Ready or Not

An Archaeological Knowledge, Skills, and Abilities Needs Assessment

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ABSTRACT

Debates about the best means of preparing archaeologists continue. This article reviews data from 674 archaeological job postings to assess in-demand archaeological knowledge, skills, and abilities. The needs assessment reveals American archaeology's demand for dynamic, highly skilled professionals capable of identifying, preserving, and protecting the past. The skills demanded in archaeology job postings are the skills necessary to not only succeed as an archaeologist in any sector but also meet the challenges faced by the discipline more generally.

Keywords: cultural resource management (CRM), labor market, training, education, archaeology

Continúan los debates sobre la mejor manera de preparar a los arqueólogos. Este artículo revisa los datos de 674 anuncios de trabajo arqueológicos para evaluar los conocimientos, habilidades y destrezas arqueológicos en demanda. La evaluación de necesidades revela la demanda de la arqueología estadounidense de profesionales dinámicos y altamente calificados capaces de identificar, preservar y proteger el pasado. Las habilidades exigidas en las ofertas de trabajo de arqueología son las habilidades necesarias para tener éxito como arqueólogo en cualquier sector y las mismas habilidades necesarias para enfrentar los desafíos que enfrenta la disciplina en general.

Palabras clave: gestión del patrimonio arqueológico, mercado laboral, formación, educación, arqueología

It has been written that "the evolution of best practice in archaeology is a result of internal self-reflection within the discipline as well as exploiting positive developments within other fields of human endeavour" (Chirikure 2013:116). As a discipline, archaeology continues to reconcile with its history of destructive digging and cultural insensitivity (Colwell-Chanthaphonh 2009) while also addressing social issues relevant to the twenty-first century more generally. American archaeology faces calls to diversify the field and the National Register of Historic Places (Flewellen et al. 2021; Franklin et al. 2020; Gamble et al. 2020), tackle pervasive inequity (Rivera Prince et al. 2022), address sexual harassment in the field (Colaninno 2019; Meyers et al. 2018), and improve public engagement (Bollwerk et al. 2015). For decades, archaeology has also faced calls to better prepare students with the knowledge, skills, and abilities needed to succeed in the archaeological workforce in the United States. As archaeology reflects on its future and looks for solutions to current challenges, addressing the divide between the archaeological curriculum and real-world archaeological knowledge, skills, and abilities remains an urgent priority.

Along with many other disciplines and industries, archaeology finds itself facing labor challenges in the 2020s. In the United States, infrastructure rehabilitation, energy transitions, climate change, looting, and community development catalyze archaeological surveillance, excavation, and mitigation projects through permitting requirements and fiscal investments. Altschul and Klein's (2022a) forecast of the cultural resources management (CRM) market for fiscal years 2022–2031 revealed that despite expected market growth, the sector will likely struggle to supply the number of archaeologists with graduate degrees needed to meet the next decade's demand. In a corresponding op-ed, Altschul and Klein (2022b) conclude the following:

> Whether the next decade is a golden period for archaeology and cultural heritage or a period wracked by our failure to meet the country's expectations to balance its historic fabric with economic development is in our hands. We cannot be passive. We must argue forcefully that archaeology is a subject worthy for universities to invest in, and we must convince those training future archaeologists that CRM is a subject worthy of study.

Advances in Archaeological Practice 11(4), 2023, pp. 371–387

DOI:10.1017/aap.2023.21

> We also need to work collectively to make archaeology a viable career, creating a workforce that represents our nation's diverse communities. The country has placed its faith in us to help decide what to protect and how to protect it while rebuilding our infrastructure and allowing economic development. We must meet the moment.

Considerable ink has been spilled outlining the disconnect between the requirements of CRM and the curriculum of the anthropology/archaeology academy. Emerging from the passage of the National Historic Preservation Act in 1966 (NHPA; https://www.achp.gov/sites/default/files/2018-06/nhpa.pdf), CRM "achieved de facto recognition as the principal form of archaeology in the United States" by the 1980s (Green and Doershuk 1998:124). Through the decades, complaints against CRM have been numerous, although largely consistent. The relationship between money, CRM, and the quality of archaeology delivered in a market economy is central to many criticisms (Hamilakis 2004:292). Some suggest that CRM has simply had its time and exists as "an aged industry that has worn out its welcome" (Moore 2006:32). More extreme criticisms cite CRM as "state-sanctioned heritage crime" (Hutchings and La Salle 2017:72). Others have taken criticisms of the relationship between capitalism and archaeology to equally dramatic conclusions: "I would rather work toward a future without archaeology; a future where, rather than perpetuating and reproducing the discipline itself, we expend our intellectual energy working through and against the structures of capitalism" (Wurst 2019:178).

Rather than robbing archaeology of standards and intellectual contributions, scholars note that CRM was an early adopter of innovations such as geophysical survey, remote sensing, and geographic information systems (GIS) and that it helped spur the incorporation of postcontact archaeologies and novel site protection initiatives (Green and Doershuk 1998:131–132). In turn, the academy has faced its share of criticisms. Some argue that the academy has failed to prepare generations of archaeologists for the realities of a career in archaeology—be that in CRM, government, nonprofits, or academia (Clark 2004:11; Gillespie 2004:15; Shackel and Mortensen 2006:23; Wolley Vawser 2004:18–19)—while saddling students with increasing economic burdens (Society for American Archaeology 2022). Many also note that contentious relationships between archaeology and external economic drivers exist throughout the discipline, as evidenced by "the alarming growth of exploitative part-time, or one-year, faculty positions at universities" (Schuyler 1999:69).

Over the years, the divide between what is taught in archaeology academic programs and what is done on the job has persisted. Analyses of university/college archaeology curricula in relation to CRM have been conducted for decades. Zeder (1997a, 1997b) assessed surveys of student and professional opinions of archaeological preparation and the profession more generally. Researchers have turned to class listings in university/college curricula, searching for CRM courses in an informal manner, to explore the divide. Whitley (2004:21) "made an informal survey of the websites for more than 50 randomly selected U.S. graduate schools in archaeology," but the sample was limited by "the good, the bad, and the ugly Internet." Wolley Vawser (2004:18) completed a similarly "less formal survey using the wonderful 21st-century tool, the *Google* Internet search." Despite limitations of the Internet and variability of website updates, both analyses provide valuable insight into what the anthropology/archaeology curriculum entails and what it does not. Speakman and colleagues (2018) completed an analysis of doctoral programs, market-share trends, and gender division in academic archaeology in North America using data collated from the 2014–2015 American Anthropological Association's *AnthroGuide*. They argued that despite the absence of a comprehensive database for analysis, reviewing occupational data is "useful for students, faculty, and administrators alike as we look towards the future of archaeology and consider what it takes to build better employment opportunities for all of us" (Speakman et al. 2018:11). In 2019, the University of Texas Master's Cohort surveyed a nonrandom sample of 850 graduates with a master's degree in anthropology on perceptions of graduate education and career paths (Hawvermale et al. 2021). Larkin and Slaughter (2021) completed a pilot study exploring undergraduate training for the workforce by surveying 30 CRM professionals and academics in Colorado and comparing perceived levels of preparation in education and CRM.

The historic literature on the divide between the archaeology curriculum and skills necessary for career success suggests that the arguments and curricula have changed little over the decades. But what knowledge, skills, and abilities (KSAs) do archaeologists need to meet the challenges of today and tomorrow? Deming and Kahn (2017:3) argue that job postings offer a vital data source: "In principle, measures of skill requirements extracted from job vacancy data can be used to study the returns to a variety of skills across occupations, labor markets and other contexts." Job postings have limitations too. They are unstandardized, subjective summaries, and they may not include descriptions of all the KSAs necessary for success in the workplace. Assessing the most in-demand KSAs may obscure equally important and relevant competencies not spotlighted by employers. Nonetheless, KSAs in job postings offer insight into the basic competencies demanded by employers and represent important, if not all, relevant expertise. This article assesses data from 674 job postings collected from six online job boards over a three-month period in 2022–2023. Analysis of the KSAs from employers in private CRM firms, universities, state, local, federal, and Indigenous governments, museums, and nonprofits reveal a multifaceted profession in search of archaeologists with broad field, research, legal, writing, and technological competencies. Although the dollar and its temptations remain omnipotent, the needs assessment reveals that American archaeology demands dynamic, highly skilled professionals capable of identifying, preserving, and protecting the past. The KSAs demanded in archaeology job postings are the competencies necessary to succeed as an archaeologist in any sector, and these are the same skills necessary to meet the challenges faced by the discipline more generally. This dataset confirms that changes to the archaeology academy are essential and urgent. Despite archaeology's penchant for the task, this study concludes that the archaeology curriculum/career divide is not a hole that the field can afford to dig any deeper.

METHODS

This article assesses data from 674 job postings listed on six digital platforms: Indeed.com, USAjobs.gov, ArchaeologicalFieldwork.com, Preserve.net, and the job boards of the Society for American Archaeology and the Society for Historical Archaeology. The platforms surveyed provide a sample of archaeological job postings listed over a three-month period. Several similar job boards were not consulted during this survey, given that a

https://doi.org/10.1017/aap.2023.21 Published online by Cambridge University Press

comprehensive review of every job board was beyond the scope of this project. The six platforms consulted represent private, government, and for-profit job boards, offering a useful variety of position types and employers to explore. From October 10, 2022, to January 10, 2023, job postings were recorded on weekdays over a total of 69 days. Job postings contain information about the employer, job, requirements, and benefits. For each job posting, the name of the employer, type of employer, job title, job location, responsibilities, required qualifications, preferred qualifications, and salary were recorded on an Excel spreadsheet. Recorded job postings represented employment opportunities from 49 states; Washington, DC; and Guam (Figure 1). Although postings were distributed across the United States, California accounted for approximately 16% ($n = 114$) of positions. Job postings represented the full spectrum of opportunities within American archaeology: private CRM firms ($n = 347$); federal government agencies ($n = 125$); universities ($n = 83$); state governments ($n = 66$); Native American, Native Alaskan, and Native Hawaiian governments and corporations ($n = 26$); nonprofit organizations ($n = 13$); local governments ($n = 12$); and museums ($n = 2$). The dataset was queried to determine the educational degree, professional certifications, and KSAs required or preferred by employers. The results of the data analysis and a discussion of their significance follow.

RESULTS

The job postings reflect a variety of archaeological positions—from entry level to supervisory management roles across private, government, and nonprofit employers. To account for variations in the KSAs expected at different levels of employment and in different entities, a closer look is taken at five common positions: archaeological technician ($n = 144$), crew chief ($n = 43$), archaeologist ($n = 152$), professor ($n = 38$), and collections management positions ($n = 39$), representing 62% of the recorded positions (Figure 2a–2h). The archaeological technician position is generally an entry-level position. Thomas King (2005:113) cites the US Labor Department, which describes the archaeological technician as providing "technical support to professional archaeologists" through fieldwork, background research, and cleaning and cataloging artifacts. Archaeological technicians are generally managed in the field by crew chiefs or field directors, who are responsible for both managing the crew and ensuring the completion of the survey in a safe, timely, and efficient manner. "Archaeologist" is a position with broader responsibilities, but in the dataset, it generally represents a mid- to senior-level position with responsibilities including fieldwork, technical report writing, oversight of federal compliance, and/or program/budget management. "Professor" is an archaeological or anthropology position in universities, with the primary responsibility of teaching and researching. Last, collections management or curation positions include laboratory managers and assistants engaged in the management of cultural materials. These five positions cover a range of vital cultural resource responsibilities. Analyzing the data by each of these positions will illuminate variations and similarities in KSAs across archaeological positions and hiring entities.

The results of the survey revealed university/college degrees to be the most common requisite for archaeological employment. Presumably, this indicates that graduation from an anthropology or archaeology undergraduate or graduate program prepares students for a career in archaeology; however, employers also sought candidates who had attended an accredited field school or

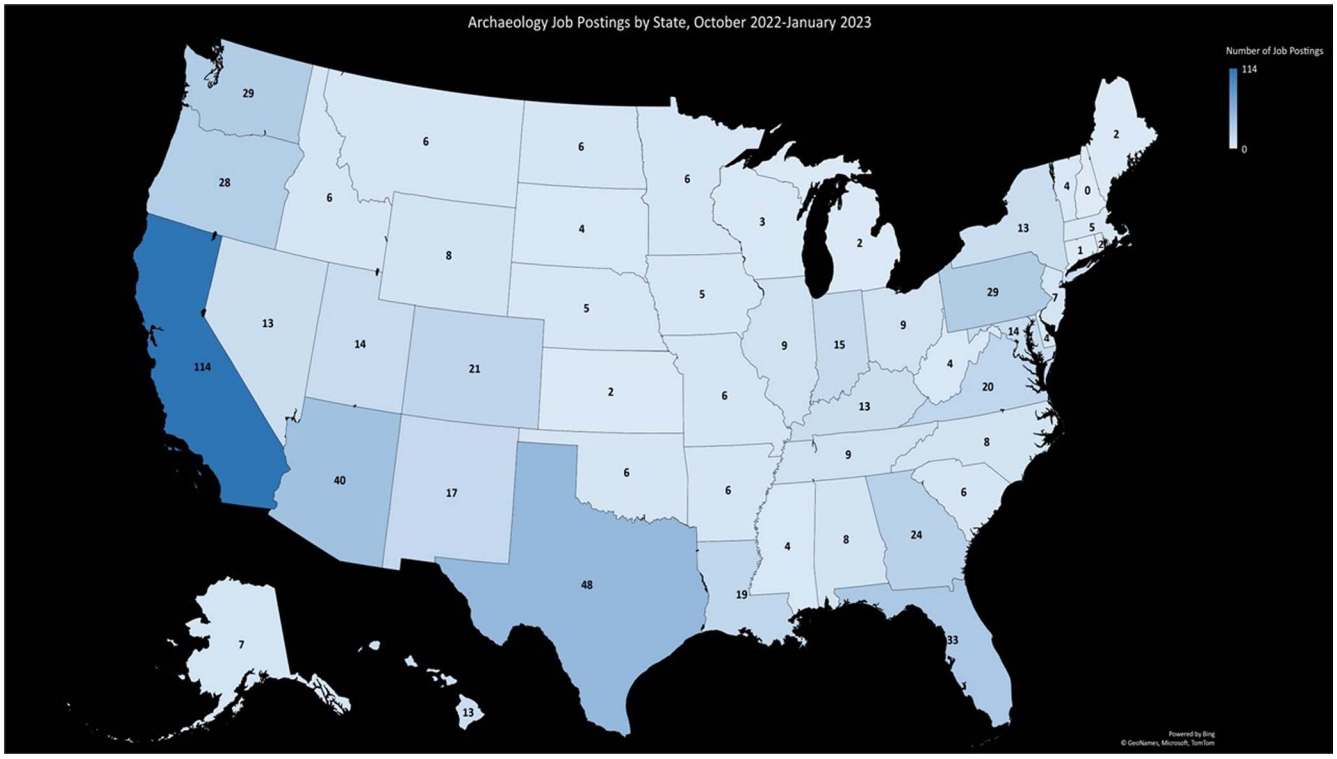

FIGURE 1. Geographic distribution of assessed archaeological job postings.

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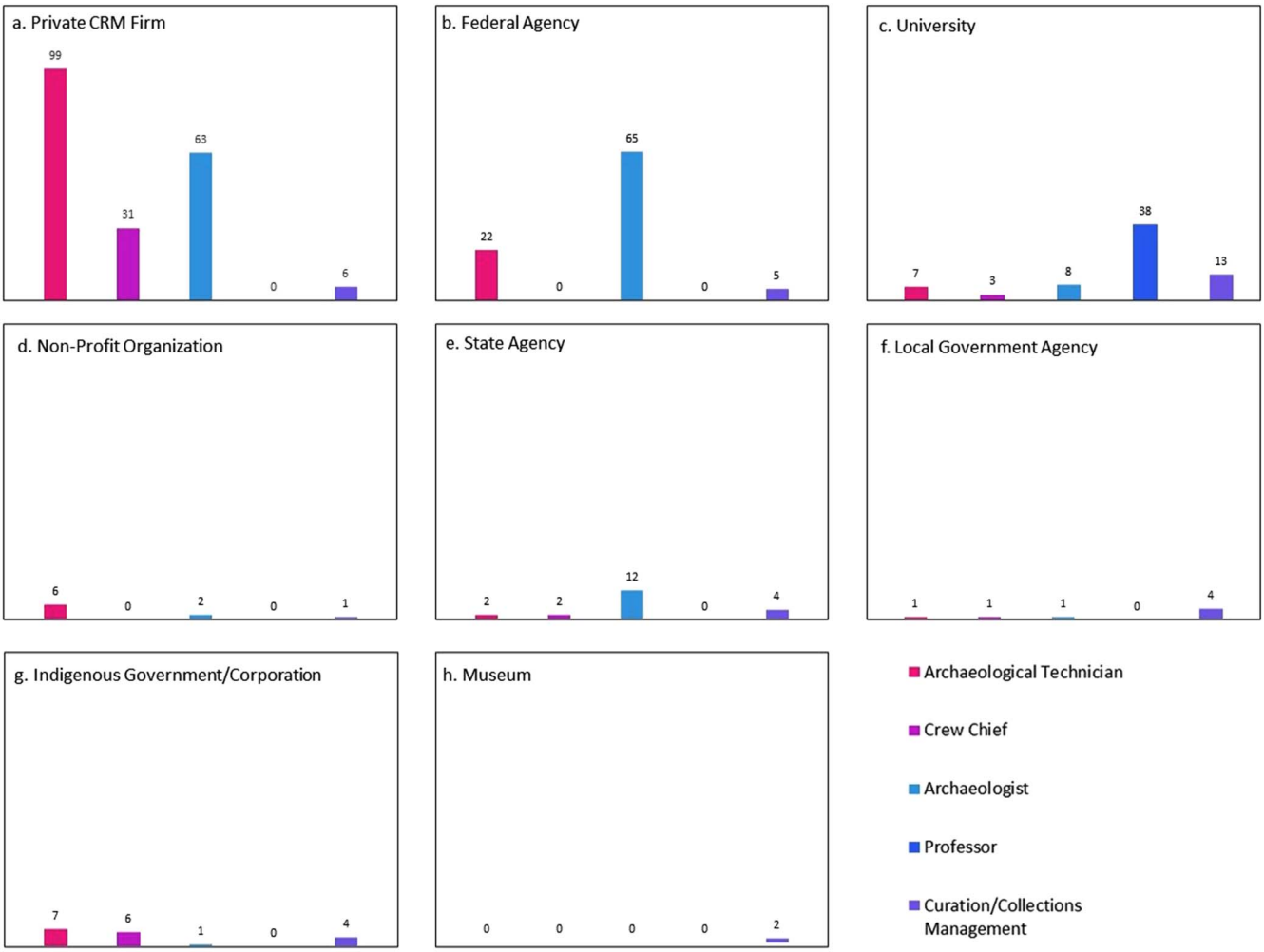

FIGURE 2. Sample archaeological positions categorized by type of archaeological employer.

—to a lesser degree—were listed in the Register of Professional Archaeologists (RPA). Additionally, employers sought archaeologists who had knowledge of historic preservation legislation and who had experience with fieldwork, technical writing, research, artifact identification and analysis, GIS, collaboration with Indigenous communities, and cataloging and curating collections (Figure 3). Many required and/or preferred qualifications aligned with the results of Larkin and Slaughter's (2021) survey, which found that the most in-demand industry skills for entry-level archaeologists were experience with pedestrian surveys, artifact identification, excavation, completing state/federal forms, and running specialized analysis. The additional detail provided in job postings offers insight into the specific knowledge and training archaeologists need to contribute to the discipline.

Degrees to Dig

Of the job postings recorded, 599 listed a degree as a requirement. Degree requirements varied across job postings (Figure 4). Some employers shared minimum degree requirements. Others differentiated between required and preferred degrees. Still others enumerated all degrees accepted. The most common degree required for employment was a bachelor's degree (n = 249). The bachelor's degree in anthropology, archaeology, or a closely related field has long been the minimum educational requirement within the field of archaeology and anthropology more generally. However, the job postings revealed that some employers accepted a high school diploma (n = 21) as the minimum degree requirement, primarily for archaeological technician positions. This may reflect employers offering college students opportunities during their university/college education or a job market already facing labor pressures and a shortage of credentialed workers. Accepting high school diplomas as the minimum degree requirement also allows community college graduates and nontraditional students with field certificates to join the archaeology workforce. The second most requested degree requirement for employment was the master's degree. Of the employers, 182 sought candidates with a minimum of a master's degree, whereas another 61 employers required a minimum of a bachelor's degree but gave preference to those candidates who also held a master's degree. The penchant for the master's degree most likely reflects the Secretary of the Interior's standards for archaeological professionals. A recent survey of anthropology students with master's degrees found that "the main complaint about master's education

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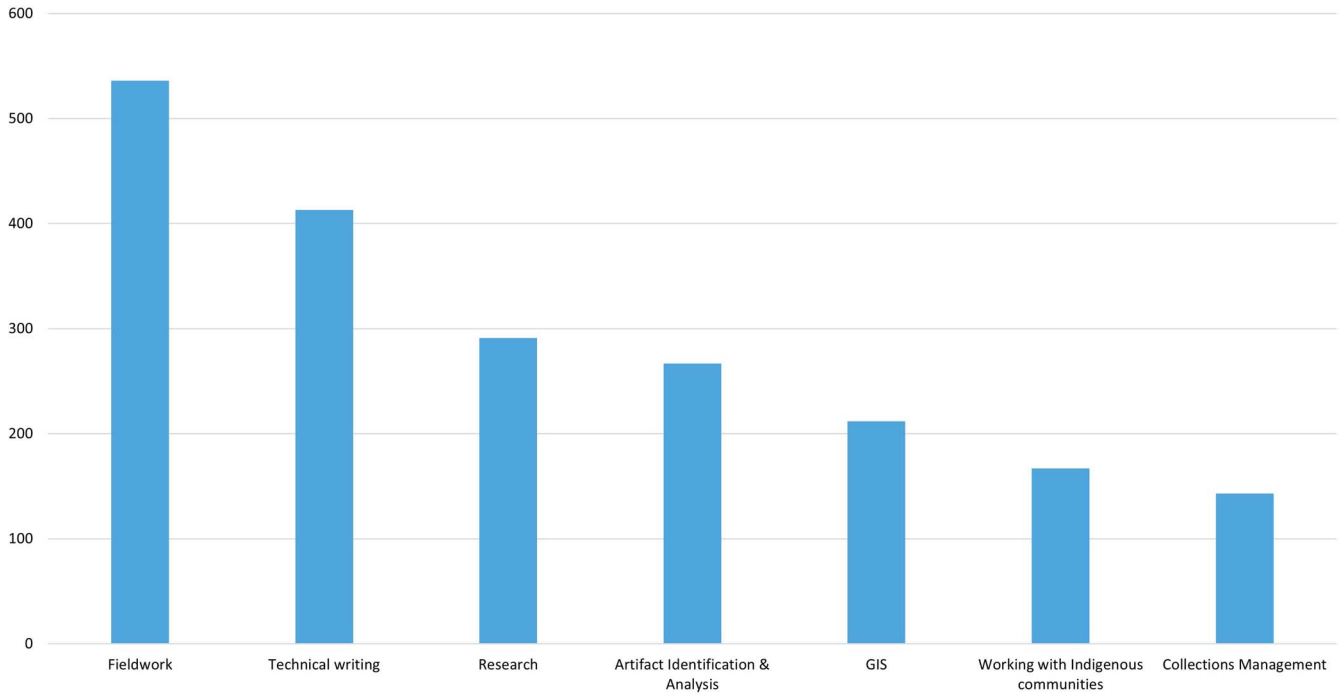

FIGURE 3. Most requested KSAs by employers in assessed archaeological job postings.

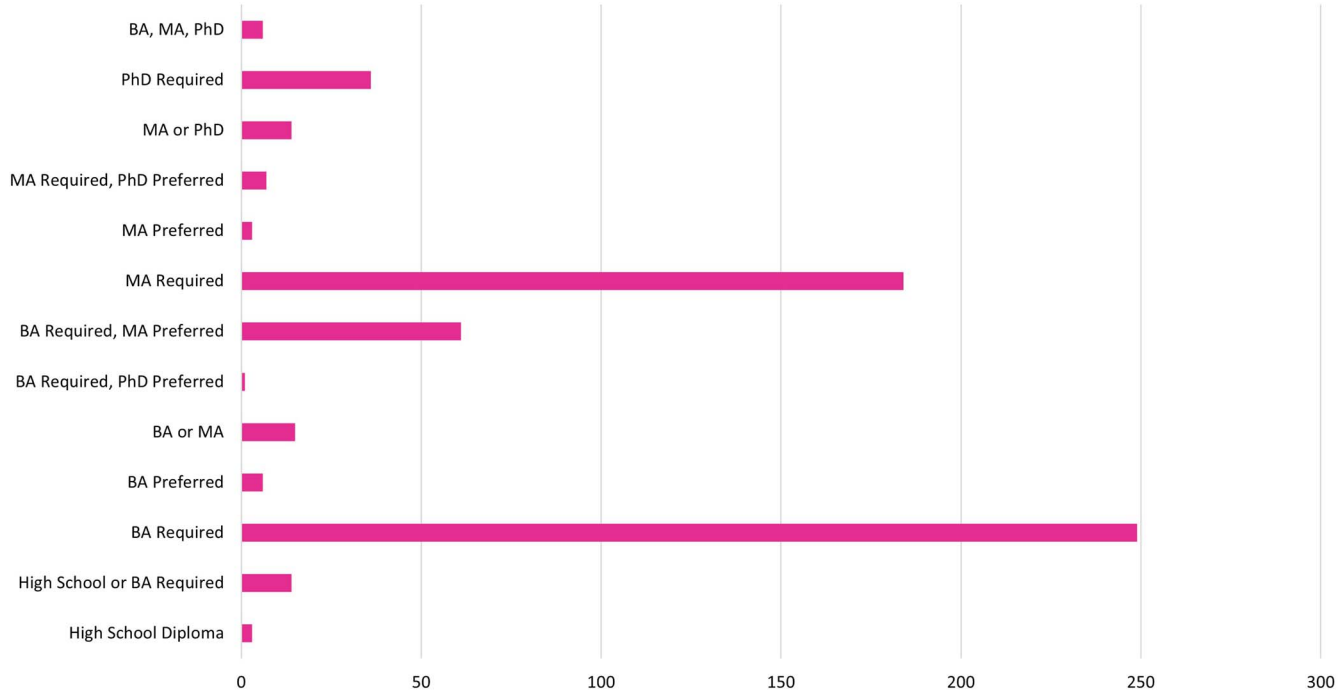

FIGURE 4. Archaeological employers listed a diverse range of degree requirements in assessed job postings.

https://doi.org/10.1017/aap.2023.21 Published online by Cambridge University Press

was that it does not give students relevant skills to enter the workforce" (Hawvermale et al. 2021:vi).

Few employers sought candidates with a doctorate. Thirty-six positions required a PhD. Others sought candidates with either a master's or doctorate ($n = 14$); a master's, with preference for a doctorate ($n = 7$); a bachelor's, with preference for a doctorate ($n = 1$); or a bachelor's, master's, or doctorate ($n = 6$). There has been much discussion about the anthropology/archaeology doctorate in recent years (Cramb et al. 2022; Marshall 2020; Speakman et al. 2018). Wurst (2019:172) summarizes, "The discipline also continues to produce PhDs at an alarming rate, increasing the production of professionals unlikely to find jobs suitable for their qualifications." As Speakman and colleagues (2018:1–7) explain, "Over the past 30 years, the number of US doctoral anthropology graduates has increased by about 70%, but there has not been a corresponding increase in the availability of new faculty positions . . . a problem that is equivalent to compounding interest on a loan."

Figure 5 shows degree requirements for archaeological technicians, crew chiefs, archaeologists, professors, and collections positions. Most employers hiring archaeological technicians sought candidates with a minimum of a bachelor's degree ($n = 103$). It may surprise some that a graduate degree was a minimum requirement for some archaeological technician positions ($n = 12$). Employers in the federal government posted 58% of the archaeological technician positions requiring a master's degree, whereas private CRM firms accounted for 75% of the postings requiring a minimum of a bachelor's degree for archaeological technicians. Although a minimum of a bachelor's degree remained a common requirement for crew chief and archaeologist positions, an increased demand for a master's degree is observable among the mid-level positions. For positions broadly labeled as "archaeologist," postings by the federal government listed a minimum of a bachelor's degree more often, whereas postings by private CRM firms were more likely to require a minimum of a master's degree. Doctorates were minimum requirements primarily for academic positions, although some universities sought candidates with a minimum of a master's degree. Collections management positions generally required a minimum of a bachelor's degree; a master's degree was a common minimum requirement as well.

The degree requirements of the job postings recorded indicate that the bachelor's degree remains the gateway to archaeological employment. Although many mid- and senior-level positions also sought candidates with a minimum of a bachelor's degree, there was an observable demand for candidates with a minimum of a master's degree in those positions, suggesting that a bachelor's degree alone may not ensure long-term career mobility. This initial survey also raises questions about sector-specific pathways afforded by graduate degrees. With federal agencies searching for candidates with graduate degrees to fill positions traditionally thought of as entry level, comparative datasets are needed to determine how this requirement could impact career trajectories and/or spur broader demand for professionals with graduate degrees. The demand for candidates with master's degrees likely reflects regulatory requirements, whereas the low demand for candidates with PhDs aligns with the shrinking opportunity for employment within the academy documented elsewhere. The expected increase in archaeological work, the pressures of outside forces such as climate change and looting, and internal efforts to make archaeology more diverse, transparent, and safe require steady workforces—ideally with low employee turnover

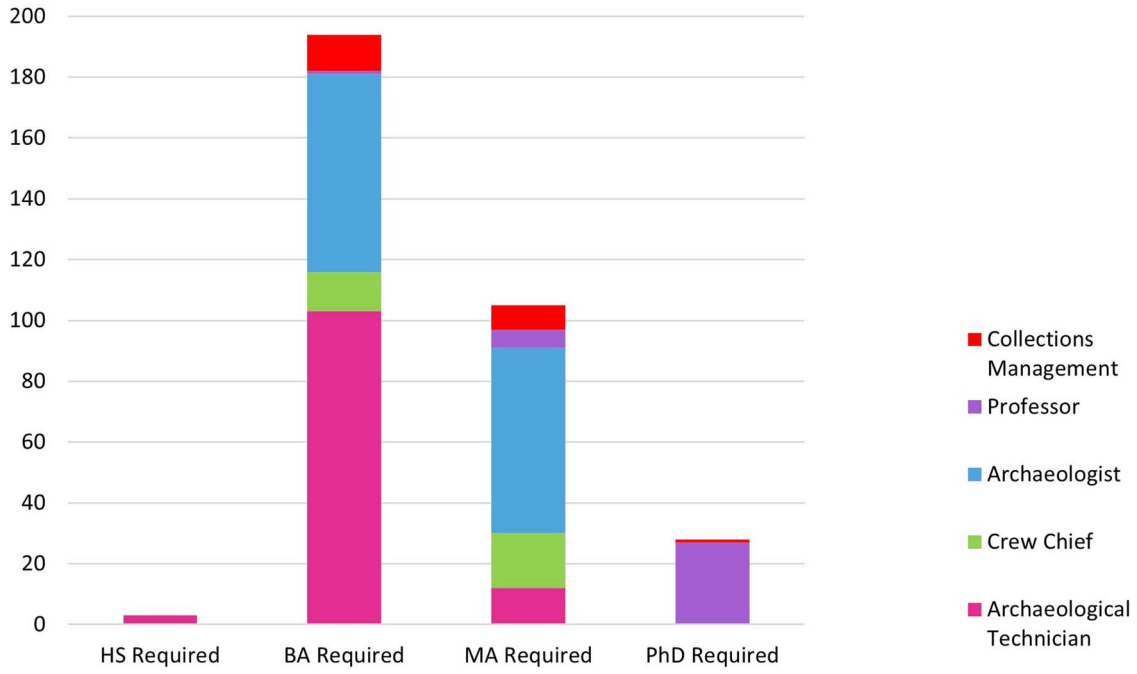

FIGURE 5. Minimum degree requirements listed in sample archaeology positions.

https://doi.org/10.1017/aap.2023.21 Published online by Cambridge University Press

and high employee engagement. If the field is to maintain a ready and able workforce, it must define career expectations clearly, prepare students accordingly, and ensure that their education and experience are put to good use.

The most prominent noneducational credential within US archaeology is a listing on the Register of Professional Archaeologists (RPA). Registration with the RPA did not rank among the top requirements of archaeology employers. Of the positions assessed for this project, only 83 employers requested a candidate listed on and in good standing with the RPA. As summarized by Altschul and Klein (2022a:11), "Archaeologists can voluntarily register with the Register of Professional Archaeologists either at the BA level ('Registered Archaeologist,' or RA) or the MA/PhD level ('Registered Professional Archaeologist,' or RPA) if they meet specific experience and proficiency criteria." The RPAs and RAs agree to subscribe to the Code of Conduct and Standards of Research Performance, which "is purposefully prescriptive, listing what an archaeologist 'shall' and 'shall not' do (RPA 2018). These standards are enforced via a grievance process" (Dennis 2021:108).

The RPA has faced criticisms because it "has no authority to police [its] own membership," raising concerns about its enforcement capacity and leaving some to conclude that American archaeology exhibits a "lack of ethical practices" (Steeves 2015:136). Joe Watkins (2015:21) notes that "archaeology in America has struggled with defining its ethical structure since the establishment of the Society for American Archaeology (SAA) in 1934." Altschul (2006:24) wrote that "only about one-third of archaeologists eligible for RPA are actually listed. . . . The dominant degree obtained by RPAs is an MA, whereas the dominant degree held by those choosing not to register is the PhD." It may be that few employers requested candidates listed as RAs or RPAs due to the perceived low number of qualified archaeologists listed on the RPA. State-specific permitting requirements might also render listing with the RPA redundant. The low demand for candidates registered with the RPA raises important questions about the role of the RPA and the code of ethics outlined in other archaeological associations as American archaeology addresses historic issues and prepares for a demanding future.

Knowledge of Historic Preservation Legislation

Employers sought candidates with knowledge of a variety of topics—including anthropology or archaeology generally, geography, geomorphology, geology, soil science, biology, zoology, paleoecology, chemistry, statistics, and archaeology of specific regions—but knowledge of historic preservation legislation was the most commonly listed specific subject area (Figure 6). Many employers required knowledge of general state ($n = 180$) or federal laws ($n = 161$). Of job postings that listed knowledge of specific laws, experience with the NHPA ($n = 260$) was most requested, followed by experience with the National Environmental Policy Act (NEPA; $n = 88$). The demand for knowledge of the NHPA and NEPA highlights the prominence of the Section 106 process and NEPA as a corresponding umbrella process within the federal permitting machine. Employers sought archaeologists with knowledge of other historic preservation laws as well, including the Native American Graves Protection and Repatriation Act (NAGPRA; $n = 51$), the Archaeological Resources Protection Act (ARPA; $n = 29$), 36 CFR 79 ($n = 4$), and the Antiquities Act ($n = 2$). Although the Antiquities Act has been largely superseded in archaeology by ARPA, the low demand for knowledge of NAGPRA, ARPA, and 36 CFR 79 is harder to understand. With looting on the rise and increased looting tied to economic instability (US General Accounting Office 1987; US Government Accountability Office 2021), it is arguable that knowledge of ARPA should be essential to many archaeologists, especially those employed with the federal government or with Native American, Native Hawaiian, or Native Alaskan governments. With the curation crisis still going strong and with pending changes to

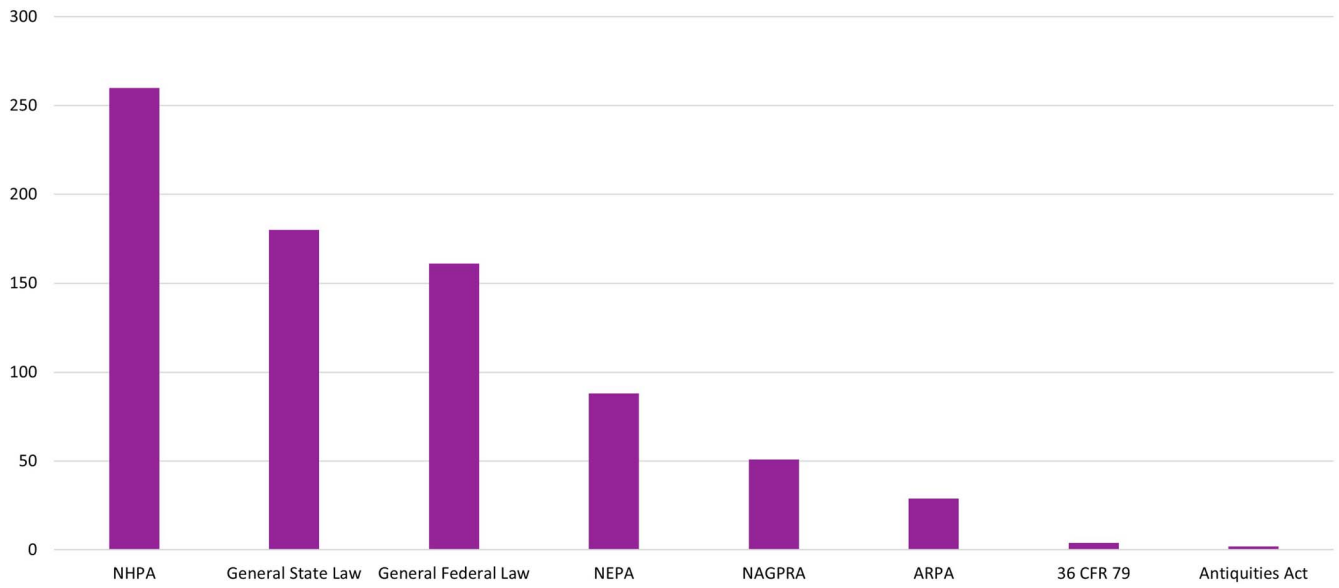

FIGURE 6. Specific legal knowledge listed in archaeology job postings.

https://doi.org/10.1017/aap.2023.21 Published online by Cambridge University Press

NAGPRA that would ideally increase protection and repatriation of ancestral individuals and sacred objects, NAGPRA and 36 CFR 79 seem to be valuable KSAs.

Among sampled positions, knowledge and experience with historic preservation legislation was most commonly sought in job postings for archaeologists, 69% of which required this KSA (Figure 7). Knowledge of the NHPA was again in highest demand, followed by knowledge of federal and state laws generally. Of postings for archaeologists seeking knowledge of the NHPA, 48% were posted by federal agencies. Private CRM firms sought experience with the NHPA specifically in 35% of archaeologist job postings; however, it would be a mistake to view this low percentage as an indication that private CRM companies did not seek candidates with knowledge of historic preservation legislation. Of the archaeologist job postings listed by private CRM companies, 48% sought candidates with knowledge of NEPA, whereas 35% sought candidates with knowledge of general federal laws. Forty-three percent of crew chief positions also required legislation KSAs. These positions were primarily listed by private CRM companies. Only 17% of postings for archaeological technicians sought legislation KSAs. Employers seeking candidates with knowledge and experience of historic preservation legislation sought candidates with a minimum of a bachelor's degree more often than candidates with graduate degrees. These initial findings suggest that undergraduate programs that include courses on historic preservation legislation are valuable to graduates entering the workforce and seeking employment in government and private sectors, although that knowledge may prove more vital to career mobility than obtaining entry-level employment.

With a high percentage of job postings coming from employers whose work is dictated by historic preservation legislation, it might be expected that closer to 90% of employers would seek candidates with historic preservation legislation KSAs. Perhaps this points to the fact that much of this knowledge is learned on the job rather than in the classroom. Shackel and Mortensen (2006:23) note that this is the case for many facets of applied archaeology jobs. After working in the CRM industry, Steeves reflected,

> I realized there was a huge dislinkage between the people in Washington who write the Sect. 106 laws, NAGPRA, and heritage protection laws, state and federal representatives in the field, and CRM firms actually doing the work. I also realized that many field archaeologists were undergraduates or recent graduates and happily oblivious to the laws and statutes regarding CRM and the protections of cultural sites [2015:128].

This observation seems to be borne out by the job postings, for which archaeological field technicians who primarily excavate to fulfill the requirements of federal preservation legislation are rarely required to have KSAs in the legal requirements they fulfill. Altschul and colleagues (2023) note, "Archaeological field technicians are the backbone of the CRM labor force, and it is upon their labor that the rest of the industry rests." And yet from education to employment, the archaeological workforce is compartmentalized into need-to-know and need-to-dig.

Calls to incorporate historic preservation legislation into the archaeology curriculum have been made for decades, although these calls for change often emphasize the need for legal courses

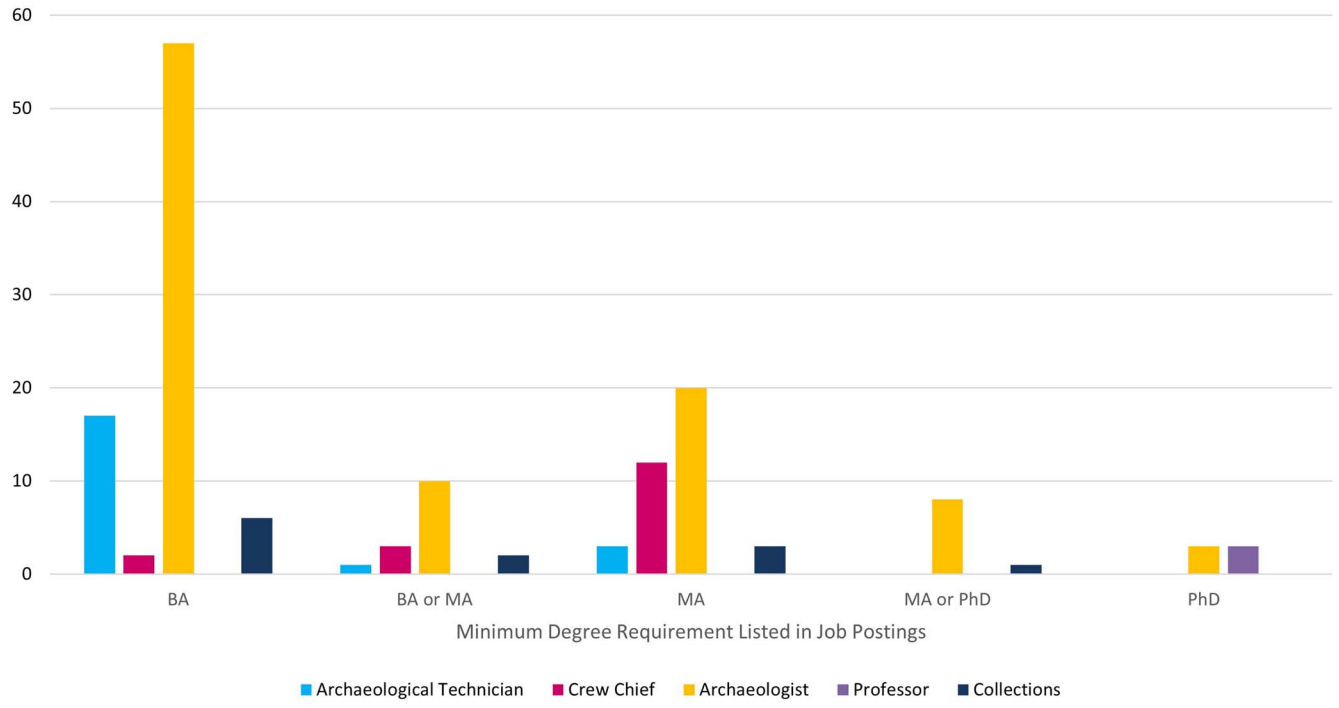

FIGURE 7. Legal knowledge requested in sample archaeology job postings.

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in graduate education (Davis et al. 1999:18; Schuldenrein and Altschul 2000:63; White 2000:113). However, assessments of curricula often show few courses "that could be construed as being somehow related to CRM," and the few that did have such courses usually had only one (Whitely 2004:21). It has been nearly two decades since surveys of university/college curricula concluded that most archaeology curricula lacked sufficient courses in CRM; consequently, an in-depth analysis of the current state of university/college archaeology curricula is necessary to contextualize these findings.

Soderland and Lilley (2015) write, "Ethics inform law and law informs ethics. . . . As practitioners in the field face a range of new threats and challenges, it is more important than ever that law and ethics coalesce to assist the discipline in adapting to continually evolving uncertain circumstances." As archaeologists confront a range of challenges, training in the legal frameworks that regulate the professional world are essential. The demand for archaeologists with knowledge of historic preservation laws is an encouraging sign that employers seek archaeologists who can respond to numerous challenges ethically and in full compliance with all relevant laws.

Fieldwork

It should come as little surprise that the top skill sought by archaeological employers was fieldwork expertise ($n = 536$). Some employers were vague in their expectations, simply requesting candidates with experience with archaeological fieldwork. Others solicited candidates with experience in various phases of fieldwork: pedestrian survey, surface collection, shovel testing surveys, test unit excavations, data recovery investigations, site reconnaissance, and/or monitoring surveys. Some employers elucidated the knowledge and experience necessary to adequately conduct various phases of fieldwork, such as the ability to read and navigate by topographic maps; orient/sight by compass; pace by meters; assess soils by Munsell color, texture, and inclusions; screen soil matrices; draw sketch maps; and thoroughly record field observations. Many employers also emphasized that positions involving fieldwork required the ability to walk, dig, and screen for long hours through challenging terrains and climates while carrying equipment weighing around 50 pounds.

Unsurprisingly, 88% of archaeological technician listings sought candidates with fieldwork experience (Figure 8a). Jobs with a fieldwork requirement more commonly requested candidates with a minimum of a bachelor's or master's degree (Figure 9a). Of those archaeological technician postings, 68% required a minimum of a bachelor's degree. Ninety-three percent of crew chief listings sought candidates with fieldwork experience. There was slightly higher demand for candidates with master's degrees and fieldwork experience among crew chief positions. Eighty-seven percent of archaeologist listings also sought candidates with fieldwork experience, with a slightly higher demand for candidates with a minimum of a bachelor's degree. Job listings for professors (26%) and collections management positions (21%) were less likely to require fieldwork KSAs.

Archaeological fieldwork embodies a complex range of physical and mental abilities that intersect, overlap, and continue to evolve. These skills are refined and improved through practice and experience, so it should be expected that archaeologists will learn and advance on the job. However, it should not be accepted that archaeologists will be introduced to the skills necessary to conduct fieldwork on the job. Courses that introduce students to the history of archaeological fieldwork, expose them to the various phases of archaeological investigation and field recording, and include practical field experiences will prepare students for the work that lies ahead.

A common requirement among employers was completion of an accredited field school (in addition to at least one and sometimes two university/college degrees). The job postings did not specify the location or type of field school to be completed. Reliance on field schools to prepare students for careers in archaeology implies that undergraduate and graduate anthropology/archaeology programs need more practical fieldwork courses that introduce and train future archaeologists in the science, methods, and theories of archaeological fieldwork. Heath-Stout and Hannigan (2020) explore the "exorbitant costs" of field schools and their inaccessibility to many students that keep archaeology an exclusionary field. Even for those students fortunate to attend field schools, there is no guarantee that they will receive training in the field skills necessary to succeed on the job. A recent survey revealed that many field schools felt that they had trained students in pedestrian survey (100% of field school respondents), excavation (91% of field school respondents), and—to a lesser extent—site monitoring (17% of field school respondents). However, only 55% of CRM employers observed recent graduates skilled in pedestrian survey, only 63% of CRM employers observed recent graduates skilled in excavation, and only 5% of CRM employers observed recent graduates skilled in site monitoring (Larkin and Slaughter 2021:11). Certainly, there is room for subjectivity in conceptions of preparedness and ability; however, these disparities highlight the disconnect between archaeology education and archaeology preparation.

With increases in archaeological work and challenges anticipated, archaeologists with field skills at the ready (not archaeologists ready to learn field skills on the job), are needed. Peres and Deter-Wolf (2018:296) note that climate change requires that archaeologists "anticipate and prepare for a rapid response on short notice. We need to survey and assess damage and loss of cultural resources, but we need to be prepared to do the science and data collection to mitigate loss of data and information from these events." Economic instability also increases the likelihood that archaeologists employed by federal agencies will need to respond rapidly to increased vandalism of archaeological sites. As climate change damages and reveals more cultural resources, as federal funding increases the CRM workload, and as the demand for innovative and respectful explorations of the past continues, the field of archaeology requires robustly trained field archaeologists capable of ethically, responsibly, and thoroughly identifying, exploring, and protecting the past.

Technical Writing

The next most in-demand KSA was technical writing ($n = 413$). Once again, employers expressed both vague and specific requests in relation to technical writing. Technical writing included writing reports to federal/state agency, State Historic Preservation Office (SHPO), and Tribal Historic Preservation Office (THPO) standards; preparing archaeological proposals, scopes of work, and requests for proposals; and writing Integrated Cultural

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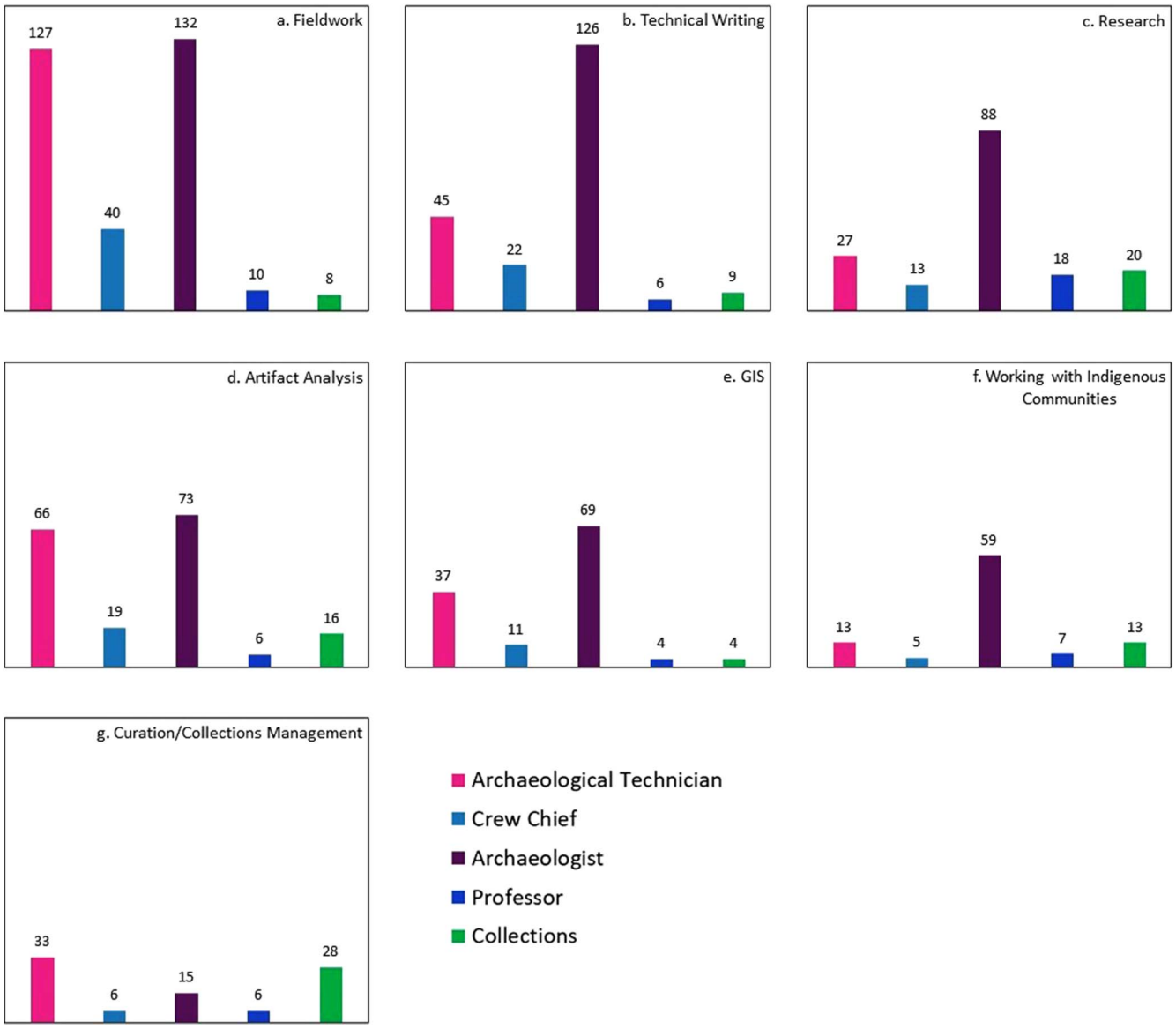

FIGURE 8. Top archaeology KSAs as requested in sample archaeology positions.

Resource Management Plans, NRHP evaluations, Memoranda of Agreement (MOAs), and Programmatic Agreements (PAs).

Archaeological reports summarizing results of Phase I, II, and III levels of investigation differ in scale and scope but include management summaries, methodologies, environmental contexts, cultural contexts, summaries of results, and assessments of effects. Integrated Cultural Resource Management Plans, MOAs, and PAs allow federal, state, and local governments, tribal governments, and public stakeholders to devise collaborative solutions to issues impacting cultural resources through rigorous legal processes. These documents tend to reflect programmatic initiatives and are developed in collaboration with legal reviewers and subject matter experts. Knowledge of the range of technical documentation in archaeology, what different documents entail, and how they help protect cultural resources would provide a limited introduction to the technical writing KSAs needed to succeed in an archaeological career.

Of the total archaeological technician sample, only 31% of listings sought candidates with technical writing KSAs (Figure 8b). Most of these positions required a minimum of a bachelor's degree (Figure 9b). By contrast, 51% of the crew chief sample and 83% of the archaeologist sample requested applicants with technical writing KSAs. Bachelor's degrees and master's degrees were requested at nearly equal levels for crew chief and archaeologist positions. Twenty-three percent of collections management positions sought candidates with technical writing KSAs as well. Few universities ($n = 6$) included proficiency in technical writing as a core competency for professors.

Admittedly, writing skills are refined through experience only, but it is never too soon to get started. On archaeological writing, Graham Connah (2010:5) states, "Basically, learning to write is rather like learning to ride a bicycle; one has to maintain a delicate balance whilst still moving forward, but at first one will frequently

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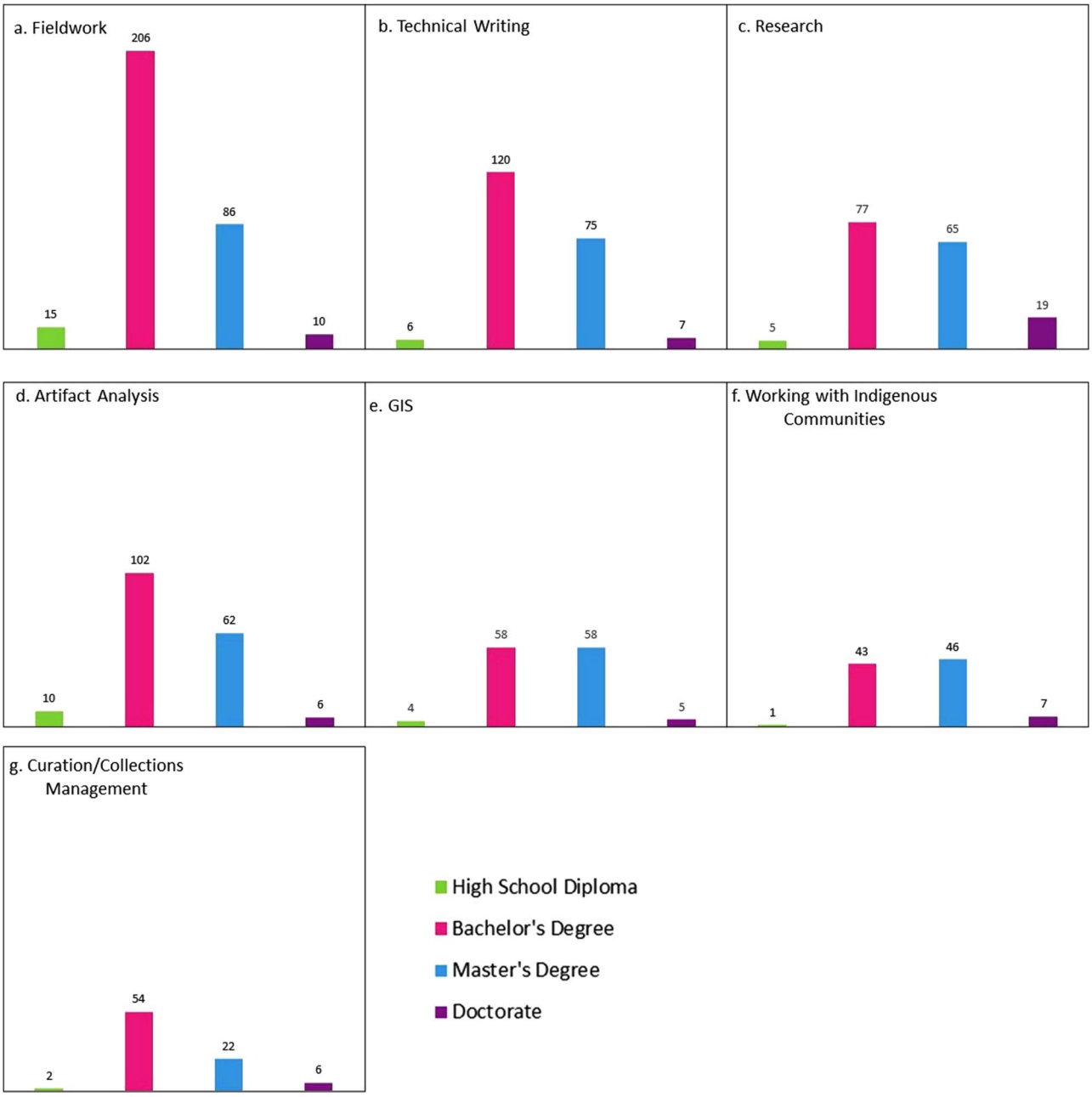

FIGURE 9. Top archaeology KSAs and minimum degree requirements for sample positions.

fall off, sometimes with painful results." CRM employers report that recent graduates are poorly prepared in technical writing, with zero respondents in a recent survey describing new graduates as prepared to write reports and proposals and 12% reporting new graduates as prepared to complete state/federal forms. Only 18% of university/college respondents emphasized report preparation; writing proposals was emphasized in none of the field schools, but 64% emphasized state/federal form production in field schools (Larkin and Slaughter 2021:11).

As archaeologists look to address challenges of the past, present, and future, students prepared to enter the workforce with some understanding of technical writing will serve the discipline well. The Black Heritage Resources Task Force has recently recommended (1) increased recording of African American sites on site forms and (2) nominations of more Black heritage sites to the NRHP (Franklin et al. 2022:3). This would require funding and initiative at the federal level as well as strong technical writing competencies across the discipline. Documenting damage to sites from looting and climate change and developing communally engaged plans for adaptation and protection also require strong technical writing capabilities for archaeologists based in government agencies and CRM. The high demand for technical writing capabilities highlights the heavy reporting responsibilities

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of conducting archaeological excavations within a compliance framework that serves the public.

Research

In job postings, research involved consulting federal and state databases, archival records, and oral histories, generally, and this skill was listed in 291 postings. More specifically, employers sought candidates with (1) experience researching state site files and previously published technical reports and (2) the ability to complete desktop studies and develop historic contexts. Across sample positions (Figure 8c), employers sought candidates with research experience in 58% of archaeologist positions, with bachelor's and master's degrees requested almost equally. Job postings sought research KSAs in 47% of professor postings and 51% of collections management/curation postings. Employers sought research KSAs less often in postings for archaeological technicians (19%) and crew chiefs (30%). These job postings required a bachelor's or master's degree most commonly. Research represented the most in demand of the top-requested KSAs for positions requiring a minimum of a doctorate (Figure 9c).

Research KSAs are likely compatible with research competencies already taught in many undergraduate and graduate archaeology/anthropology courses. Established research education should be broadened to introduce students to site file research and literature reviews with technical reports as their basis. Knowledge of available archives, their limitations, and how to query them, in addition to familiarity with the format and context of gray literature, allows archaeologists to contextualize and interpret findings accurately and thoroughly. The ability to research and make sense of numerous and varied archives is essential as archaeologists attempt to identify and stabilize looted sites and to interpret and safeguard sites exposed by natural disasters. The Black Heritage Resources Task Force has called for multidisciplinary research and descendant community engagement to foster more eligibility determinations for Black heritage sites (Franklin et al. 2022:5). Research skills are therefore critical to both contextualizing surveys in all sectors of archaeology and meeting the demands of the present and future. The sample positions suggest that research KSAs are expected from archaeologists with undergraduate and graduate degrees.

Artifact Identification and Analysis

A smaller portion of job postings sought archaeologists with artifact identification and/or analysis KSAs ($n = 267$). Generally, artifact analysis included the ability to identify diagnostic materials in the field or in a lab setting. Some employers sought candidates with more specific experience with lithic analysis, faunal analysis, ceramic analysis, or experience with the Digital Archaeological Archive of Comparative Slavery classification and measurement protocols. Figure 8d offers insight into artifact analysis requirements across sample positions, whereas Figure 9d shows minimum educational requirements for job postings requiring this KSA. Artifact analysis KSAs appeared in job postings for 45% of archaeological technician postings, 44% of crew chief postings, 48% of archaeologist postings, and 41% of collections management/curation job postings. Of sampled positions, a minimum of a bachelor's degree was requested more often than advanced degrees (Figure 9d). Professor postings listed artifact analysis as a requirement in only 16% of postings.

The material remnants of the past are central to archaeology by definition. The ability to identify and analyze a wide range of cultural materials ensures that archaeology is rectifying the mistakes of the past by finding out more about the objects found. A recent survey found that 100% of university/college respondents answered that field schools emphasized artifact identification, but only 55% of respondents taught artifact analysis. Sixty-three percent of CRM employers responded that they observed employees with training in artifact identification, but only 12% felt employees were skilled in artifact analysis (Larkin and Slaughter 2021:11). The material record is essential for Indigenous communities advocating for site protections, with one Deputy THPO noting of the archaeological record, "More and better [archaeological] information is necessary" (Kelley et al. 2022). With many parts of the country conducting controversial noncollection surveys, artifact identification and analysis KSAs are vital to understanding and interpreting the past under the pressures of federal permits and arbitrary deadlines. Along with the curation crisis and debates on catch-and-release archaeology (Heilen and Altschul 2013), strengths in artifact analysis and curation ensure that archaeologists respond to demands to better interrogate existing collections, communicate the importance of material culture, and share findings with diverse audiences.

Geospatial Information Systems

Almost one-third of employers sought candidates with experience in GIS ($n = 212$). Commandeered from geography and buoyed by CRM, GIS offers archaeology a means of recording and analyzing spatial data. Employers desired candidates with experience setting up equipment and collecting data on various devices—including Trimbles, tablets, and unspecified GPS systems—as well as candidates able to create maps, manage geodatabases, and analyze data in ArcGIS or ArcGIS Pro. The emphasis on GIS capabilities suggests that American archaeology is focused on collecting data as accurately as possible and analyzing and interpreting data in creative and analytically innovative ways (see González-Tennant 2016).

Archaeologist job listings called for GIS KSAs more than other sample positions (Figure 8e). Forty-five percent of recorded archaeologist positions called for GIS KSAs, with a minimum of a master's degree required in more of these positions. Only 26% of archaeological technician postings and 26% of crew chief positions sought candidates with GIS experience. These archaeological technician postings cited a minimum of a bachelor's degree more frequently, whereas crew chief postings accepted a bachelor's or master's degree. There was limited demand for GIS experience in professor and collections postings.

GIS is an evolving technology that can be challenging to learn and adapt to. The data on sample positions suggests that GIS experience was sought in job postings requiring bachelor's and master's degrees (Figure 9e). Early education in the software is ideal. In the context of regulatory and research projects, GIS offers archaeologists the ability to record data with greater accuracy and analytical capacity than ever before. GIS KSAs allow archaeologists to measure the impacts of erosion more precisely on known sites (Robinson et al. 2010) and create vulnerability models that can help archaeologists visually demonstrate threats and advocate for protections of cultural resources (Reeder et al. 2012).

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Incorporation of GIS into curation programs secures provenience information and facilitates "intersite and intra-site studies" (Muniz et al. 2011). GIS can also be harnessed to expand community access to and input into existing archaeological databases and datasets (González-Tennant 2016:36). GIS's multifaceted capacity to enable archaeology to be more accurate and more expansive makes it a key skill that will enable archaeologists to excel in standard archaeological investigations and meet the discipline's broader challenges.

Working with Indigenous Communities

Employers also advertised experience working with Indigenous communities as a desired qualification ($n = 167$). This experience ranged from overseeing and managing government-to-government consultation, liaising with federally recognized tribes, working with THPOs, sensitively responding to inquiries regarding Native American collections, working with tribal monitors, consulting with Indigenous communities on appropriate mitigation measures, and leading cultural sensitivity training. Figure 8f shows that experience working with Indigenous communities was in highest demand among archaeologist (38%) and collections management/curation (33%) job postings. The demand for experience working with Indigenous communities is likely associated with government-to-government consultation requirements mandated by federal laws and Executive Orders as well as work associated with the repatriation of ancestors and sacred objects. Archaeologist postings seeking candidates with experience working with Indigenous communities called for a minimum of a master's degree more often than a bachelor's degree. Overall, job postings requiring a master's degree were slightly more likely to seek candidates with this KSA (Figure 9f). Across other sampled positions demand for candidates with experience working with Indigenous communities was recorded in 9% of archaeological technician postings, 12% of crew chief postings, and 18% of professor postings.

As with other competencies, there have been previous calls within archaeology for better education and training in engaging with Indigenous communities. Suggestions have included "having students attend a descendant population meeting" (Davis et al. 1999:20) or complete internships with descendant communities (Shackel and Mortensen 2006:24). The Seminole Tribe of Florida's THPO offers one such internship, during which interns learn how to use GIS to complete desktop analysis, how to excavate and document shovel tests and test unit excavations, how to clean and sort artifacts, and how to write technical reports (Lincoln 2017). Nonetheless, these suggestions appear to have been slow to take root. Steeves (2015:134) writes, "ongoing dis-linkages between Federal officials, CRM in the field, and tribal groups can be linked to what is not taught in educational institutions, the histories, and worldview of Indigenous peoples from a first-hand perspective, taught by Indigenous scholars." Similarly, a survey of THPOs recently reported the following:

> one THPO wrote that archaeologists needed to attain "a sort of cultural competency, a true education on the history of archaeology and native people and basically being told that a lot of what those before them said about us is wrong. And that working with native people isn't all the same, they need to learn about the people specific to the regions they will be working in" [Sanger et al. 2020:31].

Reconciling with archaeology's disciplinary roots requires better collaboration with Indigenous communities in all facets of archaeology—from education to employment. Moving beyond legally required consultation to collaboration is key to addressing larger issues. Designing and implementing site protections and adaptations to climate change has often been pursued from a top-down approach, but many argue that collaboration with local and Indigenous communities is a more effective approach (Carmichael et al. 2017; UNESCO 2006). Collaboration with Indigenous communities has also been highlighted as key to protecting the past and addressing crimes against cultural heritage and sacred sites (Begay 2020). Only by improving archaeologists' ability to collaborate can the discipline hope to tackle the challenges of the present and future with respect for all.

Curation/Collections Management

For curation/collections management, employers looked for candidates with experience washing, sorting, and labeling artifacts; deaccessioning artifacts; inventorying collections; re-bagging and re-boxing collections in archival standard boxes and bags; maintaining labs to professional standards; and complying with NAGPRA. Figure 8g charts experience with curation/collections management across sample positions. Figure 9g shows degree requirements for job postings seeking candidates with curation/collections management KSAs. Experience with artifact curation was in highest demand among archaeological technician (23%) and collections management positions (72%). Experience with curation was less in demand across other sampled positions, with 14% of crew chief, 10% of archaeologist, and 16% of professor postings seeking candidates with curation KSAs. Demand for curation KSAs aligned with job postings requiring a minimum of a bachelor's degree more frequently than other degree requirements (Figure 9g). Preserving the past in perpetuity is a complex and vital component of archaeology. Education in curation KSAs is essential to justifying the importance of archaeological work in a future-oriented world.

CONCLUSIONS

Aligning university/college education with the KSAs needed to succeed in the workforce is a challenge shared by other disciplines. A recent survey found that 56% of polled Americans agree with this statement: "A four-year college education is not worth the cost because people often graduate without specific job skills and with a large amount of debt to pay off" (Lederman 2023). Even though archaeology has long struggled to communicate its importance to the public generally, economic burdens have increased pressures on archaeology departments in universities across the globe. Addressing the need for archaeology departments in the United Kingdom to adapt due to financial stressors, Anthony Sinclair (2010:132–133) warned, "Departments will need to stress the valuable skills that are taught in archaeology degrees, and the professional and educational sectors will need to look at how to support training for field archaeology in new ways that reduce the perceived financial burden on students." The most dramatic impact of these financial pressures has been seen in England with the recent closures of the undergraduate archaeology program at the University of Hull and closure of archaeology departments at the University of Worcester and University of Sheffield (Association for Environmental Archaeology 2021). In this highly pressurized environment, archaeological education must

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align with real-world job skills to ensure student retention, workforce vigor, and disciplinary survival.

Although skepticism about the dearth of real-world skills provided by universities is common, it is arguable that the divide between CRM and academic archaeology introduces unique challenges to addressing the disconnect between archaeology education and archaeology career skills. The assessed job postings data offer a limited overview of archaeology KSAs. Jobs posted in different seasons or on different job boards may provide conflicting insights. Sufficient comparative datasets to compare the KSAs in job postings to archaeology curricula in universities were unavailable. Despite these limitations, the data provide useful indicators of KSA needs in archaeology that can be best contextualized through future accumulation and analysis of comparative datasets. The job postings assessed in this article primarily represented career opportunities in private CRM firms and government agencies. Despite long-cited disconnects within the discipline, the job postings showed demand for many similar competencies with relevance to practitioners in many workplaces. Although not a comprehensive archaeological skill set, the KSAs listed by archaeological employers—fieldwork, technical writing, research, artifact analysis, curation, GIS, and experience working with Indigenous communities—are vital to completing identification, analysis, interpretation, and protection of archaeological sites. These same skills are important components in addressing the challenges posed by increased demand for compliance archaeology, climate change, looters, the curation crisis, community engagement, and diversification. Educating and training archaeologists in these core competencies prior to their entrance in the workforce improves archaeology's overall capacity to confront the numerous threats to the protection of the past, a goal surely all archaeologists share.

The assessed job postings data indicate that students should seek undergraduate programs that at the very least emphasize practical fieldwork. Programs that offer students field opportunities stressing shovel test and test unit excavation are most relevant to real-world skill development. Students should also be aware that attendance at an accredited field school is a minimum requirement for many entry-level archaeology positions. Students intent on joining the archaeological workforce should also look for internships with the federal government, universities, private CRM firms, and Indigenous communities to enhance and diversify their KSAs. Graduate students interested in future career mobility should look for programs that include education in fieldwork, technical writing, and GIS. Programs with established relationships with Indigenous communities, federal agencies, or CRM firms will provide beneficial preparation to students as well. These recommendations may seem daunting for students entering university/college with little familiarity with archaeology as a discipline or profession. Archaeologists in all sectors can help students by attending career fairs and providing cheat sheets for students that include KSA topics to consider and links to resources on the archaeology job market and real-world skill sets.

Universities can help students meet archaeology's challenges by educating and training students in the KSAs outlined in job postings as well as less frequently listed expertise such as budget management, human osteology, data management, public outreach, scuba diving, or contract administration. Some universities have already adopted curricula that prepare students in these competencies (Weisman and White 2000). However, calls to center archaeological studies on these areas have been made for decades, with change far too slow. Universities should focus on these skills because they are fundamental to high-quality archaeological investigations and cultural resource protection. These skills are valuable in careers in CRM, government agencies, universities, nonprofit organizations, and museums. There is no such thing as superior or inferior archaeology jobs, but there are outdated and out-of-touch curricula that prepare archaeologists poorly. Failure to adapt curricula and educate archaeologists in relevant subject matter does not eradicate CRM or make classical subjects or esoteric theoretical debates more relevant to archaeology. It simply pushes responsibility for educating archaeologists in the requisite skill set onto professionals in government and private sector CRM positions, who likely are still paying for the education that failed to prepare them as well. Failure to heed calls for change and prepare students for careers in archaeology hinders the field's ability to effectively identify and protect the past and confront the discipline's many challenges.

Although change in university/college curricula is essential, it is recognized that anthropology and archaeology departments face additional pressures and that specialized archaeology departments disconnected from the world of CRM may face obstacles in adapting. Anthropology/archaeology departments not traditionally associated with CRM can demonstrate the utility of their degrees by creatively integrating the KSAs sought by archaeology employers into their existing courses. Regions studied by classical archaeology departments face similar threats from climate change, looting, and development, and many of the regions are also served by private archaeology sectors. These departments can search for creative tie-ins to introduce students to the basic premises of historic preservation legislation, GIS, types of fieldwork, background research, and technical documentation. At the very least, all anthropology and archaeology departments can make their students aware of free education and certification opportunities such as the e-learning opportunities offered by the Advisory Council on Historic Preservation.

As government agencies and CRM firms face increased demand for archaeological survey and potential workforce shortages, they too can contribute to the education and preparation of archaeologists. Within the job postings data, internship opportunities were limited to government agencies. Certainly, other employers offer internships, but the discipline would benefit from an increase in internships offered by universities, private CRM firms, government agencies, museums, THPOs, and SHPOs. Internships "offer a range of benefits, including the opportunity to identify and clarify career direction, develop skills important to career readiness, and gain firsthand experience in the workplace. For employers, internships can serve as a valuable source of new hires" (Collins 2020:19). In creating new internship opportunities, employers should be aware of the exclusivity introduced by unpaid internships: "Many diverse populations don't have the luxury of working an unpaid internship, even if it's just for a few months. By offering paid internships only, you encourage those in more diverse socioeconomic standings to apply" (Robinson 2022). As archaeology looks to address historic lack of disciplinary diversity and align education with real-world KSAs, paid internships are an opportunity to address multiple challenges.

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Additional partnerships between academia and archaeological employers will also improve KSA development. In 1988, the Navajo Nation Archaeology Department (NNAD) and the Northern Arizona University (NAU) Student Training Program was established to "increase the number of credentialed Navajo and Native American anthropologists and archaeologists by providing them with training in anthropology and archaeology through part-time employment with NNAD while they obtain their degrees at NAU" (Two Bears 2008:195–196). Although it is no longer in existence, the history of this program in educating future archaeologists at the intersection of academia and CRM offers an educational partnership worthy of study and consideration. Internships and partnerships will help improve the disconnect between archaeology education and KSAs and potentially increase partnerships between archaeology employers and educators. They are not, however, a substitute for essential changes to university/college curricula.

Central to the mission of many archaeological societies is supporting archaeologists who make up their membership. Archaeological societies can help ensure relevant KSA development by expanding outreach. Many societies offer students grants, scholarships, and networking opportunities that should be aligned with archaeology KSAs. Archaeological societies offer guidance to graduate students on landing careers or grants in the academic sector. Although valuable, this training is not applicable to most archaeologists. Archaeologists outside of the academic sector need similar guidance and support. Societies can host webinars on writing archaeological resumes, applying to the archaeological job market, and interviewing, among other topics. Outreach through social media will be valuable in reaching students and those not yet committed to an archaeological education. These societies may be appropriate mediators to bridge divides within the discipline by facilitating partnerships between universities, government agencies, CRM firms, and the public for collaborative field schools, field opportunities, and engagement initiatives. The archaeological community must be united in its goals if the field is to protect the past with any measure of success, and archaeological societies have an important supporting role to play.

Archaeology knows it is headed toward a future with many challenges, but it will do so with a hardworking cadre of professionals dedicated to protecting the past. Archaeologists in every facet of the workforce need to prioritize long-overdue changes in archaeology education and to work together to provide opportunities for KSA development. In the trenches, in government agencies, in SHPO offices, in THPO offices, in private firms, and in university/college halls, all who work to identify, protect, and preserve the past are equally vital to the future of archaeology. Archaeologists must be treated, educated, trained, and compensated accordingly.

Acknowledgments

I would like to thank the reviewers for their careful and incisive review of this article.

Funding Statement

No financial support received for completion of the project or manuscript.

Data Availability Statement

The data collected and assessed in this article is publicly available at the Digital Archaeological Record: https://doi.org/10.48512/XCV8476569.

Competing Interests

The author declares none.

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https://doi.org/10.1017/aap.2023.21 Published online by Cambridge University Press