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Public engagement skills and academic expertise: transferable skills or distinct domains?

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Abstract

Public engagement practices continue to grow in prominence within higher education institutions in the United Kingdom, with increasing cultural and institutional pressure for academics to undertake such activities within their roles. However, it is unclear how well 'traditional' academic skills developed in research and teaching domains might support academics to engage in public engagement. The following qualitative study explores the topics of 'public engagement skills' and 'skill transfer' to reflect on the readiness of UK academics to undertake public engagement. A total of 15 STEM academics from UK institutions participated in semi-structured interviews to identify skills and perceptions of skill transfer between 'traditional' academic and public engagement activities. A series of skills were identified and classified in 'communication', 'expressive engagement' or 'organisation and management' categories, highlighting a range of skills commonly drawn upon in public engagement practice. Further questioning revealed two groups within the cohort – 'transfer proponents' and 'skill separatists' – who held differing perspectives on the transfer of academic skills to public engagement contexts. We reflect on the nature of skills and dispositions, practices of public engagement, and the need to support academics, with future research avenues highlighted.

Keywords public engagement; public engagement skills; academic skills; skill transfer

Key messages

- Sampled STEM academics' assessment of the skills required for public engagement can be classified under three broad headings: 'communication', 'expressive engagement' and 'organisation and management'.
- Around half of interviewed STEM academics, whom we term 'transfer proponents', view the skills needed for academia and public engagement as very similar. Their ideas of the relationship between the two skillsets aligns with the concepts of 'low-road transfer', where transfer between contexts requires little effort to recognise and accomplish. However, the remaining half, termed 'skill separatists', felt that whilst the skills of academic and public engagement work were related in abstracted theoretical terms, they differed once placed into practice. This group questions how easily the transfer of skills between the two praxes might take place.
- The previous analysis has implications for the development of public engagement capacity within academia: the transfer proponents' worldview would suggest that academics can move into the public engagement arena with little risk or need for training. However the skill separatist position would indicate a more problematic future, with requirements to undertake engagement activity proving burdensome for staff. Further research in this area is needed to understand how best to support academics as they venture into public engagement.

Introduction: public engagement and higher educational institutions

Whilst specific definitions vary, 'public engagement' (PE) can be generally understood in a university setting as activities through which the public may engage with, and benefit from, research and higher educational contexts (NCCPE, 2023). Recent decades have seen a significant uptick in these practices within UK higher education institutions (HEIs) with PE increasingly prioritised in strategic decision making and funding policy and undertaken by institutions in what has been dubbed a new 'Era of Public Engagement' (Burchell, 2015; NCCPE, 2020). In this era institutions must highlight their public engagement practice through key sectoral processes such as the Knowledge Exchange Framework (KEF) and Research Excellence Framework (REF). These processes can be seen as highly influential to the resourcing and activity of institutions, demonstrating the reach and the significance of public engagement practices in the modern HEI landscape.

Whilst PE practices have long existed in some form within HEIs (Inkster, 1980), these activities are now increasingly present within the responsibilities of academic roles as an additional duty beyond the traditional activities of research and teaching. One study of 2,454 UK academics reported that 82 per cent of researchers had undertaken at least one instance of public engagement in the previous 12 months, with senior academics recognising an ongoing change within academic culture and increasing practice of PE (Hamlyn et al., 2015). The involvement of academics with PE can take many direct or indirect forms: PE practitioners may directly engage with the public, may mediate their engagement through third-party organisations such as schools or museums, or take part in 'behind the scenes' efforts that improve the quality of PE undertaken by others (Duncan et al., 2017). Development of the 'public engagement era' has also seen growing complexity within engagement activities. Where in previous decades the public may have been treated as passive audiences of communication (a 'deficit model' approach to PE), contemporary activities may invite the active involvement of public groups within the engagement experience through consultation or participation (Rowe & Frewer, 2005). The modern dialogic approach recognises the importance of open-minded exchange and the value of public perspectives in research and education and presents new opportunities for the design of creative and impactful engagement experiences (Nadkarni et al., 2019). Such contemporary approaches to PE might include science festivals where academics interact with large public groups in many rapid-fire close interactions (Bultitude et al., 2011), the development and dissemination of engaging new media such as a research-led comic on

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obesity stigma and health that is developed and shared to aid healthcare practitioners (Gardner et al., 2021), or approaches of participatory research or 'citizen science' that see members of the public act as co-researchers to support avenues of research that might not be possible if conducted by researchers alone (Garbarino & Mason, 2016).

The increasing diversity of activities undertaken beneath an umbrella of 'public engagement' might be understood as driving greater distinction between the responsibilities undertaken within PE and those related to the core roles (research and teaching) of academics in higher education contexts. Where past 'deficit' approaches to PE were akin to actions undertaken by academics in their daily work (e.g. public lectures and lecturing to students) contemporary practices can differ more distinctly. It is unlikely that most academics, for example, will frequently engage in rapid-fire 'busking' style interactions with the public, or need to communicate complicated ideas in a way that is accessible to very young audiences, but both are required within a science festival setting. In this way PE may be understood as not only growing in prominence within academic workloads but also diversifying from more common practices within academia.

This divergence might be understood as a source of burden on PE active academics and this thesis can be indirectly inferred through wider literature. Little literature has comparatively outlined the skills necessary for PE pre or post the contemporary era. However, one previous study identified that in this new era of public engagement only 13 per cent of academics feel 'very well equipped' to undertake PE, with further works identifying a lack of PE training and development opportunities (Davies, 2013; Hamlyn et al., 2015; Watermeyer, 2011). Further research has suggested that post-doctoral academics view their skills with 'promoting public understanding of research' as some of the weakest within their academic expertise – much weaker than other skills in areas such as teamworking or conducting research (Lee et al., 2010). These findings suggest a degree of low confidence or uncertainty amongst academics towards PE that further supports an assessment of divergence of PE from common practices of academics. Self-efficacy is widely recognised as influencing decision making and behaviour: those who do not perceive themselves as capable within a context are less likely to undertake activities in that domain (Bandura, 1997). Self-confidence with PE amongst academics is notedly varied, with senior career academics, those who have received formal training, and those who engage in both research and teaching duties reporting greater confidence than other colleagues (Hamlyn et al., 2015). The body of research evidence concerning the practice of PE is growing with works examining topics such as incentives shaping research communication and engagement practice and wider stakeholders and practitioners within PE environment (Koivumäki & Wilkinson, 2022; Watermeyer & Rowe, 2022). There is, however, a significant gap in the current literature to inform this understanding of academic readiness to undertake PE; it is unclear to what degree a traditional academic skillset developed in research and teaching can support an academic wishing to undertake PE. Fundamentally this question is one of transferability, where 'prior-learned knowledge and skills affect the way in which new knowledge and skills are learned and performed' (Leberman et al., 2006, p. 2). The notion of unlearning or relearning (i.e. transformation) has been identified as relevant in the development of science communication expertise specifically in past literature, but questions remain as to how academics view the idea of transferability across academic and PE domains (Krauss et al., 2022). This fundamental characterisation holds implications for how individual academics perceive and therefore approach PE practices, and how PE practices may be nurtured within the culture of institutional settings.

Whilst not focusing on the topic of PE, guidance may be drawn from wider theoretical perspectives in skill transfer literature. Such transfers are recognised as complex and frequently context-dependent (Fauth & González-Martínez, 2021; Leberman et al., 2006). Skill transfer may be shaped by the degrees of situational similarity between domains (near/far transfer), degree of effort necessary to transfer a skill between contexts (high-road/low-road transfer) or the beneficial or detrimental impact of possessing past skills in new contexts (positive/negative transfer) (Leberman et al., 2006; Salomon & Perkins, 1989). This complexity is echoed in wider theoretical structures of skill and learning transfer (Haskell, 2001).

These perspectives recognise a complexity to the dynamics of skill transfer that are relevant to considerations of PE expertise. Skill transfer literature would challenge overly simplistic assumptions of relevance or proximity between academic and public engagement domains. This would draw into question the assumption that possessing academic skills will necessarily support an individual to undertake PE. Little literature has examined these dynamics as a focus of study, highlighting a gap that must be understood if PE practices are to be supported and developed further, or the burden of these activities on academics better comprehended. A greater understanding of the dynamics between PE and academic skillsets may in turn support more impactful skill development amongst academics or impactful PE within institutions.

Research questions

To begin to address this gap in understanding, the current paper offers a formative qualitative investigation of the relationship between academic and PE expertise through semi-structured interviews with public engagement-practising STEM academics. In order to do this, we posed the following research questions:

1) What skills do experienced, public engagement-practising academics identify as significant to public engagement?

2) How do participants view the relationship between these skills and the traditional academic skillset?

First, the skills necessary for practices of PE are identified and examined in relation to the wider literature. Then, having developed an understanding of what skills are relevant to PE, the dynamic between the skills necessary for academic or PE practices is examined to enrich understanding of skill transfer between these domains. Investigating these questions through a theoretical and empirical lens may enrich understanding and aid in comprehension of PE within university settings. A richer understanding of skill transfer between academic and PE activities may support the development of expertise and proliferation of PE practices.

Method

An interpretivist research philosophy was adopted to investigate the transferability of skills between academic and public engagement contexts. This approach was selected in acknowledgement of the differing lived experiences central to the research topic of public engagement practices and the need to recognise subjectivity within participant experiences. An inductive semi-structured interview methodology was utilised to investigate the views of participants in relation to skills in PE and more general academic domains. Cross-sectional data was collected through a single interview with each participant. Thematic analyses were conducted to examine recorded interviews and develop understanding.

Fifteen participants were recruited from universities within the United Kingdom, with nine participants identifying as female and six identifying as male. All 15 participants held academic roles within a STEM discipline and possessed a broad experience with PE defined as several years of first-hand experience in PE in multiple modalities (e.g. science festivals, in-school outreach activities, writing for popular media). These individuals possessed varied institutional backgrounds including highly selective research institutions as well as universities with greater teaching/vocational focus. Participants were recruited through non-probability convenience sampling. All participants were required to have experienced PE within a science festival setting to ensure an aspect of commonality within the sample and aid the synthesis of collected data. Controlling for participant academic domain was further warranted by past findings which suggest distinctions in the PE domains of STEM and humanities subjects (Burchell, 2015). Notably the PE experiences of these participants skewed to dissemination style activities occurring after and between research projects, with limited examples of participatory research highlighted by participants. This may reflect a greater rate of dissemination style activities within STEM subject areas, a lesser ease of conducting participatory research in these areas, or be a consequence of sampling in this initial study. PE teams at UK HEIs that hosted or frequently attended science festival

events were identified and contacted with a request to forward details of the present study to their PE-practising academics. Academics who contacted the research team were then briefed and interviewed online via the Microsoft Teams platform. Interviews took roughly 45 minutes to complete and were transcribed and analysed through content thematic analysis to identify patterns within responses.

Ethical approval was secured through the university ethics process. A semi-structured interview protocol was developed to examine the two research questions. This protocol examined topics such as participant experience with PE, including type and depth of experience with different approaches, participant views on skills required in PE, how these skills can be developed, and how they relate to academic skills, and their views on support for public engagement practices. Participants were approached with prompting research questions but also provided with space within the dialogue to introduce and explore themes they deemed relevant to the research topic. This semi-structured method was appropriate to gather the rich qualitative data necessary to sufficiently examine the nuanced topic of PE skills and the dynamic relationship between academic and PE domains. This interview protocol framed questions in relation to both PE experiences generally and specifically in relation to science festival experiences to provide some commonality in the framing of participant responses – however, participants would frequently contextualise their responses to PE more generally and draw on their diverse experiences with PE reflecting the broad experience and expertise of these participants.

Results and discussion

Research question 1: What skills do experienced, public engagement-practising academics identify as significant to public engagement?

Identified skills for public engagement

Participants were asked to reflect on the skills they view as necessary to conduct public engagement activities. Responses were thematically analysed to identify patterns and distinguish skills. Whilst PE skills are commented on in several published sources, few of these explore what specific skills are needed (Burchell, 2015; Watermeyer, 2011). Respondents in the current study were readily capable of identifying skills required for PE activities which were then analysed, coded and tallied to structure a list of the most commonly identified skills. These skills are outlined in Table 1 below.

The most frequently identified skills that are drawn upon in PE were, perhaps unsurprisingly, based on communication. If PE is understood as active interaction between academia and the public, then communication is a fundamental process within this activity. Communication skills may be understood as increasingly important within more modern, dialogic approaches to PE that recognise two-way communication with the public (Burchell, 2015; Nadkarni et al., 2019). Participants identified the importance of understanding different audiences and the need to change communication strategies to reach varied groups most effectively. These findings are consistent with earlier explorations of PE expertise supporting the validity of the present findings (Mercer-Mapstone & Kuchel, 2015). The high frequency of identification of these skills is also aligned with past findings that identify an audience-focused attitude amongst experienced PE-practising academics (Bray et al., 2012).

However, the high frequency with which these skills are identified as significant within PE also raises concern given wider assessments of academic expertise that note poor communication skills for wider audiences in academic cohorts. For example, Lee et al. (2010) identified that post-doctoral academics see their communication skills as some of their weakest whilst Davies (2013) notes that academics report a need for training or support to develop skills of identifying audiences, communicating with the right level and tone, and navigating differences within audiences. Each of these three skills were identified by participants in the current study as significant to PE practices. This may thereby be consistent with low levels of confidence for PE identified in wider studies of academics (Davies, 2013).

Table 1. Skills identified by academics as utilised within public engagement practices

Skill	Category	Mentioned by number and % of academics	Skill description
Communicating with different audiences	Communication	N=14, 93%	A versatility with communication. Being capable of modulating/translating/reframing content for different audiences.
Perceiving audience characteristics	Communication	N=10, 67%	An ability to observe and recognise the characteristics of an audience to anticipate effective methods of communication, including cultural sensitivities and differing experiences with academic contexts.
Communication strategies/'tricks of the trade'	Communication	N=10, 67%	An understanding of how to communicate with public audiences in particular, including 'tricks of the trade' such as bending factual information to form a compelling narrative or intentionally causing mistakes to draw in audiences.
Flexibility	Organisation and management	N=9, 60%	An ability to respond to the unexpected, such as things going wrong during experiences, unexpected questions, responding to larger-scale interruptions such as Covid-19.
Designing experiences	Expressive engagement	N=9, 60%	The capacity to design, create, test and refine public engagement experiences.
Creativity	Expressive engagement	N=8, 53%	A willingness to try new things in public engagement practice, breaking with convention for novel experiences, openness to different approaches to public engagement.
Ability to entertain and inspire	Expressive engagement	N=8, 53%	An ability to demonstrate enthusiasm and passion, encourage these qualities to emerge within members of the public, to motivate others whilst conveying an entertaining experience.
Project management	Organisation and management	N=7, 47%	The capacity to manage operations, logistics, coordinate, strategically plan public engagement experiences, including time management and framing clear objectives.
Resilience to failure/criticism	Expressive engagement	N=6, 40%	A willingness to face criticism or handle disappointment in the face of unsuccessful attempts at public engagement, even if negativity is unwarranted.
Crowd management	Organisation and management	N=5, 33%	The ability to handle crowds, particularly in public engagement contexts that are disruptive or disorganised.
Endurance	Expressive engagement	N=5, 33%	The physical, mental or emotional stamina to conduct public engagement experiences which may last several days and require high levels of energy throughout.
Compatibility with public engagement culture	Organisation and management	N=5, 33%	An ability to comprehend and operate within the culture of public engagement, including its nature, demands and reasonable expectations.

Participants also highlighted the importance of what may be termed 'expressive engagement skills': skills that are drawn on in the practical development and delivery of PE experiences. These include responses such as use of creativity to design and try new things, the design and testing of impactful experiences, the ability to inspire and motivate in an entertaining way, or endure the physical, mental and emotional labour of PE experiences. Where the earlier discussed communication skills relate more directly to the interaction between academic and public, these expressive engagement skills relate to personal characteristics of the practitioner that affect the mechanical development and application of the engagement experience. It may be that such skills are increasingly important as greater diversity and nuance is introduced in the dialogic approach of the new era of PE.

Participants recognised the application of creativity as a skill within the design and delivery of PE experiences. This aligns with past findings that recognise a positive impact of creative approaches to PE on both practitioners and publics (Sayer et al., 2014). The expressive engagement skills identified by participants also recognised the emotional labour within PE activities. This included fostering an affective/emotional impact on the public such as enthusiasm or motivation. However, the cost or burden of this on the practitioner was also recognised with a need for endurance and resilience to overcome the challenge of delivering PE experiences. This is a notable finding within the broader PE literature: whilst the emotional labour of *participation* has been recognised amongst widening participation groups, lesser consideration has been put to the impact of *delivering* PE experiences (Humm et al., 2020).

Participants also identified organisational and management skills as significant within PE practices. These skills included crowd handling, management of operations, logistics and event coordination. Some, such as crowd handling, may relate more directly to commonalities within the experiences of the interviewed participants such as their shared experience with science festival settings.

The influence of dispositions

Whilst the responses of participants were offered in the current study as 'skills' it is valuable to note that an alternative interpretation may instead characterise a number of these responses as 'dispositions': embodied tendencies of an individual to think or act in a given manner (Katz & Raths, 1985; Riveros et al., 2012). Dispositions and skills are related but conceptually distinct: whilst a skill refers to an ability to do something, a disposition relates to the tendency to act on this ability and apply this skill in an individual's behaviours. In this way it is possible for two individuals to both possess the same skill but for only one of them to possess the disposition that leads to that skill being actioned. Many differing dispositions are recognised in research literature. Dispositions in learning, for example, may include creativity, resilience or strategic awareness (Deakin Crick & Goldspink, 2014). Notably each of these three learning dispositions can be recognised within the responses of participants in the present study as related to PE skills. This highlights that dispositions are not context-specific but can present as tendencies for a range of behaviours. A disposition of creative thinking may see an individual engage in artistic hobbies, generate novel strategies within work contexts, or develop engaging PE experiences. Each of these behaviours might involve distinct skills but would all share a dispositional characteristic of creative thinking. In this way it may be possible that certain dispositions are shared for both academic and PE activities in a manner that supports skill transfer between these settings. Wider literature acknowledges examples of academic dispositions such as tendencies 'to know', 'to share' and 'to innovate' (Van der Rijst et al., 2009). Each of these dispositions are potentially applicable to PE practices. Tendencies to know about a domain or topic of research, to engage in activities to share this through PE, and to develop new ideas about how to accomplish this describe, in effect, the act of PE. The close relationship between skills (possessing abilities) and dispositions (tendencies to act on these abilities) can lead to the two terms being used, or discussed, interchangeably. This may be the case within the qualitative interviews conducted in the present study; participants identified skills of endurance, flexibility, resilience and creativity, which may also be viewed as dispositions. Whilst participants in the current sample did not clearly distinguish dispositions and skills in

their responses, future work should recognise this distinction and examine this topic through more direct questioning. As responses were framed by participants as 'skills' they will be treated as such within this paper.

The skills identified here are deeply useful in contextualising responses to the second, and central, question of this paper concerning the relationship between skills in academic or PE settings.

Research question 2: How do participants view the relationship between the skills required by public engagement and the traditional academic skillset?

Participants were also queried on their views of the dynamic relationship between skills for academic and PE practices. An analysis of responses revealed a diversity of opinions from which two overarching standpoints can be drawn.

Group 1: transfer proponents

Whilst almost all participants acknowledged that the skillsets of academia and PE are related to a certain degree, views differed in how strongly they believed these overlapped. For some the skills needed for PE and academia were very similar, with complementary links that supported activity in both domains. For this group, titled here as 'transfer proponents', an inability to accomplish one was viewed as an inability to accomplish both:

> *We teach and teaching in itself is a form of public engagement…I don't think those skills can be really divided.* – Participant Lima

> *If I can't run a budget to run a sci-comm activity I should be ashamed of myself because I can run a budget to run large research projects.* – Participant Juliet

> *If you are smart with what you are doing, you can get your engagement experience to feed your teaching experience, and your teaching experience to feed your engagement experience.* – Participant Delta

These transfer proponents characterised a close relationship between practices of academia and PE. Skill transfer literature would frame such a relationship as one of 'near transfer': a transfer of skills between contexts that are readily identified as sharing similar characteristics (Barnett & Ceci, 2002). A close relationship would also align to definitions of 'low-road transfer': transfer between contexts that requires little effort to recognise and accomplish. Low-road transfers of learning require minimal conscious thought, occurring spontaneously and automatically as practised skills responding to similarity in context (Salomon & Perkins, 1989).

Group 2: skill separatists

However, other participants, titled here as 'skill separatists', dissented from this characterisation of similarity. Half of the sampled academics commented that whilst the skills of academic and PE work were related in abstracted theoretical terms, they differed once placed into practice. For example, whilst skills such as 'communicating with different audiences', 'understanding audience characteristics' and 'project management' are drawn on in the delivery of lectures, these skills are actioned differently in a PE context. Participant Echo saw some degree of overlap between the two domains but also recognised that ultimately academic and PE practices focus on differing outcomes: 'I suppose the driving forces behind what people are going to take away from [public engagement or academic experiences] are different, but the same principles are there.' This sentiment is echoed by others who recognise a theoretical similarity between the two domains but context-specific characterisations that limit overlap in practice:

> *I think a lot of academics will have those skills, but they may not be able to apply those skills into the messy real world of a crazy festival, or science festival where there is noise and there are people and nothing is guaranteed.* – Participant November

> *We had a guy in the front row just answering his phone and started having a conversation. If that was one of my students, I can deal with them… but with it being a member of the public it's a completely different ballgame.* – Participant Alpha

A minority of participants took an even stronger position and believed that the application of common skills could differ so widely in academic or PE contexts that, in effect, these skills were unrelated.

> *I think that they are quite distinct… To be good at public engagement, I don't think you necessarily need to be the best academic, you just need to be passionate and know the field quite well… I think people can recognise [skills for public engagement and academia] as completely different skillsets.* – Participant Kilo

> *There are some really good researchers I know and they are awful at talking, they really are. Their forte is chatting to somebody who is on top of their subject about it, but they're not polished communicators. They are different things.* – Participant Golf

The perspectives of these skill separatists question how easily the transfer of skills between academic and PE practices might take place. Rather than a simple 'near transfer' between similar contexts, academics would need to deploy 'far transfer': a transfer of knowledge or skills between dissimilar contexts. Far transfer is recognised as a much less common form of transfer, requiring effortful intervention to build bridging structures between learning and skill use – with some questioning whether far transfer is even possible in most settings (Barnett & Ceci, 2002; Sala et al., 2019; Salomon & Perkins, 1989).

Contrasting views and implications on public engagement capacity development

This analysis identifies that not all academics share a common conceptualisation of PE skill development, with two relatively distinct schools of thought about the transferability of academic skills to the PE realm communicated by participants in the present study. These findings hold significant implications for how academics view public engagement: as something similar to their existing practice, or distinct from it. Given the recognition that public engagement practice is shaped by workload pressures, it is necessary to consider that this differing view of proximity to existing practice may be seen as an important, but under-recognised, dimension of PE capacity building (Kassab, 2019). These two positions can be seen to offer contrasting levels of optimism and implications for public engagement skill capacity in the contemporary 'new era' of public engagement.

The first group of STEM PE academics sees the two skillsets as closely related and thus susceptible to 'near' and 'low-road' transfer: an easy application of academic skills in PE contexts. This positioning of similarity would suggest an optimistic position on the development of PE in HEIs. First, it would imply a greater degree of readiness within the academic community to undertake and develop their practice of PE. Academics, according to transfer proponents, will already possess skills that can support undertakings of PE. Second, a positioning of similarity between these areas of expertise would minimise the risk posed by the growing pressure to undertake PE in contemporary academic culture. Whilst funders and institutions may increasingly insist that academics undertake PE, this would not, seemingly, represent an insurmountable challenge for academics who will be readily skilled to undertake these tasks. Finally, the characterisation of similarity would support the value and utility of existing academic professional development programmes that focus on research or teaching skills as providing, indirectly, skills that also apply to PE practices.

These potential implications offer a positive picture of the place and capacity for PE within HEIs. However, whilst positive, it is important to note that the skill transfer literature does highlight a need for recognition between contexts of skill application: near transfer occurs through an automatic recognition of similarity. In this case, from the transfer proponent perspective, it would be necessary for academics to have a clear understanding of, or perhaps first-hand experience with, PE, in order to facilitate an easy application of their academic skills. Whilst this nuance was not clearly articulated by the current sample of expert PE practitioners, it may be that less experienced individuals must navigate this hurdle before applying their academic skills in a new setting. This would support the encouragement of participation with PE experiences by academic staff, even as a bystander, to recognise the similarity of skill usage in each domain. Overall, the views of these participants support an optimistic landscape of PE and trajectory for its future.

However, the case of the second group, which represents a plurality of participants, suggests a more problematic vision of the academic involvement in PE. This group characterises a more distant relationship between skills in the academic and PE domains. A 'far transfer' between academic and PE skills would have distinct implications for both academics and institutions. According to this view, academics who are now expected to undertake PE would face not only additional duties, but duties that required greater commitment to undertake. This burden of practising PE was recognised by participants such as Participant Foxtrot who noted: '[Public engagement] takes up a lot of my time and it is not really gaining me anything.'

A limited ability to draw on academic skills in PE practices would also compromise the ability of institutions to undertake a key activity necessitated by governmental and funding bodies. Training offered by institutions to support academic expertise in teaching or research could not, according to the position held by these participants, be considered beneficial for adopting practices of PE. This would imply a need for greater participation with PE training; however, the wider literature suggests a historic low access or participation with such training (Burchell, 2015). The need for more profound training provisions was echoed in the current sample, with Participant Oscar noting that in a perfect world 'everyone [would have] equal equitable access to public engagement opportunities and training', and Participant Charlie supporting the value of informal learning: 'I'm probably a strong advocate for "Go and watch somebody else do it, and then find out how they do it"'.

Skills and practices: acknowledging the breadth of public engagement

Whilst many participants challenged the notion that academics' skills could directly apply to PE practices, these responses also identified aspects of nuance to this question of skill transfer. The skills raised by participants were complex, covering topics such as communication dynamics, creativity in thought and practice, and capabilities in inspiring others. It may be that the question of overlap between academic and PE skills are similarly nuanced, with some skills more directly applicable to PE practices than others. Participant Alpha recognised differences in the application of audience management skills between academic teaching and PE practices, but also recognised preparation and planning skills and resilience as applicable to both settings. This highlights that the question of skill transfer is not binary but may depend on the specific skills in question. Having identified within this current study that academics view the overlap of academic and PE skills in a complex manner, future research may be capable of codifying individual skills more specifically as more or less relevant to PE practices.

A further nuance to the question of skill transfer between academic and PE practices lies in the diversity of practices now recognised as 'public engagement'. It is possible that some practices of PE can be facilitated with academic skills more so than others. It is reasonable to expect that delivering a public lecture to an audience of adult members of the public is more similar to academic teaching than more novel forms of PE such as science busking or artistic performances. In this way the contextual characteristics of the PE activity may shape the degree of overlap possible with academic skills. This nuance may apply not only to the type of activity undertaken but its location. Some settings, such as a

busy PE event, may be too chaotic to facilitate active learning and reflection by academics attempting to bridge their academic and PE expertise.

Support for this position is offered by Participant Echo, who highlights that PE can be 'bigger, it's brighter, it's better, it's louder'. This is relevant given that far transfer – the types of transfer between more distinct contexts – requires conscious intervention. The setting in which PE activities such as writing for a newspaper or engaging on social media are undertaken may facilitate more thoughtful action – allowing practitioners to think about their thinking in metacognitive terms – and apply their academic skills more impactfully. This insight challenges thinking in strictly dualistic terms between 'near' or 'far' transfer settings and recognises that transfer between academic and PE contexts is likely to be diverse. It may be that the responses of participants in the present study, including their scepticism of easy transfer between academia and PE, is reflective of their collective experience: whilst these participants had undertaken many forms of PE, they had all experienced science festivals as a significant part of their experience. This setting would be unlikely to allow the space to facilitate more thoughtful and time-consuming transfer of skills, and so may have shaped the pattern of results offered by this sample. This warrants further investigation with different samples.

It is also possible to hypothesise that the diversity of activities recognised as PE in contemporary practices may support the learning and development of participating academics. Bransford et al. (2000, p. 78) recognise that 'Knowledge that is taught in only a single context is less likely to support flexible transfer than knowledge that is taught in multiple contexts.' In this way the new era of PE may offer a richer environment for practitioners to establish their abilities or transfer existing skills through reflection and diverse experience in many varied contexts.

Whilst the perspective of participants did not always align in regard to the applicability of academic skills to PE practices, much greater agreement was noted towards the value of the PE as a whole. The positive views of PE offered by participants, in spite of the difficulties applying academic skills to these efforts highlighted by many participants, supports the value of studying this topic. Whilst the methodology of the current study focused on transfer of skills from academic to PE contexts, an alternative approach may consider the reverse: the ability of PE skills to bolster the teaching and researching skills of practitioners.

Conclusions

The exploratory investigation of public engagement skills outlined in this paper offers a number of novel insights to support the development and practice of PE.

A range of skills are identified as relevant to the practice of PE. Communication skills are highlighted as key by almost all participants; however, previous studies have recognised that academics in general are likely to see their communication skills as a weakness. This is therefore a likely source of previously identified patterns of low confidence with PE. Dispositions, as tendencies to apply skills, are also recognised as salient to the practice of PE. These findings inform a wider understanding of what expertise is drawn on in the PE domain. Little past literature has explicitly articulated a list of PE skills or considered the dispositions of academics in relation to this expertise, supporting the novelty of these insights. Care must be taken to acknowledge that this is not a definitive list: the diversity of activities undertaken in the new era of PE is likely to determine a demand for skills not listed here. This is a topic requiring further investigation.

This investigation also provides a novel perspective on the ability to draw on and apply 'core' academic expertise of teaching and research within PE practices, and the associated need for training provision to develop HEIs' PE capacity. Some participants viewed this dynamic as a straightforward skill transfer between practices, suggesting that for these individuals HEIs can provide appropriate training through a combination of exposure and academic skills development programmes. However, others saw greater difficulty in the transfer of skills from core academia into PE. This perspective would characterise the growing emphasis on undertaking PE as a burden and source of difficulty for academic staff. It would

also suggest that HEIs must more effortfully support PE skill development, perhaps through specialised training programmes, in order to meet their PE obligations.

The examination of academic and PE expertise outlined in this paper is offered as a formative investigation of this topic. These findings recognise the complexity of approaching skills and skill transfer for the broad and complex PE context. Some skills may be more obviously transferable than others or transfer may be more actionable in some practices of PE than others.

Our findings also highlight the complexity of this topic. It is suggested that some skills may be more transferable than others, such as planning or resilience, whilst other skills are more specialised to particular contexts. The research outlined in this paper is offered as a first step towards greater understanding.

However, the findings of this first exploratory study of perspectives on academic/PE skill transfer must be considered in relation to the present sample and their experiences. Whilst participants came from different career stages, from a range of institutions, and possessed different experiences with PE, all participants possessed STEM backgrounds. It may be that the ontological and epistemological foundation of STEM subject areas – aligned to positivism and objectivity – shaped participant perspectives on these topics. However, it may also be that those who participate in PE develop values that are shared between STEM and non-STEM practitioners. Further study of perspectives on skill transfer beyond this first study should consider the views of PE practitioners from non-STEM backgrounds. This would also present the opportunity to expand the sample of PE practitioners further. The present interview methodology offered rich data and the sampling technique ensured that participants had experienced an array of PE experiences, but the population of PE-practising academics is wider than 15 individuals.

Future work may pursue this topic further; it would be valuable to consider how academics/practitioners from other domains, such as the humanities, view and experience skill transfer given previously recognised differences in PE undertaken by those in STEM or humanities subject areas. Future work may investigate the degree to which these transfer proponent and skill separatist positions align to the views held by different groups in the PE culture, including academic practitioners, those in PE-specific roles within wider organisations, or leaders and decision makers within HEI contexts. A wider sampling drawing on quantitative methods may also provide the opportunity to gather a broader perspective and diversify the views considered – it would be valuable to consider the experiences of those just beginning their journey into PE practice, or the views of trainers who have experience supporting the development of PE expertise. A greater understanding of the relationship between academic expertise and skills for PE may facilitate stronger support for the practices and practitioners of public engagement.

Declarations and conflicts of interest

Research ethics statement

The authors declare that research ethics approval for this article was provided by the BAHSS2 ethics board of the University of Lancashire.

Consent for publication statement

The authors declare that research participants' informed consent to publication of findings – including photos, videos and any personal or identifiable information – was secured prior to publication.

Conflicts of interest statement

The authors declare no conflicts of interest with this work.

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