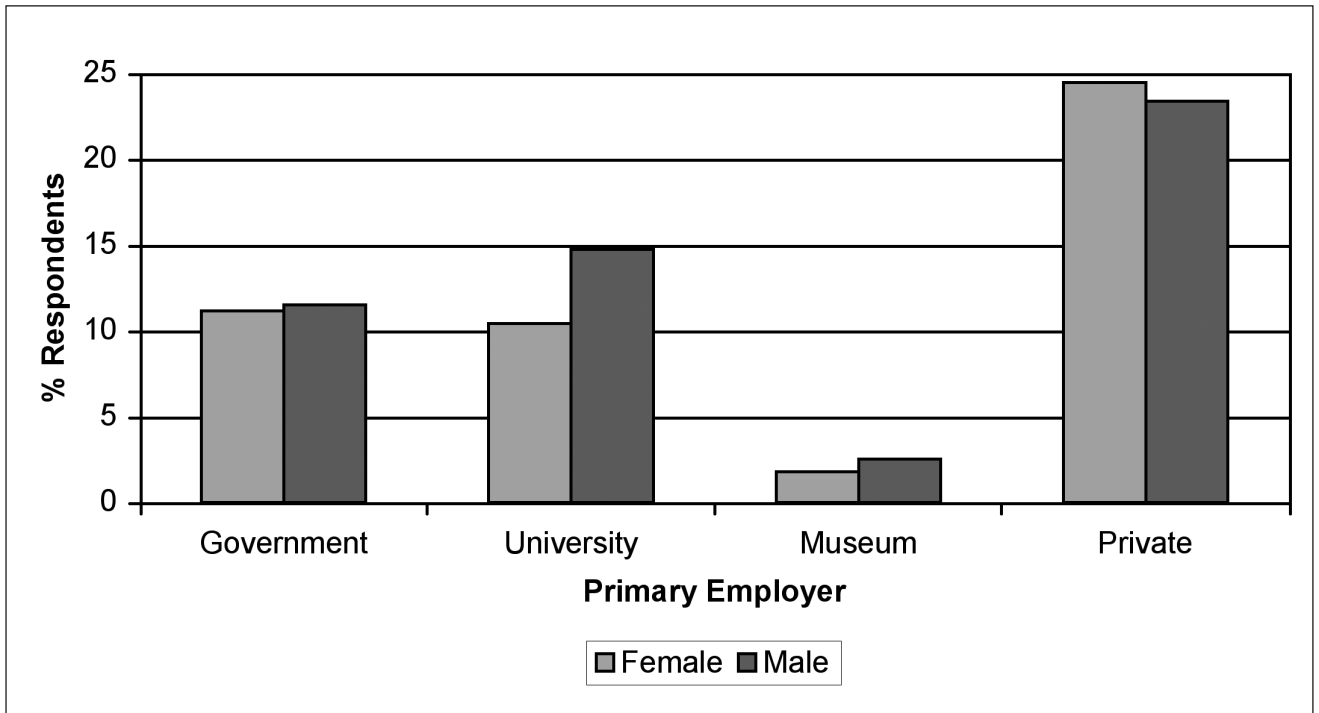


Figure 5 Distribution of respondents by primary employer and gender (n=278).

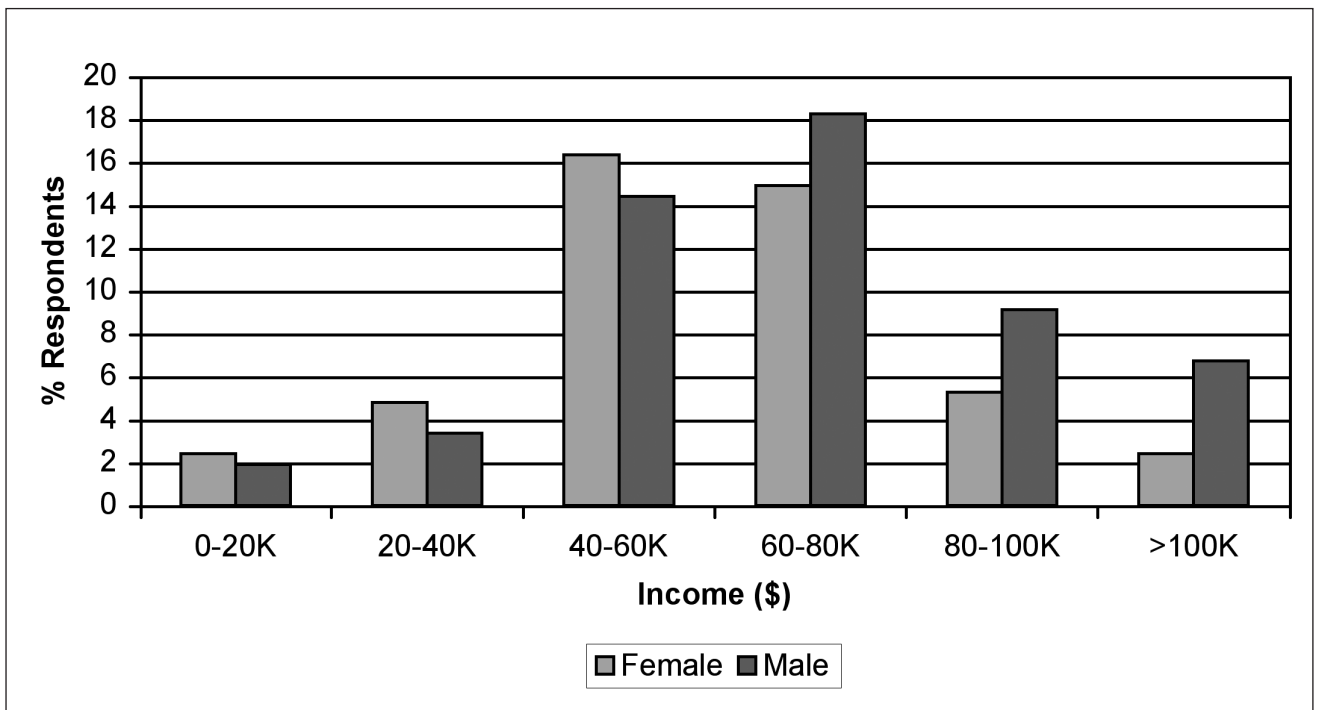


Figure 6 Full-time gross income from archaeologically-related employment during 2004 by gender (n=208).

Australia (1:5.2). These findings support the mismatch identified by Colley (2004:191) between university archaeology curricula and the realities of the Australian archaeological workplace, with as many courses focussing on overseas archaeology as Australian. Many respondents also commented on the apparent reduction of teaching capacity in the area of Indigenous archaeology, particularly on the east coast.

Some other features of the workplace are worth brief mention. Over 85% of respondents were employed in workplaces with fewer than 10 archaeologists, 55% with fewer than five, emphasising the small scale of work units in the discipline. Almost 72% were employed full-time,

with less than one-third (28%) employed on a part-time or casual basis. This trend is supported by other data showing that 65% of respondents worked five days or more a week. These findings are at odds with anecdotal statements about the highly casualised nature of the Australian archaeological workforce. Average gross incomes for full-time archaeologists are well above the national average (see Barber and Kopras 2004), with over 87% earning more than \$40,000 in 2004, 56% earning more than \$60,000 and 23.5% above \$80,000 (Fig. 6). There are slight but significant disparities in the distribution of income by gender, with women earning 54% of incomes below \$60,000 and men earning 60% of incomes over \$60,000.

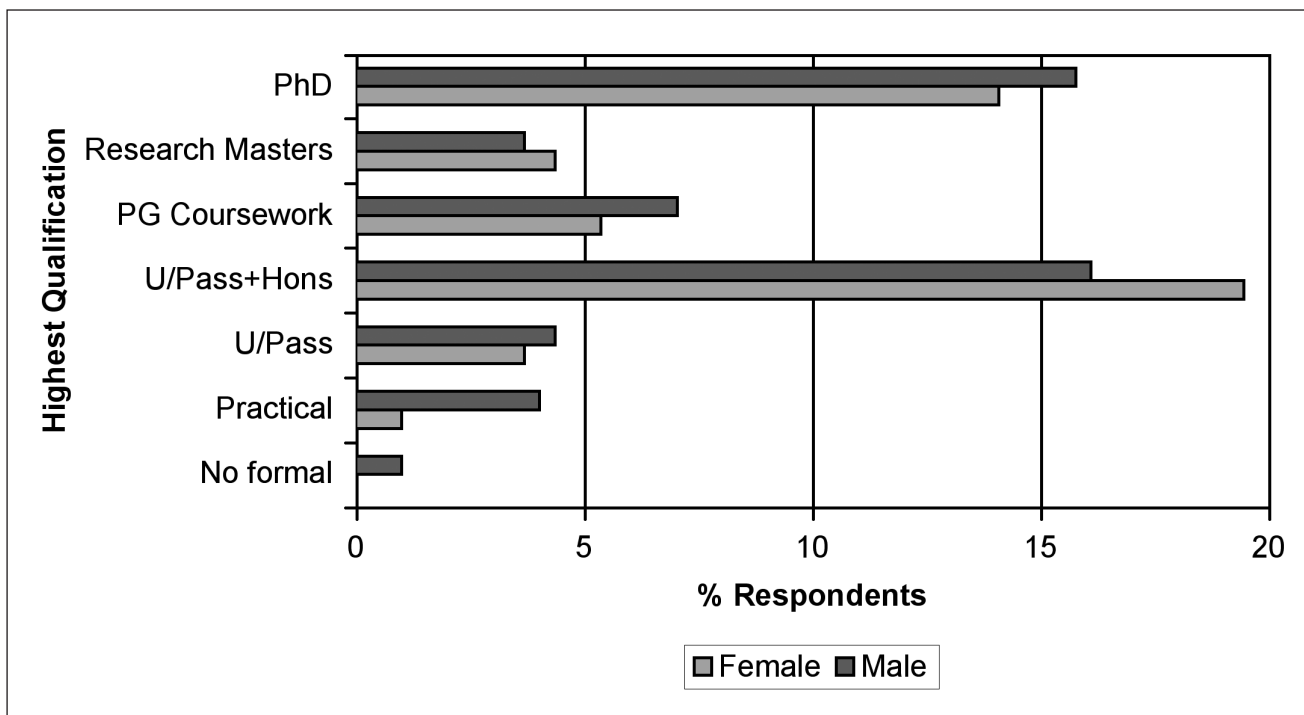


Figure 7 Highest qualification by gender (n=298).

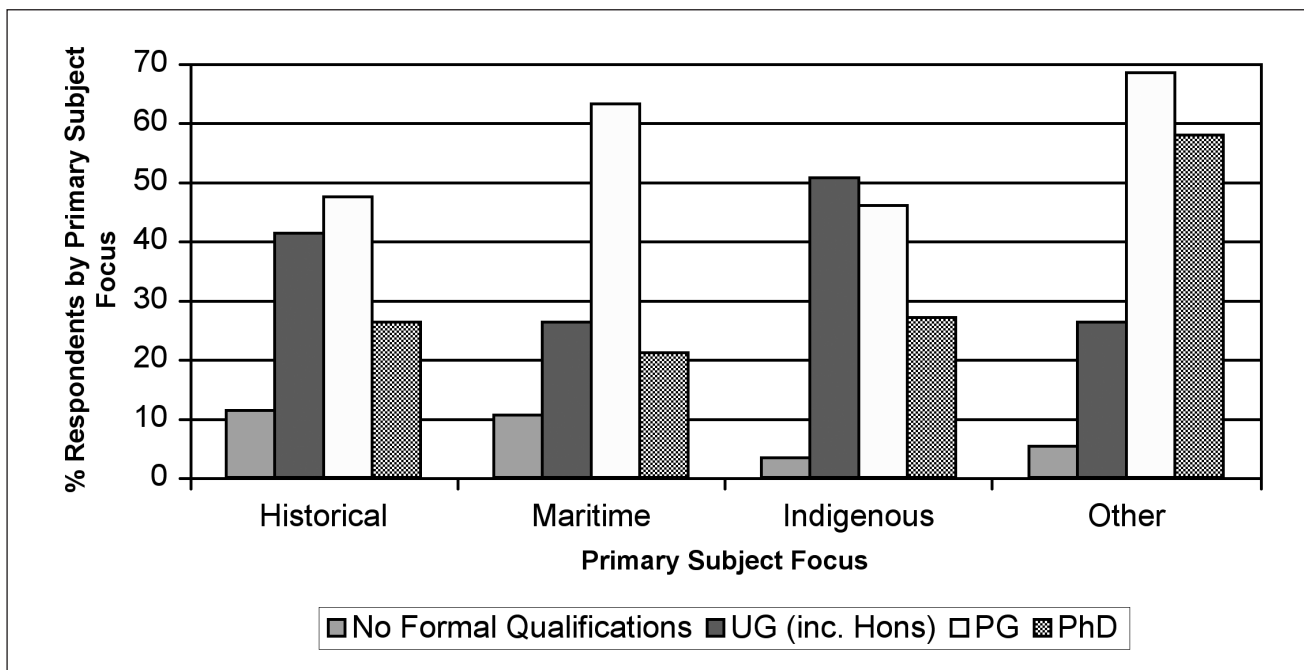


Figure 8 Highest qualification by primary subject focus. PhD degrees are shown to indicate proportion of PG degrees which are PhDs (n=289).

Qualifications and experience

An honours degree is often cited as the ‘minimum industry standard’ for professional archaeologists in Australia (e.g. Beck and Balme 2005; Colley 2004:198), yet nearly 15% of respondents worked in archaeology with only an undergraduate pass degree, practical experience or no academic qualifications (Fig. 7). This pattern is most pronounced in historical and maritime archaeology, where over 10% of professionals have no formal qualifications in archaeology, compared to 3% in Indigenous archaeology (Fig. 8), although some of these respondents held an

academic qualification in another discipline. Overall, the vast majority of professional archaeologists held a higher degree (50.5%) or honours degree (35.6%) (Fig. 7). Maritime archaeology exhibits the highest proportion of professionals holding higher degrees (63%) although with the lowest proportion of PhDs (21%), reflecting the importance of masters-level programs in this field (Fig. 8).

Ninety-three percent of respondents had a minimum of an undergraduate pass degree with archaeology as a major area of study (Fig. 7). This result is similar to figures available from the United Kingdom (90%), indicating that

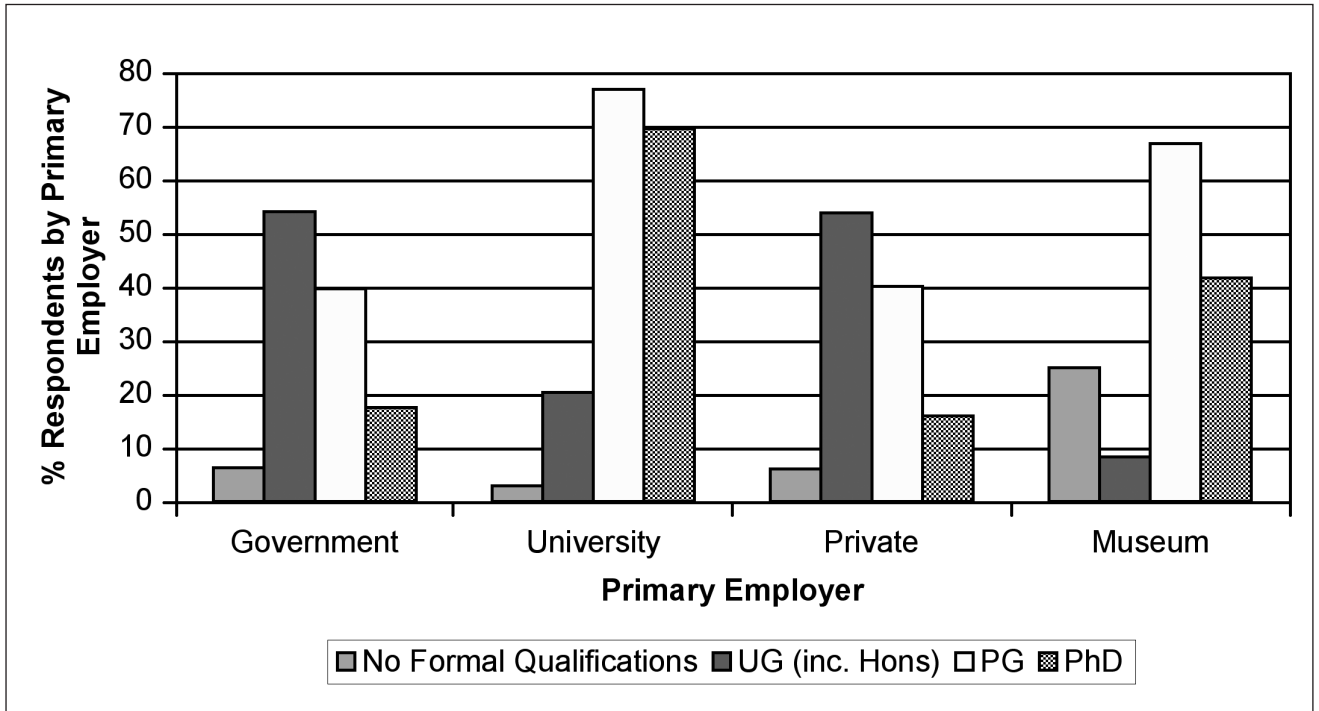


Figure 9 Highest qualification by primary employer. PhD degrees are shown to indicate proportion of PG degrees which are PhDs (n=276).

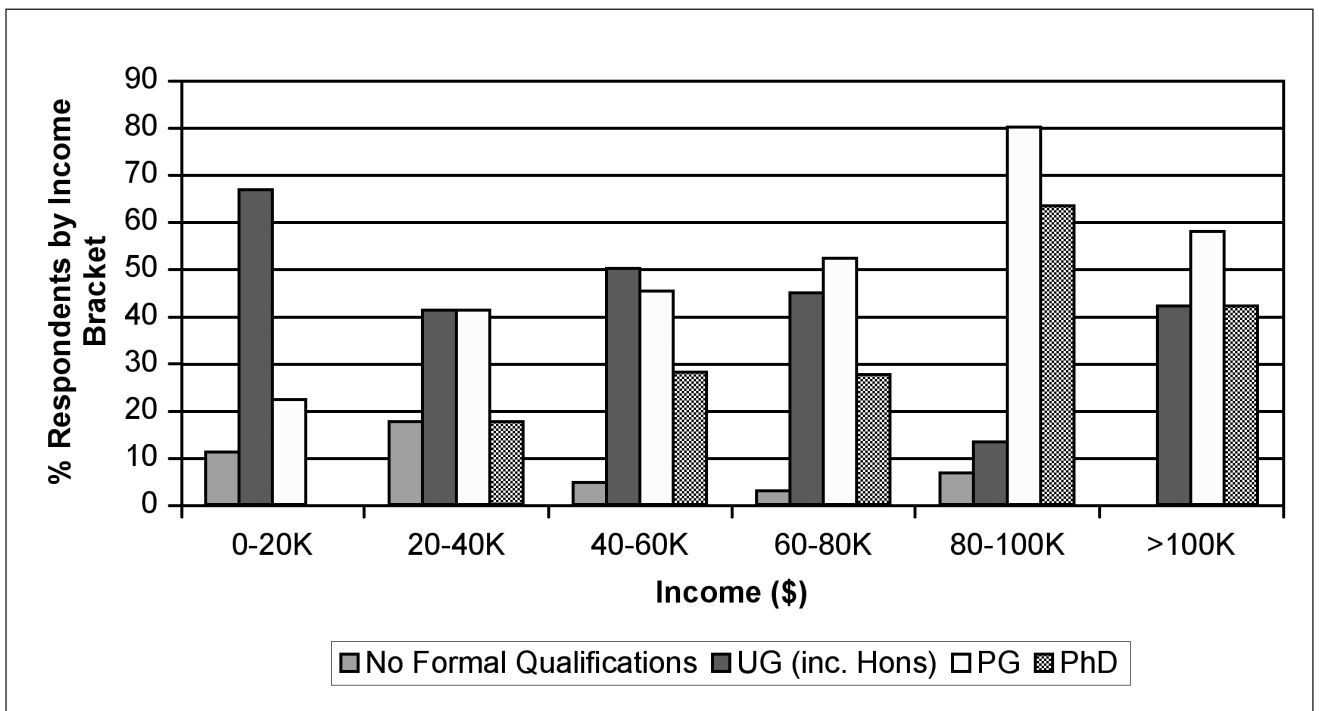


Figure 10 Relationship between highest qualification and income, full-time only. PhD degrees are shown to indicate proportion of PG degrees which are PhDs (n=208).

archaeology is a graduate profession (Aitchison and Edwards 2003:xiii). Australian archaeologists compare favourably with archaeologists in the United Kingdom in terms of advanced degrees, with 30% of respondents holding PhDs compared with only 10% in the UK study (Aitchison and Edwards 2003:xiii).

Not surprisingly, most archaeologists working in the university sector hold PhDs (70%), with the distribution of qualification levels in the government and private sectors being almost identical (Fig. 9). Data shown in Figure 9 for the museum sector may not be representative owing to the small number of respondents (n=12), although the distribution suggests a division between technical staff with few formal qualifications and research or curatorial staff holding advanced degrees.

The level of highest qualification of respondents is strongly correlated with income levels, with archaeologists holding postgraduate degrees dominating the highest income brackets (Fig. 10). Although many factors impact on income, this relationship might be taken as an indicator that university education is valued in the workplace, at least in terms of remuneration. The point is reinforced by the number of archaeologists undertaking study. Just over 22.7% of respondents working in archaeology during 2004 were also studying, 47.1% of these at PhD level.

Nearly a quarter of respondents (23.2%) had completed formal academic training in archaeology outside Australia, over half of these (55.1%) at research masters or PhD level, indicating the important role international institutions have in training archaeologists working in and from Australia at senior levels. This point has not previously been raised in discussions of Australian archaeology teaching and learning issues (e.g. Colley 2004).

A final key issue in the area of qualifications and experience is the role of volunteer work. Over 93% of respondents indicated that they had undertaken voluntary archaeological work. Nearly three-quarters (73.2%) of these

had undertaken more than 3 months of voluntary work, and nearly half (42.8%) more than 6 months in total over the course of their careers. These figures suggest that voluntary activity plays a key role in archaeology training and learning in Australia.

Skill sets and skills gaps

The real-world skills of many graduates seeking [cultural heritage management] employment (e.g. in basic areas such as the drafting of reports and effective correspondence) are deficient.

Over the last decade, government and private sector employers have been increasingly vocal about a perceived lack or diminution of graduates' archaeological knowledge and skills (see Colley 2004; Gibbs et al. 2005; Lydon 2002). These concerns are reflected in the survey results. Nearly 85% (84.1%) of respondents agreed that more emphasis should be placed on developing practical consulting skills in undergraduate degrees, while 87.4% agreed that more emphasis should be placed on developing broad critical thinking skills in undergraduate degrees. Virtually all respondents also agreed (16.3%) or strongly agreed (81.7%) that practical, field-based archaeological experience should be an important part of undergraduate training in archaeology, with 86.2% agreeing that there is a need for a vocationally-oriented option for graduates as well as the traditional research-oriented honours year.

Previous commentary on archaeological skills and skill gaps has been based on anecdotal evidence or largely unstructured qualitative data collected as part of teaching and learning conference and workshop sessions (e.g. Colley 2003; Gibbs et al. 2005; cf. Lydon 2002). In an attempt to explicitly address this issue, respondents were asked to rate both their *personal* level of experience in a range of skill areas and then to rate how valuable these skills were for *archaeologists* in their workplace. The 38

Non-Archaeology Specific Skills	Archaeology Specific Skills
General business	Field survey techniques
Interpersonal communication	Excavation techniques
Leadership	Stone artefact identification and analysis
Human resource management	Faunal analysis
Occupational health/safety	Residue and use-wear analysis
Sales/marketing	Archaeological theory
Advocacy/public relations	Rock art recording and analysis
Report writing	Ceramic analysis
Library/archival research	Human skeletal identification and analysis
Computer literacy	Knowledge of legislation
Geographical Information Systems (GIS)	Significance assessment
Statistical analysis	Heritage management planning
Cross-cultural communication	Conservation of artefacts
Knowledge of intellectual property issues	Policy development
Photography	Understanding of research ethics
Critical thinking	Drawing/illustration
Time management	
Project management	
Negotiation/mediation	
Diving	
Four-wheel driving	
Teaching/training	

Table 2 Skill areas used to define gaps in training (after Colley 2004).

Skill
Report writing
Interpersonal communication
Field survey techniques
Computer literacy
Library/archival research
Time management
Project management
Critical thinking
Knowledge of legislation
Significance assessment

Table 3 Top-10 most valuable skills (all respondents).

Skill
Geographical Information Systems (GIS)
Human skeletal identification and analysis
Advocacy/public relations
Faunal analysis
Residue and use-wear analysis
Statistical analysis
Rock art recording and analysis
Human resource management
Occupational health/safety
Conservation of artefacts/Policy development

Table 4 Top-10 skill gaps (all respondents). Note that two skills were ranked equal tenth place.

skill areas were divided into overlapping categories of ‘Non-Archaeology Specific Skills’ and ‘Archaeology Specific Skills’ (Table 2) and are loosely based on those identified by delegates at the Redfern National Archaeology Teaching and Learning Workshop as what students should learn through studying archaeology at university in Australia (Colley 2004:194). The skill areas range from the specific (e.g. ceramic analysis) to the generic (e.g. critical thinking).

The top-10 skills identified by respondents as most valuable for archaeologists in their workplace accord well with issues identified by others (Table 3), with report writing ranked as the most valuable skill, followed by interpersonal communication and field survey techniques. Only three of the 10 most valued skills are considered to be archaeology specific skills, with the others representing more generic skills.

Skill gaps were determined by calculating an index for each respondent for each question (i.e. the gap between how valuable they ranked the skill in their workplace versus their personal level of experience). The most significant finding of this analysis was that there is no overlap between the 10 most valuable skills and the top-10 skill gaps (Tables 3-4). For example, library/archival research was ranked fifth in the list of most valuable skills, but was ranked last out of the 38 skill gaps, indicating no perceived skill gap in this area. In contrast to the 10 most valuable skills which tended towards more generic skill categories, the top-10 skill gaps tend to focus on specific skill sets such as GIS, faunal analysis etc.

In general terms, when the distribution of skill gaps is considered by primary subject focus (Table 5) some clear trends are evident. For example, diving is not in the top-10 skill gaps for maritime archaeologists, presumably because most professionals already have this skill. Similarly, cross-cultural communication features in the top-10 gaps for historical and maritime archaeologists, but not for specialists in Indigenous archaeology. Other findings are counter-intuitive at first glance, such as ceramic analysis identified as a major skill gap for Indigenous archaeology, however, many Indigenous archaeology professionals identified historical archaeology as a secondary area of professional practice and vice versa.

Identified skill gaps show remarkable consistency across primary subject focus and primary employer (compare Tables 5 and 6). Faunal analysis, GIS, human skeletal identification and analysis and advocacy/public relations are gaps for professionals working in Indigenous, historical and maritime archaeologists across the private, university, government and museum sectors. Statistical

Indigenous	Historical	Maritime	Other
Human skeletal identification and analysis	Advocacy/public relations	Human skeletal identification and analysis	Human skeletal identification and analysis
Residue and use-wear analysis	Geographical Information Systems (GIS)	Ceramic analysis	Residue and use-wear analysis
Geographical Information Systems (GIS)	Human skeletal identification and analysis	Geographical Information Systems (GIS)	Geographical Information Systems (GIS)
Faunal analysis	Human resource management	Faunal analysis	Faunal analysis
Advocacy/public relations	Faunal analysis	Advocacy/public relations	Advocacy/public relations
Statistical analysis	Statistical analysis	Statistical analysis	Policy development
Rock art recording and analysis	Cross-cultural communication	Residue and use-wear analysis	Statistical analysis
Human resource management	Occupational health/safety	Cross-cultural communication	Rock art recording and analysis
Occupational health/safety	Sales/marketing	Sales/marketing	Heritage management planning
Ceramic analysis	Residue and use-wear analysis	Stone artefact identification and analysis	Conservation of artefacts

Table 5 Top-10 skill gaps by primary subject focus. Shaded cells indicate skill gaps common across all primary subject focus areas. ‘Other’ includes contact and classical archaeology.

analysis is also identified as a gap across all primary subject focus areas and all sectors except museums. Similarly, residue and use-wear analysis is a gap across all primary subject focus areas and all sectors except government. The commonality of the valued skills and the skill gaps identified across sectors and primary subject focus areas suggest there are core skills essential to much of the professional workforce (cf. Lydon 2002:131). These findings can inform curriculum development in universities and continuing professional education.

Discussions in the profession on the preparedness of graduates for the archaeological workforce have typically focused on specific skill sets (see Colley 2003, 2004) such as basic survey and excavation methods. These concerns are generally reflected in the survey data, but the gap analysis shows that other generic and business skills such as advocacy/public relations, statistical analysis and human resource management are also seen as critical across all professional sectors and primary subject focus areas (see Gibbs et al. 2005). These findings echo those of Lydon (2002), who argued that both technical and broad conceptual skills were vital to meet current demands of the workplace as part of a broader curriculum (see also McBryde 1980). Lydon's (2002:134, original emphasis) respondents 'identified practical skills as those which they find useful in their work but which they acquired *outside* their formal university courses, and they nominated these skills as priorities for further training'. As Gibbs et al. (2005) have argued, these skill areas are precisely those that have suffered the most with changes in university funding and pressure on resources.

Our results contrast with the potential skill gaps identified in Aitchison and Edwards' (2003:xiv) recent study in the United Kingdom where information technology, project management, desk-based research and archaeological landscape characterisation were identified as priorities for training. Although there was no comparable skill category to 'archaeological landscape characterisation' in our study, computer literacy, project management and library/archival research all ranked outside the top-25 skill gaps identified here. These results point to the different character of contemporary professional archaeological workplaces in Australia and the United Kingdom.

Responsibility for teaching and learning

There is a woeful lack of engagement by the universities with government funded and private-sector cultural resource management – which are the areas in which most archaeology graduates are likely to find employment.

Respondents clearly emphasised responsibility for archaeology teaching and learning as a joint responsibility of individual universities, associations and professional bodies and government agencies (cf. Colley 2004:195) (Fig. 11). Respondents also overwhelmingly agreed (93.9%) that there must be greater collaboration between universities, government and industry in teaching and learning archaeology in Australia. These findings are supported by responses to other statements in the survey. While slightly less than half of respondents (47.5%) agreed that non-academic professional archaeologists have a responsibility to train undergraduate students, most (68.5%) agreed that non-academic professional archaeologists have a responsibility to train graduates. Some respondents pointed out that 'training ... rarely fits into consulting work – consultants have responsibilities to heritage clients and stakeholders and must usually pick already trained assistants' and that 'consultants cannot afford either the time or the money to teach on the job – and why should developers pay for it?' However, the overall attitude of respondents is given further support by respondents with 85% agreeing that they would be willing to place students and early career graduates in their workplace to gain vocational experience and 97% agreeing that there is a need to better coordinate opportunities for students and early career graduates to gain vocational experience in the workplace.

A clear role for continuing professional development emerged, with 95% of respondents agreeing that there should be more short (e.g. 2-5 day) professional development courses on offer for archaeologists. The receptiveness of the professional community to professional development opportunities is also evident in participation rates. Nearly half of respondents (48.7%) indicated that they had attended an archaeological professional development workshop or short course in Australia or overseas during 2004.

Private	University	Government	Museum
Faunal analysis	Residue and use-wear analysis	Advocacy/public relations	Geographical Information Systems (GIS)
Geographical Information Systems (GIS)	Human skeletal identification and analysis	Geographical Information Systems (GIS)	Human skeletal identification and analysis
Human skeletal identification and analysis	Geographical Information Systems (GIS)	Human skeletal identification and analysis	Heritage management planning
Residue and use-wear analysis	Faunal analysis	Statistical analysis	Residue and use-wear analysis
Advocacy/public relations	Advocacy/public relations	Faunal analysis	Faunal analysis
Human resource management	Statistical analysis	Cross-cultural communication	Advocacy/public relations
Rock art recording and analysis	Rock art recording and analysis	Negotiation/mediation	Ceramic analysis
Statistical analysis	Conservation of artefacts	Human resource management	Policy development
Occupational health/safety	Ceramic analysis	Occupational health/safety	Sales/marketing
Policy development	Stone artefact identification and analysis	Rock art recording and analysis	Human resource management

Table 6 Top-10 skill gaps by primary employer/sector. Shaded cells indicate skill gaps common across all sectors.

Taken together, these results suggest that archaeologists are generally happy for universities to be largely responsible for undergraduate teaching and learning, with input from the sector more generally, but that the non-academic sector has a clear role to play in graduate training and continuing professional education.

Accreditation and benchmarking

Colley (2004:198) notes that although honours is traditionally considered the ‘minimum industry standard’ to work as an archaeologist, the degree itself is ‘insufficient for such purposes’. Colley (2004:200) highlights the fact there is no formal accreditation or regulation of professional standards, except that provided for part of the sector by the Australian Association of Consulting Archaeologists Inc. and heritage agencies who monitor research standards and issue permits under legislation, but points out that ‘accreditation raises a whole set of other challenges and implies a nationally recognized body representing all relevant stakeholders, which does not yet exist in Australia’. Gibbs et al. (2005:31) also raise concerns about the possible use of formal accreditation ‘against the survival of university departments’ and suggest the accreditation of particular courses rather than programs as a whole.

Despite these concerns, respondents clearly identified accreditation and benchmarking as key issues in archaeology teaching and learning, with 86.9% agreeing that there is a need for national accreditation of all professional archaeologists, and 85.7% agreeing that Australian undergraduate and honours degrees in archaeology should be benchmarked nationally to ensure that graduates have common basic skills (see Beck and Balme 2005). These data are supported by many respondent comments, including:

Formal benchmarking and accreditation for archaeological university training in Australia is

critical for the future development and survival of the discipline.

Do not expect government to sort out the training, professionalisation, accreditation. The discipline needs to sort this out for itself. It is essential for the future viability of the archaeological profession outside of an academic context.

Aboriginal people and their heritage, this valuable, non-renewable resource, gets sold out by ... charlatans. *Accreditation for consulting archaeologists is absolutely essential.* The Irish system (relevant qualifications, minimum level of experience and pass an examination by a government board) is worth examining [original emphasis].

The positive endorsement of the professional community for accreditation and benchmarking coupled with the existence of a common skill set indicated earlier by congruence of valued skills and identified skill gaps may provide a way forward for those grappling with these issues.

Discussion

Results of the ‘Australian Archaeology in Profile’ survey presented here demonstrate that there is a young, well-qualified and enthusiastic professional archaeological workforce in Australia. Most archaeologists in Australia work in the private sector, with the high confidence expressed for expansion of this sector emphasising the key role it needs to play in archaeology teaching and learning. Support for this position is found in the view that more vocationally-oriented learning options should be available and the consensus that all sectors have a role to play in archaeology teaching and learning.

Several commentators have noted that the low staffing

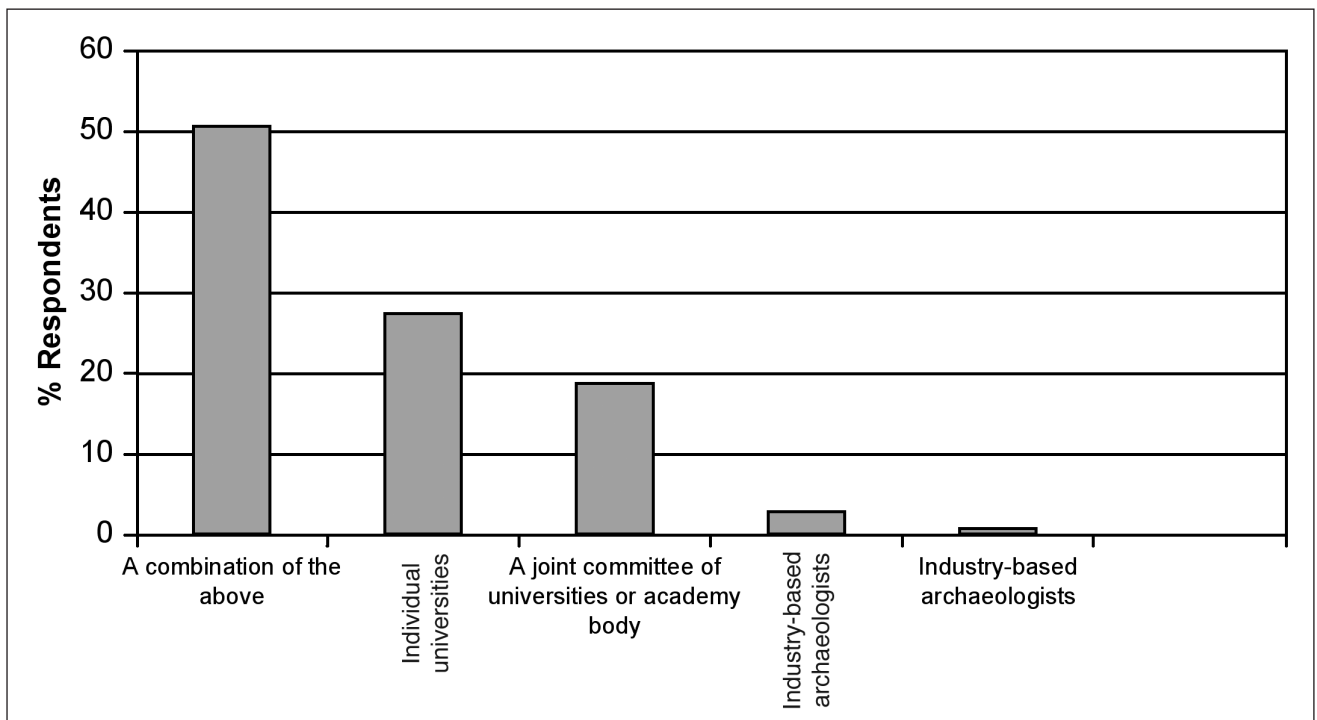


Figure 11 First preference for overseeing archaeology teaching and learning in Australia (n=289).

levels and resource constraints in Australian university archaeology departments limit their ability to offer a large range of courses (e.g. Colley 2004:190; Lydon 2002). In response to changes in the discipline, Beck and Balme (2005:33) note that universities 'have changed their courses to include units in heritage, public archaeology and so on, but within the current degree structure there is simply no room to provide the kinds of specific training that the profession expects'. At the undergraduate level, some of the kinds of specialist skills identified here as skill gaps might require new appointments in archaeology departments where staff expertise does not exist (e.g. physical anthropology) or investment in teaching facilities (e.g. computer laboratories for GIS). Additionally, only the small numbers of students who will enter the profession are likely to undertake such specialist courses, further undermining their viability in the current university funding and policy environment. However, respondents do provide practical directions for resolving this dilemma. Many agree or strongly agree on the need for a vocationally-oriented option for graduates as well as the traditional research-oriented honours year. Many also agree on the need to coordinate opportunities for students and early career graduates to gain vocational experience in the workplace and, at least in principle, support the idea of placing students and early career graduates in their workplace to gain vocational experience. Many also see a clear need for more short professional development courses to address the ongoing training needs of those already in the workforce.

In the short-term, some of the skill gaps that were identified can be addressed by providing more structured guidance to undergraduate students to undertake specific courses in faculties beyond the humanities and social sciences (see also Gibbs et al. 2005; Lydon 2002:134). For example, GIS can be studied in geography and planning departments, human skeletal identification and analysis in anatomy, statistical analysis in mathematics etc. Although it might be more desirable to design specifically archaeological course content in these areas in the long-term, using existing courses would allow resources to be redirected to other more pressing areas. Basic expertise in specialised archaeological skills, such as faunal analysis, residue and use-wear analysis, rock art recording and analysis and conservation of artefacts might be usefully addressed outside the university context by short courses run by professional bodies such as the Australian Association of Consulting Archaeologists Inc. and Museums Australia, which already offer some courses in these areas.

Several authors have recently noted that the changing demands of the broader teaching and learning environment have a direct impact on students' study options and preferences (e.g. Fredericksen 2005). There is clearly a need to balance the more traditional framework of obtaining practical skills while studying through volunteer laboratory and fieldwork with changes in students' economic environments, in which many work either part-time or full-time and have a range of competing responsibilities beyond university. As Frankel (1998:25) notes, the 'multiple skills required in the field can only be learnt by practice ... [and] [s]erious archaeology students often sacrifice much in order to participate in excavations, and much research is

dependent on their voluntary contributions in the field and laboratory'.

Another major theme emerging from the survey is an urgent need to facilitate greater involvement of private, government and museum sectors and Indigenous groups as part of an integrated approach to the archaeology teaching and learning design and management process. To be effective, a national body with a charter to represent all sectors of the industry needs to be established and resourced. The Australian Joint Interim Standing Committee on Archaeology Teaching and Learning (JISCATL) has partly addressed this issue, but its effectiveness is hampered by a lack of resources to ensure engagement with all sectors. Unlike professional bodies in the United States and United Kingdom, Australian professional bodies and associations are entirely voluntary and have limited resources.

In the past, cooperation across sectors has been limited by perceived differences in agenda between private and university stakeholders. However, the often-cited schism between applied and academic archaeology appears to be overstated, as the dramatic growth of this sector over the last three decades has meant that most junior academics have spent at least some time in the private and/or government sectors (see also Lydon 2002:131). The boundaries between the sectors are much more porous than might be imagined too, with universities actively encouraging academics to undertake consultancies as revenue-raising activities. This fluidity is also reflected in the numbers of applied archaeologists holding adjunct or honorary academic positions in archaeology departments, undertaking advanced degrees while working and convening specialist workshops, like those in the AACAI Professional Development Workshop Series. These trends, supported by strong support from all sectors for greater engagement, suggest that the time is right for taking advantage of the climate to establish and resource effective mechanisms for contributing to the debate.

Conclusion

This paper briefly touches on some of the major themes emerging from the 'Australian Archaeology in Profile' survey that are relevant to archaeology teaching and learning in Australia. Further analysis of the rich and diverse data generated by the project will result in insights into more nuanced findings, although the full value of the exercise will only be realised when comparable longitudinal data are available to chart the changing face of the Australian archaeological workplace, as has been undertaken in the United Kingdom (see Aitchison and Edwards 2003).

While by no means definitive, the data presented here are important for improving archaeology teaching and learning and for investigating the connections between graduate skills and those skills needed in the workplace. In particular, the skills and skill gaps identified by practising professionals provide useful grist for debates about benchmarking undergraduate (Gibbs et al. 2005) and honours degrees (Beck and Balme 2005) in archaeology.

The major theme emerging from this study is an urgent need to facilitate greater involvement of industry groups, the private, government and museum sectors and Indigenous groups in the archaeology teaching and

learning design and management process. Solutions will need to be based on innovation, collaboration and genuine goodwill to maximise limited resources and create a sustainable dialogue across all sectors of the archaeological profession in Australia.

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