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Technicians as teachers: the emerging role of technical staff within higher education teaching and learning environments

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ABSTRACT

Technicians and technical staff are making increasingly significant contributions to the teaching and learning of undergraduate and postgraduate students in the UK. This paper reports on a survey of 1766 technical staff regarding their roles within teaching and learning environments, and a series of follow-up focus groups with 44 technical staff further exploring the roles, visibility, and recognition of technical staff. Analysis suggests many technicians' roles have transitioned to such an extent that traditional lines between academic and technical teaching responsibilities, expertise, and contributions are becoming increasingly blurred. This trend is particularly noticeable for disciplines within creative arts but is also found in other discipline areas. This is likely accelerated by a competitive higher education environment and global graduate job market which incentivise skills-based learning and graduate employability, with a general transition towards increased value of 'know-how' as well as 'know-what'. Although this can greatly enhance students' skills-based learning at the hands of experienced practitioners, there is a danger that under-valued 'cheap labour' could be used to replace under-resourced academic teaching communities, or that technical staff find expansion of their teaching responsibilities are not being matched with adjustments in value, recognition, or reward. Specific examples are explored, and the impact of COVID-19 related disruption is further used to highlight these overall themes. The authors advocate for common understanding and recognition of teaching roles throughout the higher education sector, regardless of job family.

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Technician; skills; teaching and learning; vocational knowledge; status of teaching

Introduction

Technical staff play a vital role in teaching and supporting the learning of students within UK higher education (HE). They are increasingly being relied upon to design and deliver teaching and learning activities and, in many cases, to engage in formative and summative assessment. Despite this, their role within UK HE teaching is seldom considered, explored, or recognised within their faculties, institutions, or the wider sector. Technicians, technical roles, and their contributions are typically poorly understood, particularly within teaching environments.

Historically, there has been very limited academic- or policy-oriented discussion and/or published work about any aspect of the UK technical community or its make-up. There have been a handful of recent notable exceptions, with many triggered by the Science Council's recent Technician Commitment initiative, the Gatsby Foundation's recent Technicians Make it

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Happen initiative, and the Midlands Innovation TALENT programme, all of which seek to improve overall visibility, status and opportunities for UK technicians (Lewis and Gospel 2013; Lewis and Gospel 2011; Royal Society, The 2021; Technician Commitment et al. 2020; STEMM-CHANGE 2019; TALENT 2022).

Within UK HE, there has been an increasing focus on teaching qualifications, accreditation, and professionalism for academic teaching staff, from the 1997 Dearing Report through to the formation of Advance HE (formally HEA) and their professional standards framework and 'teaching fellowship' accreditation programmes, and more recently the Teaching Excellence (and Student Outcomes) Framework (TEF) in England. This increased focus on professionalism has been in part encouraged by UK government policy decisions, changes to the HE funding landscape, increased deference to university rankings and associated metrics, and generally an increased competitive marketisation of higher education following societal cultural changes and increasingly competitive UK and global graduate job markets.

However, despite an increasing focus on the professionalism of academic staff involved with HE teaching, and accompanying studies exploring the implications of these changes, there has been very limited work, focus, or published research exploring *technicians*, or *technical staff*, and their role within teaching and learning at HE level. The bulk of the relevant material in this area originates from two primary authors: Paul Lewis, who between 2010 and 2017 published a string of reports on behalf of the Gatsby Charitable Foundation that explored technicians within various science and engineering disciplines and industries, albeit mainly focusing on their role within research and innovation rather than teaching activities (Lewis 2010–2017); and Tim Savage, who in 2018 and 2019 published explorations of creative arts technicians within his home institution, the University of Creative Arts, with a primary focus on aspects pertinent to teaching (Savage 2018, 2019).

When reporting on an overview of UK science and engineering technicians, Lewis and Gospel (2011) noted variation in the perceived role of technicians within HE teaching activities, regarding whether technicians *support* teaching or whether they actually *teach* students. They explained that in many cases, particularly within post-1992 HEIs, technicians' formal duties extended 'beyond simply facilitating practical classes to carrying out some of that practical teaching themselves' (Lewis and Gospel 2011, 19). They went on to comment that, even for technicians for whom teaching duties are not formally required, 'they often do so unofficially, either by providing informal assistance to students in laboratory classes [. . .] or by helping students who are working on projects to learn how to use scientific instruments and carry out experimental procedure'.

Within creative arts disciplines, Savage (2019) commented on a recent increase in the number of technicians applying for AdvanceHE Fellowships in one department in the University of Creative Arts and reported that creative arts technicians in his study 'believed that their teaching had evolved to resemble academic practice-based teaching rather than demonstration or [. . .] instruction, combining both concept and context with technique' (Savage 2019, 4). These studies, while exploring localised and discipline-specific technical communities, suggest an HE landscape in which technical roles have evolved to include more sophisticated teaching and greater teaching responsibilities.

Taking inspiration from these early findings, we examine the prevalence and range of involvement technical staff have within teaching and learning throughout UK HE on a national scale and across a range of different discipline areas, job roles, and workplace type. We aim to identify whether a pattern of increasing teaching responsibility is found throughout the sector and across discipline areas and endeavour to explore the implications of our findings.

We also use this work to build on arguments put forward by Dickinson, Fowler, and Griffiths (2022) who explored professional identities and overlap between academics, practitioners, and 'pracademics' in their own post-1992 HE institution, which itself has strong links to themes within Savage's (2018) exploration of individuals transitioning from creative arts technical staff and/or practitioner roles into academic teaching roles.

A changing HE landscape: shifting emphasis towards skill-based knowledge

Lundvall and Johnson (1994) explored the concept of contrasting modes of knowledge by considering four key categories: know-what (i.e. facts); know-why (i.e. theoretical knowledge of underlying principles); know-who (i.e. social relations and interactions); and know-how (i.e. skills; knowing how to do things).

UK HE has broadly seen a shift in emphasis, from a traditionally primary focus on know-what and know-why to an increasingly perceived importance around know-how: skill is now becoming more important than theoretical knowledge in many areas, with an emphasis on ways of thinking and practicing like a practitioner rather than like a theoretician, particularly in disciplines with practical elements and in which graduate recruitment will rely on delivering practical skills (Carless 2015; Jensen et al. 2007; McCune and Hounsell 2005).

The importance of practice-oriented skills-based knowledge has shifted, with a higher expectation of vocationalisation of HE, creating 'employment ready' graduates within an extremely competitive graduate job market (Andrews and Higson 2008). The drivers for this shift will likely come from many directions, including introduction and expansion of tuition fee burden on graduates leading to the marketisation of HE and the search for 'good value' degrees which help graduates towards higher lifetime earnings. Further, UK government appears increasingly focused on a skills-based economy, and UK HE institutions are competing for a limited pool of high-quality students but also competing to help their students towards good graduate outcomes for the sake of higher standings in UK and/or global university rankings.

While this study is specific to the UK HE environment, it also has wider implications for the global HE landscape: many of the factors contributing to the changing UK HE ecosystem – competition, marketisation, shifts to skills-based learning and graduate employability – are also being seen globally, and are also likely to be accompanied by changing responsibilities of those who work within these ecosystems.

Technicians in HE: who are they and what do they do?

The word 'technician' is one shrouded in preconception, tending to evoke different things depending on the audience. The definition in use, and accordingly the level of understanding of what a technician is or does, is rarely consistent across institution-, discipline-, and/or sector-level boundaries. Pre-existing differences in understanding and implied meanings of the word 'technician' complicates our own definition and understanding of the technical community. While academic and policy literature has traditionally overlooked technicians and/or technical staff, even in instances when they are referred to it remains difficult to identify a consistently used definition.

HE technicians and technical staff encompass a wide range of discipline areas and job titles, from apprentices and junior technicians through to specialised technical experts, senior managers and technical directors, with significant and varied contributions to research, teaching, infrastructure, training, and many more areas besides (TALENT 2022).

Because technicians and technical staff occupy a huge range of roles and responsibilities within education and research, it is very difficult to identify one concise all-encompassing definition. But, expanding on an initial definition suggested by HEaTED (2018), one could describe a technician as trained and/or skilled in the techniques, tools and technology of their subject, providing the practical application of knowledge and/or the expertise to best utilise this practical application through managing, teaching, and/or training others to do so, and/or through maintaining and developing the environment, standards, resources, and facilities required.

While previous definitions or references to UK HE technical communities have tended to give greater focus to their role within *research* and related areas, in this study we will primarily reflect on their role within HE *teaching and learning*.

In this study, we aim to uphold the broadest and most inclusive definition of the term 'technician' or 'member of technical staff'. While our primary focus for this study is technicians within UK HE, we have aimed to remain inclusive of the UK technical community across all disciplines and roles. Through our community evidence gathering methods, we sought to engage with anyone who self-identified as part of the UK technical community.

Method

Data presented in this study are part of a broader project aiming to provide strategic insight into technical communities within UK HE and research (TALENT 2022). The study design of this wider project comprised: (i) initial stakeholder interviews and workshops to provide scope and context for the broad areas of investigation, building on a review of the existing literature; (ii) a large-scale online survey of technical staff to explore a wide range of subjects pertinent to the studied population; (iii) a series of focus groups with technical managers to explore elements linked to recruitment, retention, and career pathways for technicians; (iv) a series of focus groups with technical staff to further explore key elements arising from the online survey, particularly those linked to value, recognition, and acknowledgement. This study will refer only to (ii) and (iv), the aspects of the project most pertinent to exploring technicians' roles within HE teaching environments.

1766 technical staff from 90 UK universities and 16 UK research institutes participated in an online survey of 60 questions that explored a range of themes. Four questions directly referred to the respondents' role within HE teaching and learning, with a further two open-ended questions being used by many respondents to explore teaching-related elements. Other questions explored other themes pertinent to the wider project and/or provided demographic information. Open to all technical staff in the UK, survey respondents were heterogeneous in terms of discipline area, age, sex, and job role, though the majority worked in HE institutions (90%) and were white (88%). Respondents were self-selecting and could enter themselves into a prize draw upon completion, though the survey was primarily publicised and cascaded via communication networks for technical managers within UK universities and research institutes, and/or followers of the wider TALENT project. Responses were screened out or removed due to incompletion, duplication or through not being part of the UK technical community. We commissioned Shift Learning Ltd, a research agency specialising in HE, to host our e-survey on their platform for the five-week launch period (plus an initial pilot phase to ensure functionality) as well as manage the prize draw and initial data-cleaning processes. Questions were tested using members of the target population to ensure their clarity and function.

The four key teaching-relevant questions within the survey were developed to build on the existing literature by providing a quantitative measure of: (1) the extent to which UK technicians are involved in HE teaching; (2) common types of involvement; (3) how those involved feel their contributions are valued by others; (4) whether those involved have completed teacher training and/or accreditation; and (5) whether any of these four measures varied by discipline area. These questions were framed using the UK Professional Standards Framework for teaching and supporting learning in higher education (Advance HE, Guild HE, and Universities UK 2011), which provided a starting point added to by the researchers, using their previous experiences of HE teaching environments, and targeted engagement with the intended population. Two open-ended questions explored priorities for change for technical staff and their wider communities; these questions were not limited to teaching-related topics, though many respondents referred to them in their answers.

Determining a final response rate is difficult due to the dissemination routes chosen and uncertainty around numbers exposed to our dissemination. However, use of Higher Education Statistics Agency (HESA) staff records suggests our final survey sample includes approximately 10% of the *total* technical population within all UK universities (excepting IT technicians who generally do not identify as part of the wider technical community); however, not all of these will

have been exposed to our survey communications so the actual response rate will likely be much higher than 10%.

Responses to the two aforementioned open-ended questions were analysed using emergent thematic coding, and these, alongside responses to other close-ended survey questions, were used to identify a number of key themes relevant to both the wider technical community and those directly involved with teaching responsibilities.

A series of nine follow-up focus groups were held with 44 UK technical staff to further explore the themes that had emerged within responses to the online survey. Key themes of exploration included value, recognition, and acknowledgement, with each theme explored in either general terms or specific to research or teaching environments, depending on the group. The primary purpose of these groups was to generate richer detail and additional insight, clarify the understanding and expectations of technical staff, explore nuances of the differences found in different working environments, and identify specific information-rich examples of experiences within technical communities. The focus groups allowed deeper exploration of these key themes, through semi-structured questioning followed by further emergent thematic coding, and provided the opportunity to crystallise our interpretations of the key themes that had already emerged, as well as their perceived meaning to the technical staff and/or communities themselves. Each semi-structured group discussion featured the same overall themes and initial questions, though follow-up questions varied and the discussions allowed space for participant-led lines of inquiry. Discussions (approx. 90 minutes) were held virtually using Microsoft Teams, enabling diverse participant geographies: 44 participants represented 24 universities and research institutes across England, Scotland, and Northern Ireland. Groups of 4–7 participants were heterogenous in terms of sex, role, discipline area, and time spent working as a technician. Potential participants were recruited via the same communication channels as the online survey and were not compensated for their time.

Results

Technical teachers: proportion of workforce involved in teaching activities

Respondents to the TALENT national survey of UK technical staff were asked if they had recently been involved in teaching and/or supporting student learning within HE. To ensure fair reflection of current practice, wording was chosen to specify recency (within the previous 3 years).

Over four-fifths (81%) of respondents working in UK universities indicated their role *did* involve teaching or supporting the learning of HE students. This is a significant majority of the total sample population – across all age groups, seniority levels, and discipline areas – and highlights the prevalence of the contribution of the HE technical community to teaching and learning with UK HE.

The proportion of a given workforce involved in teaching was linked in part to the type of university the technicians worked for. Table 1 shows an overview of teaching-involvement according to different workplace types. Respondents from post-1992 universities were more likely to be involved in teaching activities than those from Russell Group universities or other pre-1992 universities, all of which were at least nearly twice as likely to be involved than respondents from research institutes. These findings can likely be explained by post-1992 universities generally

Table 1. Proportion of UK technical staff involved in teaching HE students, by workplace type.

		Workplace type				
	All surveyed technicians	Research institutes	Universities (all)	Russell Group universities	Other pre-1992 universities	Post-1992 universities
Involved in teaching (%)	77	41	81	76	83	91
Total sample population (number)	1760	151	1593	764	328	351

Table 2. Proportion of university technical staff involved with teaching HE students, by discipline area.

		Discipline area							
	All surveyed university technicians	Creative arts	Engineering	Chemistry	Biosciences	Medicine, dentistry & health	Physics	No specific discipline	All other disciplines
Involved in teaching (%)	81	95	83	82	79	78	73	58	85
Total sample population (number)	1593	227	206	134	399	183	70	114	260

favouring teaching-focused activities and more applied discipline areas (two-thirds of creative arts technical respondents worked in a post-1992 university, for example), in contrast to other universities and research institutes which traditionally favour less-applied disciplines and have a greater focus on academic research than teaching.

The likelihood of a technician being involved in teaching activities also appeared to be dependent on discipline: Table 2 shows teaching-involvement of university staff according to several key discipline areas. Respondents within creative arts disciplines (including design and performing arts) were more likely than those from other disciplines to identify involvement with teaching and learning activities (95% cf 79% for all other university technicians). Involvement was broadly consistent across all other discipline areas though was markedly lower for those who self-identified as not having a specific discipline. Elsewhere in the survey, creative arts HE technicians were also more likely to identify their job role as a 'Teaching Technician' (48%, plus 5% as 'Research and Teaching Technician') compared to those from any other discipline area (16%, plus 14% as 'Research and Teaching Technician'). Further, almost zero creative arts technicians self-identified as purely a 'Research Technician', compared to a fifth of all remaining technicians. Together, this suggests a clear pattern of creative arts technicians associating as teachers to a much stronger extent than technicians from other discipline areas.

Technical teachers: level of involvement in specific teaching activities

Having determined the *proportion* of the technical workforce who have some involvement in teaching activities, it was also important to determine what *level* of involvement was being delivered by technicians within HE and in what types of teaching activities. All respondents who identified recent teaching-involvement were asked to specify, from a list, which types of activities they were involved in (see Figure 1). These ranged from activities which could be perceived as background 'support' of teaching through to undeniable 'delivery' of teaching itself, such as through direct delivery of instruction to large groups of learners or provision of formal feedback. Some activities went beyond this delivery level and into the realm of 'design', of both course material and curricula, responsibilities which might traditionally be associated with academic teaching staff rather than technicians and technical staff.

While the most common activity was 'providing background support' (86%, across all discipline areas and workplace types), many other activities were selected by *over half* of those asked, including preparing resources, providing 1-to-1 support to learners, delivering instructions to groups of up to 10 learners, and designing and/or co-designing teaching and learning resources. This suggests that a majority of HE technical staff contribute to teaching of HE students in a variety of ways, including delivery and elements of design.

Some identified even greater involvement in delivery and design elements, including nearly a half who delivered instructions or teaching to larger groups, and over a third who designed or co-designed lesson plans. Further, a quarter of those asked identified delivering formal feedback to

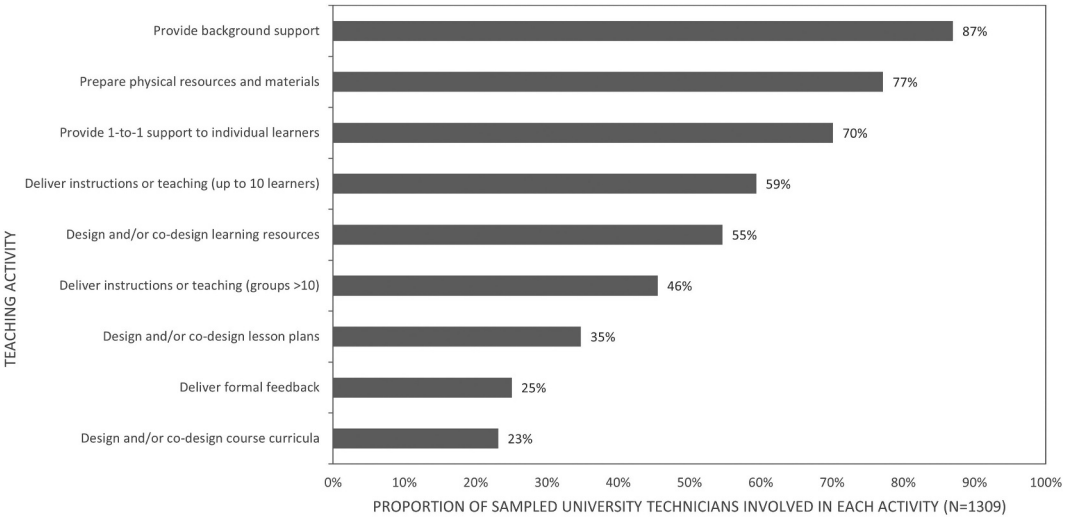

Figure 1. Types of activity delivered by university technical staff involved in teaching (n = 1309).

learners and a similar proportion identified designing or co-designing curricula, suggesting that these technicians are performing duties well beyond 'supporting' teaching and are in fact delivering duties more traditionally associated with academic teaching staff.

Creative arts technicians were significantly more likely to be involved in any and all of the different teaching activities compared to respondents from other discipline areas (see Table 3). This was particularly striking for activities such as designing lesson plans and course curricula, for which creative arts technicians were more than twice as likely to be involved.

It is perhaps pertinent to mention that, particularly within some discipline areas, there are a significant minority of technical staff who held PhDs before starting their technical career; 29% of our survey respondents within physical sciences reported as such, as did 22% of those within biosciences. It was also noted through discussion within the community that the proportion of technicians holding PhDs has increased over time. While it is possible that some of those individuals

Table 3. Types of activity delivered by university technical staff involved in teaching; a comparison between creative arts technicians and those in other disciplines.

	Proportion delivering activity as part of their role (%)	
Activity within HE teaching and learning environment/s	Surveyed HE creative arts technicians (n = 216)	All other surveyed HE technicians (n = 1093)
Provide background support	94	86
Prepare physical resources and materials	92	74
Provide 1-to-1 support to individual learners	92	66
Deliver instructions or teaching to groups of up to 10 learners	83	55
Design and/or co-design teaching and learning resources	84	49
Deliver instructions or teaching to groups of more than 10 learners	75	40
Design and/or co-design lesson plans for individual sessions	68	28
Give formal feedback to learners to support their learning	33	23
Design and/or co-design curricula for courses or modules	41	20

experienced greater exposure to teaching responsibilities during their PhD studies than other technical staff may have done during their pre-technician years, we do not think this is the reason why so many technicians are now involved in teaching, nor why so many technicians deliver activities with higher levels of teaching responsibility. Firstly, the proportion of PhD-holding technicians does not account for the proportion of technical staff that are involved with teaching activities, across any of the activities discussed above. Secondly, creative arts, the discipline area with the most significant teaching involvement across its technical staff, is also the discipline area with the smallest proportion of technical staff holding PhDs (0% of our creative arts survey respondents held a PhD when they started their technical career).

Impact of COVID-19

Respondents were able to indicate how their involvement in specific teaching activities had been affected by COVID-19 related changes between March 2020 (the date that marks initiation of UK national lockdown measures in response to the COVID-19 pandemic) and March 2021 (the survey end-date). Those activities which appeared to be most affected included preparation of physical resources and materials, delivery of instructions or teaching to groups, and providing 1-to-1 support to learners, likely linked to a sector-wide reduction of face-to-face on-campus teaching during this period. While there were generally very low numbers indicating only *starting* involvement in an activity during this period, there was a disproportionate increase in those 'designing and/or co-designing teaching and learning resources'. This was likely caused by an increased demand on some technical staff to create resources for online and blended teaching activities, brought in to replace previous face-to-face methods and/or redesigning other resources as part of adapted reintroduction of face-to-face teaching. Other engagement suggested significant increases in administrative and health and safety workload linked to teaching within a COVID-19 affected environment, much of the burden of which fell on technical staff. Many of the UK's technical staff were relied upon to stay on-campus' throughout the UK, updating and implementing protocols to keep things running, even as many of their non-technical colleagues within the sector were encouraged to work from home. Away from a teaching-specific focus, a 2020 study explored how the first few months of the COVID-19 pandemic had impacted the UK HE and research technical communities, emphasising the key role that technicians had played through an extremely tumultuous period (Technician Commitment et al. 2020).

Training and accreditation for technical teachers

Survey respondents who identified involvement with teaching activities were subsequently asked whether they had received training on how to teach or support teaching within HE (see Table 4). Nearly two-thirds of university technicians involved in teaching reported receiving zero relevant training, and fewer than a fifth had received training that contributed towards an externally recognised qualification. Of those who identified spending more than half of their time on teaching activities (in a typical pre-COVID-19 week), only 56% reported having received any training on teaching and/or supporting teaching.

Those specialising in creative arts were more likely to have received training compared to those in other disciplines (48% cf 37% for all other university technician respondents), including a much higher proportion receiving training towards externally recognised qualifications. Technicians within medicine, dentistry and health disciplines also reported a comparably high proportion of training, though with the majority indicating this did not contribute to externally recognised qualifications.

When later asked about their individual skill development needs, nearly two-thirds (65%) of those who were involved in teaching but hadn't yet received any relevant training indicated that they wanted to develop their teaching and/or teaching-related skills over the next 3 to 5 years. When

Table 4. Proportion of university teaching technicians that have received relevant training, by discipline area.

		Discipline area							
	All surveyed university technicians	Creative arts	Engineering	Chemistry	Biosciences	Medicine, dentistry & health	Physics	No specific discipline	All other disciplines
Have NOT received teaching-related training (%)	62	51	70	63	66	56	69	71	62
Have received teaching-related training (%)	37	48	29	36	33	44	31	29	35
Have received teaching-related training as part of an externally recognised qualification (%)	15	32	9	10	10	11	15	11	17
Total sample population (number)	1309	216	176	112	321	144	52	66	222

asked to specify further, responses included formal teaching qualifications, as well as developing skills in online delivery, formulating lesson plans, and engaging learners.

For those within UK HE, the Higher Education Statistics Agency (HESA) staff records include information about teaching qualifications, accreditation, and HEA fellowships held by staff. Reporting this data is mandatory for academic staff but has never been so for technical staff. Accordingly, these datasets are largely incomplete for technicians. Sector-wide underreporting makes tracking trends difficult and limits possibilities for detailed analysis. It was our intention to recommend that HESA update their teaching qualification field to be mandatory for technical staff, but their recent change to optionalise all non-academic staff records in England and Wales has reduced the potential impact of this recommendation.

Blurred lines: the increasing responsibilities of technical teachers

A subsequent series of focus groups supported and deepened our understanding of findings from our national survey of UK technical staff.

During these focus groups, UK technical staff from a range of disciplines, seniority levels, and institutions reported that lines have become blurred between the responsibilities, duties, and expertise of teaching *technicians* and teaching *academics*. One technical engineer highlighted that they now plan, teach, mark, and help design curricula and that they do this across a number of different modules. Another technician within a creative arts discipline explained that they are the module convenor for two separate modules in their department.

Throughout focus group discussions and responses to open-ended survey questions there were repeated references to an increased workload and increased level of responsibility on technical staff, specific to teaching activities as well as in general terms. These referred to individual members of technical staff as well as wider technical workforces within departments and institutions, including the suggestion that an evolution had occurred regarding the shared roles of academic and technical staff who teach.

These findings echo those previously highlighted by Savage (2018, 2019); however, while Savage's findings were specific to the creative arts, this study shows that similar blurred lines are occurring and/or being perceived across different discipline areas and throughout different types of HE institutions.

During the focus groups, it was suggested that there are now two extremes of teaching technicians: one extreme who are primarily *supporting* the teaching activities of academic staff and another extreme who are effectively *delivering* duties typical of academic teaching staff (despite not being recognised or remunerated as such).

A further point raised in both the survey and subsequent focus groups was that technical staff can often be better suited to teaching practical skill and expertise than their academic counterparts. It was argued that in some cases what students can learn from technical staff can be of greater value than what they might learn from academics, especially in terms of real-world applicability and graduate employability, and particularly so within more applied discipline areas.

Many technicians highlighted working with students as a particularly positive aspect of their job, and many of those who had not already expanded their teaching role were open-minded to expanding it in future. However, the feeling that such expansion should be accompanied by increased recognition, reward and/or acknowledgement, was a very strong theme throughout our research.

One creative arts technician highlighted that they would like greater involvement within curriculum design within their department, in part to ensure that technical aspects are properly considered from the onset of the teaching and learning process, including initial planning and design phases. More generally, the importance of early involvement of technicians and technical expertise when planning changes to e.g. laboratory or workshop infrastructure and equipment was also highlighted on several occasions, relating to both research and teaching spaces.

Perceived value, recognition and acknowledgement

Survey respondents were asked to detail 'what single change would have the greatest positive impact' on both (i) them as technical staff and (ii) the wider technical community within UK HE. These questions were open and unprompted, and several key overall themes emerged including visibility, value, recognition, career progression, pay, and workload.

Many respondents took the un-prompted opportunity to make direct reference to technical staffs' roles within teaching. These often also referred to one or more of the aforementioned overall themes, such as the medical sciences teaching technician who hoped for 'Acknowledgement of the teaching contributions I make (ideally with pay/progression, but any acknowledgement would be good)', the creative arts technical manager who hoped for similar acknowledgement for the teaching delivered by technical staff throughout their faculty, and the chemistry teaching technician who hoped for 'Recognition of the work that we technicians do in teaching as this is not valued [by] management who only see the importance of the technicians who support research'. This perceived disparity in acknowledgement between teaching technicians and research technicians was supported by others within the community, as was a disparity in acknowledgement between technical staff and academic staff.

Here, we divide the voiced concerns of technical staff involved in HE teaching into three main themes: value, recognition and visibility. These themes recurred through our engagement with UK HE technical communities, within both our survey and our focus groups.

Value

Surveyed HE technicians who indicated involvement in teaching activities were asked how they felt their teaching contributions were valued by other groups. The majority of respondents reported feeling positively valued by their technical colleagues (74%), students (by both postgraduates, 76%, and undergraduates, 75%), managers (70%) and their academic/non-technical colleagues (65%).

However, fewer than a third felt positively valued by senior leadership in their institution (28%), very few felt positively valued by national policymakers (3%), and only a fifth by other colleagues within professional services and human resources (21%). Although holding a teaching qualification made little difference to how technicians felt valued by others, creative arts technicians were more likely to report feeling positively valued for their teaching contributions than technicians from other disciplines were, and self-identified 'Teaching Technicians' were more likely to feel positively valued for teaching than those 'Research Technicians' who were also involved in teaching. The theme of value was explored further in follow-up focus groups, where it was expanded upon and closely linked to a perceived lack of recognition for contributions made by individuals and technical communities, as well as a perception of invisibility as a workforce amongst senior managers and institutional leaders.

Recognition

Technical staff we engaged with wanted to be recognised and acknowledged for their contribution to teaching, particularly by departmental and institutional leadership, and there was a desire for recognition to be both formal and informal in nature. Technical staff reported that, although students were often thankful and could recognise and appreciate the valuable input that technical staff provide to their teaching, this was often not matched by members of academic or senior staff. Recognition or acknowledgement was often missing from any formal course documentation or wider publicity, for example, and it was felt that any awareness or acknowledgement of the contribution that technical staff make was lost as you moved up an institution's hierarchical structures.

One creative arts technician described the production and delivery of a faculty showpiece event for which a programme brochure had been published including only the names of academic staff and/or tutors, despite many of these academic staff having minimal presence and/or involvement with the work towards the event. The participant highlighted that it was actually the technical staff who were present throughout the entire process, providing significantly greater face-to-face time, support, teaching and guidance for the students; however, zero members of technical staff were recognised, acknowledged, or referred to in the final programme brochure. This suggested either a lack of understanding of the roles this faculty's technical staff had played throughout the process or a knowing and wilful lack of recognition of their contributions. Such occurrences seemed all too familiar to others in the group.

A surveyed creative arts technician expanded on this theme when asked about possible change to introduce positive impact for technicians:

> To be treated with the same regard as the academic staff. Often academics only know the theory, they understand little to no knowledge of the practicalities to achieve the students vision. Technical staff understand theory, have teaching qualifications, and impart technical knowledge to the students on how to achieve their outcome, yet we are given little credit and our pay is nowhere near that of an academic.
>
> *Creative Arts Teaching Technician (Survey, March 2021)*

This same individual went on to describe what they saw as the ultimate cost of this disparity in acknowledgement and pay between academic and technical staff in their discipline area:

> Many of my colleagues have gained an educational qualification and moved onto different institutions to become an academic because of pay. This means we are [losing] valued members of staff with a great knowledge base. It also means that the surrounding technicians have to cover absent areas until the position is filled, placing greater stress on those staff. Managers then have to spend more time interviewing and training new staff. Money spent advertising for these new positions [might] be better spent on pay rises for the current staff.
>
> *Creative Arts Teaching Technician (Survey, March 2021)*

This point supports themes explored by (Savage 2018), also within creative arts disciplines. While losing technical staff to academic teaching positions in significant numbers may be more likely in certain discipline areas than others, the point remains that a perceived persistent pattern of poor

recognition may persuade individuals to look elsewhere for other opportunities. As the above teaching technician points out, this will negatively impact long-term staff retention, workforce sustainability, and institutional resources.

Visibility

Beyond discussion of formal recognition (through pay and/or promotion, for example), a number of technical staff suggested that simply raising their visibility to staff and students would help them feel more included and valued as a member of the teaching team. This could be as simple as inclusion on course documentation, or being introduced to students at the start of their courses. One shared example of good practice included a department prominently displaying the names and faces of a teaching laboratory's technical team on the door; it was pointed out that even this low-cost low-effort approach helped to generate a sense of inclusion and perception of acknowledgement amongst the technical teaching teams.

Other technicians suggested the potential benefits of raising visibility of technical teaching contributions to the wider non-technical community, such as through active inclusion in whole departmental meetings, newsletters, and updates. One focus group participant explained how this recently worked well in their department, with a technician presenting to the wider university community about some of the work their team had done in response to COVID-19 disruption:

> The university had a town hall meeting recently and they got the senior [technical] manager of the teaching labs to give a presentation about what they've been doing and that was very well received and it was a fantastic opportunity for her to be able to present to the wider community, and to the senior leadership team, exactly what they had to do to make everything possible for teaching. And the feedback that she got: so many of them were genuinely blown away with what they had managed to do and just couldn't believe what they'd made possible.
>
> *Technical Manager (Focus Group, July 2021)*

Impact of COVID-19 on visibility of technical contributions

It was generally felt that COVID-19 related disruption had increased the awareness of some non-technical colleagues to the contributions that technicians make to teaching and learning environments and activities and in some cases had prompted opportunities to celebrate and showcase technical contributions, boosting their visibility. However, it was also felt that awareness needed to improve for technical contributions towards the 'business as usual' work that existed before COVID-19 related disruption and which will continue to exist long after this disruption has reduced. It was hoped that the little ground that had been gained during this recent period could be retained, and built upon, in future.

Discussion and conclusions

Technical staff make a significant contribution to the teaching and learning of students within UK HE, and in many cases are being relied upon to deliver, plan, and design teaching activities and take on roles and responsibilities more traditionally associated with academic teaching staff rather than technical teaching staff.

Accordingly, technical staff have a direct impact on the quality of education provision for HE students and therefore contribute to linked implications such as student retention, student progression, and student employability. These implications are likely to become increasingly important in an evolving HE landscape which favours market competition for students and uses linked metrics to compare performances of HE providers.

As highlighted throughout this study, technical staff aligned to creative arts disciplines seem to have a particularly strong link to the teaching and learning of students. Compared to counterparts from other disciplines, creative arts technical staff were significantly more likely to be involved in all proposed teaching and teaching-design activities, more likely to identify themselves solely as

Teaching Technicians, more likely to have received training for teaching activities, and more likely for this training to be part of an externally recognised qualification or accreditation.

This can be linked to a lesser focus on research activity within many creative arts disciplines' departments, and these subjects increased prevalence within post-1992 universities, but another key factor is the dependence of these disciplines on application of technical skill and expertise of skilled practitioners. Compared to other disciplines areas, those within creative arts are more likely to place greater value on modes of knowledge that favour know-how rather than know-what. This is in contrast to other disciplines, within traditional science disciplines for example, where the value placed on know-what is traditionally higher, and there is a greater dichotomy between the know-how of technical staff and the know-what of academic staff. It follows that there is a reduced separation between roles of academic and technical staff that teach HE students within creative arts disciplines.

While technical staff within creative arts appear to be towards one extreme end of a spectrum of technical teaching roles and responsibilities, it is perhaps useful to consider it as a potential foreshadowing of the direction of travel for a number of other disciplines. As the focus of the wider HE sector transitions towards greater application of skill and graduate employability, the value of know-how increases across all discipline areas, and the status of technical expertise is boosted accordingly, increasing the likelihood of greater technical staff involvement in imparting this know-how to students. Through our engagement, it was apparent that technical staff from a range of discipline areas are taking on ever-increasing HE teaching responsibilities, in many cases blurring the lines between 'academic' and 'technical' teaching duties.

As the scale and range of some technical staff's teaching responsibilities are expanding, there is an accompanying increase in appetite for professionalism and skill development through training and formal recognition, qualifications, and/or accreditation. However, this vital and expanding role remains poorly understood and rarely acknowledged. Technicians generally perceive students to be appreciative of their contributions, alongside some academic staff who work with them closely, but feel their contributions are undervalued by other academic staff, professional services staff, senior leaders, and others, particularly those not directly involved with teaching activities.

The perception of being an invisible and undervalued workforce mirrors general challenges identified within the wider HE technical community but appears to be felt more keenly when considering contributions to teaching. Largely, technicians feel their contributions to teaching are less visible, less well understood, and less well recognised than similar contributions to research activities, particularly those research activities which are accompanied by discrete research outputs (such as publications or grant funding).

While many technical teaching staff reportedly relish engagement with students above many other aspects of their job, they also felt their ever-increasing teaching responsibilities were not being matched by accompanying increases in recognition, acknowledgement, or reward. There was a noticeable inconsistency regarding expected teaching contributions, as well as subsequent acknowledgement and recognition for these contributions, across different institutions, departments, and discipline areas, particularly so when dealing with workforces of differing size.

Creative arts disciplines appear to be at the forefront regarding technical staff as teachers, and the resulting blurring of lines between academic and technical teaching responsibilities. However, creative arts do not hold a monopoly on these developments, with technical staff within many other disciplines indicating many of the same challenges.

In the UK, and globally, a greater focus of HE on employability and graduate-outcome has improved recognition of the importance of different forms of learning and different modes of knowledge. A sector-wide increase in the perceived value of know-how and skills-based knowledge may ultimately lead to a greater awareness and valuing of the practical expertise found within the

UK's technical community. This may in part explain the increasing role of technical staff and practitioners' involvement in teaching students across a range of discipline areas, though further work is needed to explore long-term implications and to what extent traditional dichotomies between 'academic' and 'technical' need to be revisited.

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