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Taxonomies as boundary objects for social change: Enhancing visibility of academics' impact-related information behaviours

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Abstract

Introduction. This paper analyses taxonomies of societal engagement and impact associated with research as 'boundary objects' that mediate and make visible the information behaviours of academics undertaking this work.

Method. The study uses 'boundary objects' (Star & Griesemer, 1989) as an analytic lens to explore institutional approaches in Denmark and Australia that classify societal engagement and impact activities.

Analysis. The team used quad-ethnographic analyses of the taxonomical structures used in three schema – two used in proprietary research information management systems (*Pure* and *Symplectic Elements*) and one empirically designed taxonomy (*ReACT*) – to identify alignment and/or disjuncture with academic engagement and impact work.

Results. The findings show proprietary system taxonomies limit the scope of reportable engagement and impact activities, rendering many academics' information behaviours invisible. Adopting empirically derived taxonomies that more closely represent engagement and impact work can make academics' related information behaviours visible, thereby informing approaches to capability development and tracking of relevant impact work.

Conclusion. The study identifies the limitations and benefits of how each schema represents (or renders invisible) academics' experiences of undertaking societal engagement and impact work.

Introduction

Academics undertaking community engagement and impact activities encounter new work requirements and distinct information behaviours (Kelly & Given, 2023; Cattlin & Given, 2025). Universities increasingly rely on information systems to capture data about these activities, alongside other academic work, like publishing. These systems are based on taxonomies that influence how academic work is described, understood, and valued, yet academic staff are rarely involved in their design or application. This paper examines the roles taxonomies play as boundary objects (Star & Greisemer, 1989), making visible and influencing academics' information behaviours (Lykke et al., 2023).

Studies of academics' information behaviours often focus on such research practices as scholarly communication (Miller, 2015; Steinerová, 2019) and accessing literature (Borrego & Anglada, 2016). Recently, studies have broadened to examine information behaviours associated with impact work, including paradata creation (Huvila et al., 2024), managerial constraints (Willson, 2018), and non-academic collaborations (Du & Chu, 2022). These studies highlight that changes to work practices create new information needs, seeking, use, and creation activities.

The work associated with identifying, describing, and tracking engagement and impact also creates new information behaviours. The identification and documentation of these activities reify the often invisible, intangible, and undocumented work academics do, which are often not tracked or rewarded by universities. These activities are reflected in some source data, such as details of meetings or events, which may or may not have tangible artefacts (e.g., minutes), as well as altmetrics, media coverage, or social media interactions.

The use of research information management systems to record impact-related work creates expectations of what academics should track and how to classify it, but this representation of academics' experiences is often incomplete. Research information management systems and taxonomies are not neutral; the concepts and terminology influence how academics, professional staff, and administrators understand impact work and related information behaviours. Taxonomies are hierarchical structures that influence how information is collected, collated, used, and understood (Pedersen et al., 2020).

This paper explores the application and usefulness of impact taxonomies as mechanisms to capture and report on impact-related academic work. We compare three taxonomies used in two universities, including those embedded in proprietary research information management systems (i.e., Elsevier's *Pure*, at Aalborg University, Denmark; and Digital Science's *Symplectic Elements*, at RMIT University, Australia) alongside a researcher-developed taxonomy (i.e., *ReACT*) that captures impact-related activities.

Background

The rise in research information management systems

As universities embrace analytics for societal impact, alongside publications, grants, and other activities, research information management systems are rising in popularity. Proprietary systems, such as *Symplectic Elements* and *Pure*, are described as the 'source of truth' (<https://www.symplectic.co.uk/theelementsplatform/>) of institutional 'research output, impact, and capabilities' (<https://www.elsevier.com/en-au/products/pure>). Universities embrace these tools for reporting, governance, decision making, accountability, performance, and capability management.

Research information management systems integrate information on project management, finances, publications, grants, community engagement, impact narratives, and achievements (e.g., awards). They produce researcher profiles, both for internal performance tracking, and for institutional websites. The systems allow some local customisation but often prioritise data

analytics (requiring bibliometric datasets) over the production and analysis of qualitative data. Thus, tracking publications, particularly if easily imported to research information management systems (e.g., from ORCID), is easier than tracking societal impact, which requires narrative forms of evidence.

Yet, creating indicators that capture the complexity and diversity of activities, across disciplines, globally, is challenging. For impact-related work, there are varied definitions of concepts and different assessment frameworks (Pedersen et al., 2020; Smit & Hessels, 2021). While it is well established that user needs must be addressed in system development and deployment (Huvila et al., 2022; Leitch & Warren, 2010), limited studies examine academics' research information management systems needs. This leaves little guidance for integrating societal impact indicators into these systems.

Assessing societal impact influences university information contexts

Tracking impact work has significant implications for shaping research priorities, university performance expectations, and promotion criteria (Kelly & Given, 2023), and for influencing academics' identities and practices (Watermeyer & Tomlinson, 2022). Academic identity is 'bound up with the characteristics and structures of the knowledge domains which are difficult to separate' (Becher & Trowler, 2001, p. 42), providing academics with a 'sense of identity and personal commitment' (p. 47). Yet research information management systems rarely reflect academics' experiences (Balaban & de Jonge, 2023). Studies point to differences between 'performative impact', as required by government assessment, and the authentic impact researchers pursue with communities (Smith et al., 2020, p. 68; Chubb et al., 2017). To represent complex information practices and outcomes, across disciplines, taxonomies must contain appropriate and clearly defined terms.

There are also challenges in identifying appropriate indicators or proxies for societal engagement and impact (Lykke et al., 2023). One approach, attribution analysis, links societal change to research outputs (e.g., journal articles), seeking to trace direct causal links between research and observable outcomes. These are often measured through standardised indicators such as patents, licences, or citations (Guthrie et al. 2013; Milat et al. 2015; Pedersen et al. 2020). This approach risks narrowing assessments to economic or bibliometric outputs by highlighting only 'who' solved what 'problem'. In contrast, contribution analysis emphasises the 'productive interactions' through which researchers engage with stakeholders and co-produce knowledge (Morton 2015; Lykke et al., 2023; Spaapen & van Drooge 2011). Here, impact is conceptualised as interactive processes, dependent on numerous researchers and societal partners. In short, attribution emphasises determination of responsibility for *products*, while contribution emphasises *processes* for co-creating knowledge. Both approaches raise distinct information needs for documentation and construction of impact narratives alongside reporting of traditional research outcomes.

Research information management systems also shape how academics seek, create, organise, use, and share information about societal impact, as they attempt to fit their work into predetermined categories over which they have little control. Willson and Given (2020) identified the challenges early career academics face in navigating universities' complex information environments. Simultaneously, universities increasingly seek to streamline institutional information management to maximise the value of research knowledge (Veer-Ramjeawon & Rowley, 2019), to facilitate sharing among staff (Tan, 2016), and to further develop partnerships (Elezi, 2021).

While bibliometric data (e.g., citations), are used heavily for tracking academic output, few options exist to easily and systematically track societal impact. Altmetrics may track how some people engage with publications, but tracking other engagements (e.g., research translation workshops) or impacts (e.g., practice change from research) is difficult. Much of this information is known only

to researchers, who must document activities in research information management systems using manual tracking and reporting.

Taxonomy development for impact-related tracking

The taxonomies within research information management systems mediate and translate information to create shared understanding (Star & Griesemer, 1989). Impact-focused taxonomies are not merely classificatory schemes, but function as what Hacking (1999) calls ‘interactive kinds’ of schemes (p. 59). By defining what counts as ‘impact’, taxonomies actively shape how researchers present, prioritise, and pursue their work; this creates a ‘looping effect’, influencing the content and structure of taxonomies (Hacking, 1999). Although taxonomies can serve as boundary objects—that is, facilitating communication across heterogeneous communities (e.g., funders, institutions, researchers), taxonomies differ from traditional boundary objects because they are not neutral mediators of external objects. Individual taxonomic categories can also be seen as boundary objects, with varying degrees of stability and materiality. Some categories are more boundary-like than others, however. Some are relatively tangible and enduring—such as publications—while others, like media appearances, are ephemeral and temporally unstable. Valuation further complicates this picture: an appearance in national media may carry more institutional weight than an organisation’s internal podcast, even if both are labelled ‘outreach’ taxonomically.

Taxonomies thus occupy paradoxical spaces: they are tangible artefacts, comparable to datasets, but they also evolve over time, as institutions adjust what counts as ‘impact’. In this sense, they resemble provisional communication tools at the intersection of distinct domains (i.e., research; administration; research policy; society), but ones that gradually sediment into stable systems with their own internal logic. Taxonomies of impact begin as primitive mechanisms for coordinating across evaluative cultures. Yet, over time, they may harden into regimes that set norms, redistribute value, and direct behaviour (Galison, 1997). Classifications impose ideas or methods at a fine level of detail, which disadvantages some academics (Bowker & Star, 1999, p. 320), while also influencing their role identities. Thus, taxonomies guide academics’ assessment of whether they are progressing well against institutional and disciplinary markers of success.

Methodology

This paper uses the concept of boundary objects (Star & Griesemer, 1989) as a framework to analyse the impact taxonomies in two proprietary research information management systems (i.e., *Pure* and *Symplectic Elements*), alongside an independent taxonomy called the ‘researcher-informed classification tool’ (i.e., *ReACT*). The analysis identifies how schema represent academics’ experiences of engagement and impact work. The research information management systems included here are used by the co-authors’ institutions (i.e., *Pure* in Denmark and *Elements* in Australia); the *ReACT* taxonomy was developed by two co-authors, through evidence-based design and implementation with academics.

The team used a quad-ethnographic, collaborative methodology, with co-authors examining taxonomical definitions in *Pure*, *Elements*, and *ReACT*, based on their expertise in societal engagement and impact work. This is a variation on duo- and tri-ethnography, with ‘multiple voices in dialogue’ (Sawyer & Norris, 2015, p.2). The team engaged in generative dialogue in online meetings and via email to test examples of engagement activities across the three taxonomies. These interactions were summarised and shared within the team, with a shared document used to integrate reflections collaboratively from their own experiences and perspectives. This allowed the team to interrogate the implications of taxonomy language and structures, with findings emerging from this co-constructed dialogue (Burleigh & Burm, 2022). While the team are information scientists, they bring specialisations in information behaviour, higher education, taxonomy development, and technology use. This enabled holistic analysis (Polkinghorne & Given, 2021) by attending to different understandings of how engagement and impact work are enacted and

categorised. The transferability of the findings is supported by the implicit comparability of ethnography (Armstrong, 2008, p. 2005) and the established use of boundary objects as a theoretical framework for exploring use of taxonomies (Lewis & Ritchie, 2013, p. 264).

Theoretical framework

Taxonomies as boundary objects

In Star and Griesemer's (1989) original study, boundary objects mediate distinct information sources and perspectives to create shared understanding through 'translations scientists perform in order to craft objects containing elements which are different in different worlds' (p. 412). In Star's (2010) work, she explored the concept of 'invisible work' in science (p. 607), in the gap between what is formally recorded and other activities. Developing classifications involves going back and forth in local contexts to create robust representations of reality. For societal engagement and impact, invisible research elements are important, because the work depends on time, relationships, informal knowledge, and personal, embodied elements.

Boundary objects bridge gaps or divisions between different knowledge, expertise, or experiences by being 'plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites' (Star & Griesemer, 1989, p.393). Boundary objects allow integration of knowledge by providing mechanisms for 'diverse individuals to span the boundaries of their specializations' (Caccamo et al., 2023, p.2). Boundary objects (e.g., texts, documents, classification systems), mediate creation of, and access to, information. They can make processes or activities visible, or invisible, such as time, informal practices, and relationships. There are also less tangible boundary-like objects, such as meetings, that mediate understanding between actors.

Boundary objects have served as analytic frameworks for exploring various classification systems, including for knowledge creation (Albrechtsen & Jacob, 1998), museums (Huvila, 2013), document studies (Huvila, 2011, 2012), and work practices (Davies & McKenzie, 2004; Huvila et al., 2014). These analyses show boundary objects are not neutral, but involve 'exercising of power' (Huvila, 2011, p. 2535) in processes that privilege one perspective over another. Organisations can also create boundary objects (e.g., guidelines) that reflect their own agendas (Davenport, 2000). Boundary objects provide ways of making visible 'the sociotechnical contexts within which people seek, retrieve, use, share, and curate information' (Huvila et al., 2017, p. 1811).

The following sections explore taxonomies as boundary objects that mediate understanding of societal engagement and impact within universities. This, in turn, influences understanding of impact work, shaping academics' information behaviours. The analysis explores how taxonomies support shared understandings of impact work, reflecting the scope of possible activities and responding to local contexts.

Analysis and discussion

The *Elements* and *Pure* research information management systems enable data tracking for publications, grants, societal impact, and technology transfer to support governance and reporting. Both systems have interconnecting modules allowing some customisation, including user interfaces, fields, and descriptors. *Elements* has an impact tracking module requiring input of narrative data on external engagement (e.g., engagement instances, impact evidence). Aalborg University has customised these, using the labels 'service and engagement' (for work within academe, e.g., committee membership, and external, e.g., public engagement) and 'records of impact'.

The *Pure* taxonomy, used at Aalborg University, has fourteen metadata types, including traditional academic work (e.g., publications, funding). These metadata can be linked to indicate relationships, such as relating publications to a research project. The 'Impact' field allows researchers to register

impacts by name and description, including type: green (i.e., environmental), cultural, quality of life, political, social, or economic. The 'press/media' and 'activities' fields register external engagement and other non-academic work, such as consultancies and participation in professional events.

The ReACT taxonomy was developed at Aalborg University, based on social sciences and humanities scholars' experiences, and developed further in STEM (Lykke et al., 2023). ReACT was designed to label activities, including those generating impact, across three main dimensions of interactions: *Participation-in-person* (e.g., advice, membership), *Participation-by-proxy* (e.g., reports, articles), *Inflow* (e.g., responses to research). These are further subdivided, up to three levels, and researchers' role are attached to the participation-in-person categories (e.g., speaker, evaluator). ReACT also includes three specifying categories to enhance interaction descriptions: *core contribution*, (e.g., critique, explanation), *target* (e.g., practitioners, companies), and *draw-upon* (e.g., personal research, general expertise). The taxonomy has informed development of impact indicators at Aalborg University, and as a mapping tool for researchers to review their engagement activities.

Taxonomies define impact work

Taxonomies operate as boundary objects in translating and operationalising institutional definitions of societal engagement and impact. Researchers' experiences of societal engagement are mediated by these classifications, which may or may not reflect their lived experiences, involving processes of reification, interpretation, and description.

Taxonomy	Categories	Examples
Elements	Media commentary: Public-facing media contributions, including authored articles and thought leadership pieces and reviews for the public Media coverage: reviews in the media about your work, including interviews and quotes	Media commentary: Thought leadership article in <i>The Conversation</i> Media coverage: Interview on national television; expert commentary quoted in a news article
Pure	Press/media covers press articles that were published in the media Publications: Contributions that do not have a text form: Sound and/or image production (digital)	Press/media: Newspaper article about how insecurity and untrained social skills lead to seeking friends online Publications: Podcast about crime in cyberspace in popular science podcast platform
ReACT	Participation by proxy: Media • Outlets (TV, Radio, Newspaper, Edited website, unedited website, social media etc) • Product (translation, opinion, critique, article, video, etc) Participation in person: Media presence • Interviewer • Interviewee • Debater	Participation by proxy: Media: Feature article in newspaper about freedom of speech and tech giants Participation in person: Media: Interviewee in national TV about importance of names in food branding

	• Critic • Host	
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Table 1: Taxonomy categories for media engagement.

Media engagement is a common activity supporting community engagement and is represented in all three taxonomies. However, media engagement in *Elements* and *Pure* presents a limited representation of activity types and academic roles (see Table 1). These systems focus on tangible outputs in mainstream media (e.g., quotes in news articles; video interviews), where researchers are authors, commentators, or news subjects. Here, media engagement is a simplistic transaction, at a moment in time, documented as a citation. The fields for entry, examples, and definitions serve as boundary objects by specifying the qualities and extent of individual activities and engagement instances. These representations of media engagement reflect the central purpose of research information management systems (Nickerson et al., 2013) as management and reporting tools, aligned with institution, funder, and government priorities.

The ReACT taxonomy provides a more expansive range of media engagements, across multiple channels, and capturing various roles. In ReACT the types of ‘presence’ enable a detailed representation of an individual’s relationship with media, through multiple types of contribution and differing relationships with outlets; these include the specification of media type (e.g., documentary, blog) and the role (e.g., debater, interviewee). ReACT documents both intentionality, and format, providing nuanced and detailed representations. This highlights media engagement as a process, rather than a product, enabling academics to capture the iterative and ongoing interactions with media, and the shifting influence of others’ reactions to that engagement.

The representation of media engagement in *Elements* and *Pure* does not reflect researchers’ lived experiences, as research information management systems do not capture the temporal or relational process elements of media engagement. The research team identified several process-related instances of media engagement in their careers, such as developing relationships with media outlets and becoming trusted sources for journalists. Research information management systems’ focus on identifying commentary instances (e.g., radio interviews), renders invisible the work involved in building relationships with media contacts. Focusing on singular instances overlooks ripple effects of media presence essential for public visibility and generating new relationships. The ReACT taxonomy captures these nuances, which enables identification, over time, of multiple requests and changes in academics’ media roles.

These nuances not only indicate levels of esteem and significance of individual academics but also enable universities to understand the research capability required for effective, long-term media engagement. The relational aspects of media engagement raise unique information behaviours for academics, with many requiring process-focused media support. Effective taxonomy design requires balancing of scope and specificity to enable ‘coherence across intersecting worlds’ (Star & Griesemer, 1989, p. 393). Research information management systems should reflect the breadth of process-related activities and range of roles undertaken, beyond documenting tangible products. While taxonomies in *Pure* and *Elements* support the collection, preservation, and reporting of impact work to serve institutional purposes, their narrow representation of academics’ experiences limits their ability to bridge understanding of the complex nature of that work.

Taxonomies and the complexity of impact work

Taxonomies of societal engagement and impact need to represent the work involved by documenting significant or instrumental activities and outcomes. The categorisation should

Taxonomy	Categories	Examples
Elements	Public outreach or event: Organising, facilitating or participating in industry, government, or community events, such as public talks, workshops, or showcases.	Facilitator at a co-designing community workshop; invited lecture at a government policy forum, panel presentation at an industry conference.
Pure	Lectures and presentations in private or public companies	Invited lecture at national broadcast company Speaker at international biotech expertise group
ReACT	Non-Academic Event: Events where the content is predominantly non-academic and where the main part of the participants and stakeholders do not have a scientific background.	Speaker at seminar for the Danish HR Director Network Roundtable participant at conference for energy sector seminar

Table 2: Taxonomy categories for public engagement.

untangle the complexity of activities that academics undertake in teaching, research, and service and represent these in a structure aligned with both institutional goals and researchers' experiences (Lippell, 2022). While it is challenging to represent the complexity of the work involved, an over-simplification of concepts creates a false taxonomy. The classification of public outreach activities (as outlined in Table 2) illustrates this challenge.

Academics undertake public outreach for various reasons. However, the *Elements* category of 'Public Outreach or Event' is defined narrowly as 'organising, facilitating or participating in industry, government, or community events, such as public talks, workshops or showcases', with the examples provided including being a 'facilitator', giving a 'lecture', or serving on a 'panel'. In *Pure* this category is even more restrictive, comprising 'lectures and presentations in private or public companies', such as biotech firms or at a national broadcaster. In these categories, other representations of outreach – such as public library talks, or creation of a documentary – are invisible. This invisibility overlooks many common forms of outreach, devaluing these activities by their absence. Such omissions may lead academics, and other university staff, to believe such activities do not 'count' as appropriate forms of outreach.

In comparison, *ReACT* provides more nuanced and inclusive representations in the category of 'Non-academic event'. This includes meetings with community organisations, presentations, workshops, open days, and many others. And, the taxonomy allows for documentation of various roles, such as initiator or participant. Further details can be provided through the sub-categories, for example, the 'target audience' or indicating content the engagement 'draws on', and whether this is based on 'student's research' or 'general expertise'. Where research information management systems are limited to formal roles and involvement through invitation or as a coordinator, *ReACT* allows for lower status, often invisible activities, such as having an informal conversation at a workshop, to be counted as valuable contributions.

Both *Pure* and *Elements* base their outreach representations on the need for evidence of tangible products, while *ReACT* represents a more realistic representation of the diversity and scope of outreach as a process. These two RIMS oversimplify the concept of engagement, rendering

invisible a significant portion of academic activities. This has implications for how academics understand impact work where documented activities focus on summative and substantial events, rather than ongoing, incremental, and often small-scale interactions that represent cumulative expertise and career-long impact. These oversimplifications also hide the depth of information behaviours that academics must navigate to engage successfully. Effective impact taxonomies should balance conciseness with completeness and robustness of differentiations to meet users' goals (Bowker & Star, 1999; Nickerson et al., 2013). Lykke et al. (2023) found one benefit of ReACT's deep subcategories was the 'nuanced description' (p. 1064) possible in representing the work involved in enabling societal impact.

Taxonomies make the intangible tangible

Taxonomies articulate and reify impact work by making tangible, and measurable, the fleeting, ephemeral, and intangible experiences of academics undertaking engagement. Academics' engagement with media and at public events can involve tangible outputs, such as videos, but also involve intangible interactions that are necessary to enable impact. For example, academics can develop relationships with journalists over time, through regular contact for off-the-record conversations or background advice. These interactions indicate not only academics' status as advisors and sources, but also their willingness to develop long-term, trusted relationships. Such relationships can foster avenues for future coverage of research but also require different information behaviour support than what may be covered in standard university 'media training'.

In *Elements* and *Pure*, the categories for events and media do not include details on academic roles beyond organising, facilitating, or participating in an activity. ReACT allows for detailed documentation of intangible 'participation' in 'non-academic events', such as being an initiator, or an invitee. Such nuanced categories demonstrate the complexities of engagement, which are not routinely captured on academics' curriculum vitae; they may be fleeting and lack the status of activities with tangible outputs but require time and support to do well. Recording these instances provides ways of reifying transient experiences contributing to societal impact, such as the progression of a relationship from informal meetings to a partnership. This also enables recognition of academics' skills, time, and expertise in undertaking this work.

The temporal dynamics of impact activities are also intangible and not easily captured by taxonomies. While journal articles are trackable via citations once published, the effect of engagement activities depends on stakeholders signalling whether an impact has occurred. The absence of systematic feedback loops makes some category boundary objects latent, surfacing belatedly, or never at all. ReACT indicates the possibility of this through categories of 'responses' or 'requests' which identify how others have responded to instances of engagement. These activities are not visible in *Pure* and *Elements*, as the categories are limited in scope by their purpose in supporting institutional administration. Such RIMS are also limited in that they do not show the interconnections between types of engagement and tangible impacts, such as the adoption of community resources following public outreach.

Davies and McKenzie's (2004) study found documents can serve as temporal boundary objects that have 'a co-ordinating role with regard to other documents, recording the presence of or evidence from other documents'. (Lykke et al., 2023) found ReACT reflected researchers' 'momentum' (p. 1066) by providing an 'overview' (p. 1063) for their career and development. Given the myriad information behaviours involved in impact work, such visibility is critical for academics' professional development. For universities, ReACT's more detailed taxonomy can provide guidance on capability development needs, and valuable data on intangible pathways to impact, alongside tangible ones.

Taxonomies influence information behaviour

Taxonomies are socio-technical artefacts that underpin information infrastructure for impact work, influencing the information behaviours of academics on multiple levels. Taxonomies are instrumental in shaping how societal impact of research is defined and enacted by making visible both institutional goals and reifying the activities of researchers (Hacking, 1999). These representations of impact work shape how the work is perceived, experienced, learnt, and recognised. Taxonomies mediate understanding and recognition of impact work by shaping the exchange of information between institutions and academics. Taxonomy categories and examples determine the activities considered legitimate (and therefore documented and counted) and those that remain invisible (and not documented or counted). This has flow-on effects for documenting the information behaviours embedded in engagement and impact-related activities and for the availability (or lack) of institutional sources to support those information behaviours. Not only are taxonomies structural representations of the adage ‘we count what we value, and we value what we count’, but they are also representative of the informational supports that may (or may not) be provided to academics for impact work.

The definitions and examples represented in the categories and descriptions in *Pure* and *Elements* fail to reflect the scope of researchers’ experiences. In contrast, the ReACT taxonomy’s nuanced approach illustrates the potential for more fulsome representations. The ‘looping effect’ (Hacking, 1999, p.59) means the taxonomic representations of impact work, in turn, influence how academics conceptualise impact, understand the work involved, reflect on their capabilities and decisions on what activities to undertake, and the resources, skills, and time required (Lykke et al., 2023). For emerging researchers, the taxonomic representations serve as a guide to potential engagement and impact success, and either enhance or limit the relevant information behaviours in which they engage.

Taxonomic categories also influence researchers’ approaches to creating information about their engagement experiences by determining what experiences are valued. The researcher profiles and career narratives generated by RIMS data reinforce these definitions and present an incomplete picture of what is involved in enacting engagement and impact. The taxonomies influence researchers’ day-to-day information behaviours in seeking, using, and creating information about their impact work. For example, the creation of data about public outreach activities requires academics to implement new routines to record activity details, to decide what to include, how to organise the information, and how to describe it. The routines, and the records academics create, in turn cement the activities within research practice. In this way, the activities that are prioritised are those that contribute to workload and recognition for career progression. If formal media interviews, as represented by tangible quotes in news articles, are the only available category to document ‘media engagement’, researchers will focus their information behaviours and capability development on these activities. Ironically, while media relationships may cement an academic’s role as a trusted source, focusing on limited, transactional representations of media ‘quotes’ may limit an academic’s influence in the longer term.

Taxonomies can also render visible the usually invisible information behaviours of academics while undertaking engagement activities, as these involve different information needs to traditional scholarly work. Academics preparing to present to an industry group, for example, require understanding of industry contexts, organisational priorities, and preferred ways of communicating. Similarly, information sharing and creation is evident in categorisation of academic roles in events, such as interviewer, facilitator or presenter. Representation of these types of activities within ReACT creates a profile of information behaviours that signal areas of expertise or capability development needs. The application of ReACT to STEM disciplines, for example, identified not only the value for researchers in identifying and describing engagement activities, but also the challenges in representing quantitative values in ways that were accurate

and meaningful (Lykke et al., p. 1067). In this way, a taxonomy of societal interactions ‘made visible’ the activities academics undertook and highlighted ‘shortcomings in relation to activities that may affect an academic career’ (p. 1063) and support and skill development needed for these activities (p. 1064).

Taxonomies seek to integrate the tangible ‘products’ of impact work (e.g., a medical device) or evidence of change in society (e.g., a community program) with the less tangible ‘processes’ that contribute to these creating these impacts (e.g. meetings, informal discussions). In Figure 1, the tangible ‘products’ exist as information objects (e.g., radio interviews), while the ‘processes’ might only exist as notations in a calendar, notes from a meeting, or a post on social media. While process activities are far less tangible, and may not exist as identifiable objects, taxonomies initiate their creation by signifying the need to collect information about them. For example, developing a relationship with a stakeholder often includes informal meetings and building relationships over a long period of time, which is not usually recognised in workloads or noted in career progression. These activities involve complex information behaviours for academics, requiring tangible support for success. The reification of invisible work and integration with tangible information has the potential to enable greater understanding of the reality of impact work and may confer recognition and status on the activities concerned (Star, 2010). An in-depth taxonomy like ReACT, can illuminate the complex, unique information behaviours involved in engagement and impact work, providing visibility for researchers to seek support and recognition for these activities.

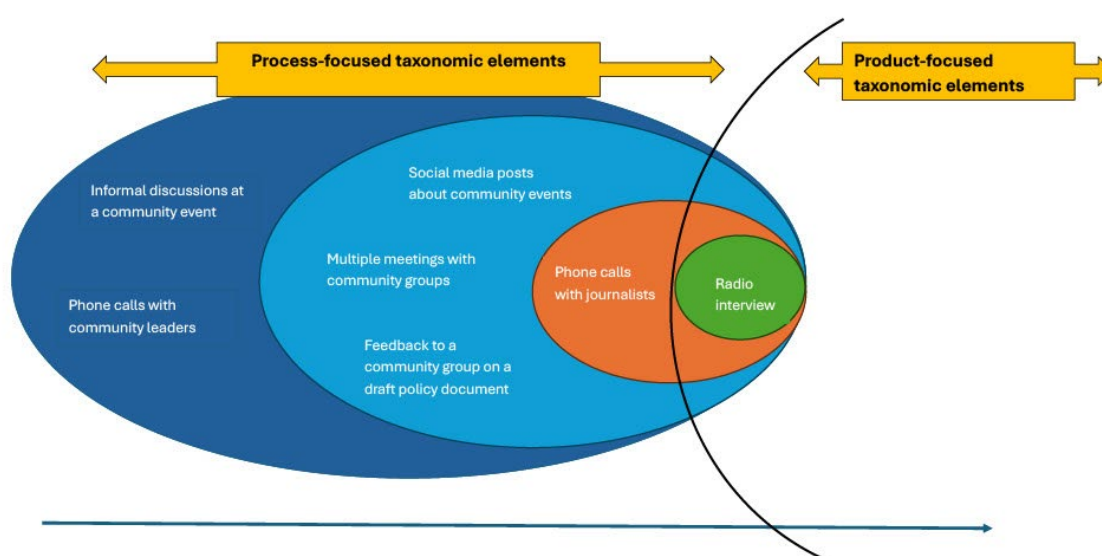


Figure 1. Examples of taxonomic elements of impact work, from process to product.

Conclusion

The collection of societal engagement and impact-related information is the latest development in datafication of academe (Gourlay, 2024), requiring significant resources for academics and institutions to track and document activities and contributions. Institutional approaches to collecting, collating, and sharing data also have significant implications for shaping behaviour by creating blueprints that influence academics' practices (Hacking, 1999, p. 59). When institutional expectations are instantiated in RIMS, the taxonomies used to document engagement and impact work play critical roles in representing what activities are valued, and where staff capability development is needed to support information behaviour.

This study found proprietary taxonomies, like those underpinning *Elements* and *Pure*, can present limited views of engagement and impact, focusing on narrow groupings of summative and tangible outputs—or 'products'—of impact-related work. These RIMS demonstrate the pros and cons of investing in 'off the shelf' systems, which may be cost-effective, but which may lack the flexibility and depth needed to adequately represent impact work. These systems also limit representation of capability development and changes over time, such as the deepening of relationships with non-academic partnerships. While RIMS provide some levels of institutional customisation, their taxonomies are quite shallow, obscuring invisible, intangible work required of academics to engage successfully beyond academe—and the information behaviours foundational to the work.

When researchers co-develop taxonomies, these tools can articulate more complete pictures of impact-related activities, thereby also providing insights on the information behaviour supports needed. For example, an academic engaging with media may need networking opportunities to meet journalists, guidance on how to pitch opinion pieces, or strategies for managing the immediacy of the 24/7 news cycle. The *ReACT* taxonomy is one example of an empirically derived schema, which represents not only the products of academics' work, but also the formative and intangible work—that is, the 'processes'—academics foster to enable impact to occur. Process-related information behaviours are just as important as those that are product-focused, despite being less visible, by nature.

While proprietary taxonomies mediate institutional engagement and impact goals, they are unsatisfactory as boundary objects; these should fully represent the needs and experiences of academics engaged in impact work. Rather, these taxonomies construct a reality of engagement and impact that emphasises the end points of complex, multifaceted relationships between academics and the non-academic groups that adopt research innovations. Proprietary RIMS under-represent the markers and pathways to impact, as well as the informational supports academics need to achieve it. As the *ReACT* taxonomy reflects academics' experiences it is more holistic and fulsome; however, it also brings inherent limitations, as its categories require significant time to document processes and products, and to enter this information into systems, manually. To become meaningful boundary objects, taxonomies must reflect both institutional and academic needs, while balancing the time and effort involved in representing and documenting all phases of impact work.

It is also noteworthy that RIMS rely on academics to create and input engagement and impact-related data; this involves new information behaviours for academics, who must decide what to document and how to represent their work, which is time-consuming and requires specific skills (e.g., storytelling for impact cases). Yet, proprietary systems provide little value in return for these efforts, beyond serving as clearinghouses for gathering data and populating researcher profiles. Empirically derived taxonomies, which are created by academics engaged in impact work, can also serve as pedagogical tools; these can educate academics, and professional staff and university administrators, in the process-related activities that lead to impact. Capturing the true extent of engagement and impact work supports researcher development, by modelling the skills and

activities required, representing sustained activity over time, substantiating achievements for career progression, and demonstrating the extent of activity that contributes to impact outcomes.

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References

- Albrechtsen, H., & Jacob, E. K. (1998). The dynamics of classification systems as boundary objects for cooperation in the electronic library. *Library Trends*, 47(2), 293-312.
<https://www.proquest.com/scholarly-journals/dynamics-classification-systems-as-boundary/docview/220452474/se-2>
- Armstrong, K. (2008). Ethnography and audience. In P. Alasuutari, L. Bickman, J. Brannen (Eds.) *Ethnography and audience* (pp. 54-67). SAGE Publications Ltd,
<https://doi.org/10.4135/9781446212165.n5>
- Balaban, C., & de Jong, S. P. L. (2023). Academic identity at the intersection of global scientific communities and national science policies: societal impact in the UK and Netherlands. *Studies in Higher Education*, 48(6), 941-962.
<https://doi.org/10.1080/03075079.2023.2195424>

- Becher, T., & Trowler, P. (2001). *Academic tribes and territories*. McGraw-Hill Education (UK).
- Borrego, Á., and Anglada, L. (2016) Faculty information behaviour in the electronic environment: Attitudes towards searching, publishing and libraries. *New Library World*, 117(3/4), 173–85. <https://doi.org/10.1108/NLW-11-2015-0089>.
- Bowker, G. C., & Star, S. L. (1999). *Sorting things out: Classification and its consequences*. MIT Press.
- Burleigh, D., & Burm, S. (2022). Doing duoethnography: Addressing essential methodological questions. *International Journal of Qualitative Methods*, 21. <https://doi.org/10.1177/16094069221140876> (Original work published 2022)
- Caccamo, M., Pittino, D., & Tell, F. (2023). Boundary objects, knowledge integration, and innovation management: A systematic review of the literature. *Technovation*, 122, Article 102645. <https://doi.org/10.1016/j.technovation.2022.102645>
- Cattlin, J., & Given, L. M. (2025). Reciprocity in information exchange: How social exchange enriches collaborative research partnerships. *Information Research an International Electronic Journal*, 30(CoLIS), 159–173. <https://doi.org/10.47989/ir30CoLIS52279>
- Chubb, J., Watermeyer, R., & Wakeling, P. (2017). Fear and loathing in the academy? The role of emotion in response to an impact agenda in the UK and Australia. *Higher Education Research & Development*, 36(3), 555–568. <https://doi.org/10.1080/07294360.2017.1288709>
- Davenport, E. (2000). Clinical guidelines and the translation of texts into care: Overcoming professional conflicts concerning evidence-based practice. *Journal of Documentation*, 56, 505–519. <https://doi.org/10.1108/EUM00000000007125>
- Davies, E. & McKenzie, P. J. (2004). Preparing for opening night: temporal boundary objects in textually-mediated professional practice. *Information Research*, 10(1) paper 211. <http://InformationR.net/ir/10-1/paper211.html>
- Du, J.T., & Chu, C.M. (2022). Toward community-engaged information behavior research: A methodological framework. *Library & Information Science Research*, 44 (4). <https://doi.org/10.1016/j.lisr.2022.101189>
- Elezi, E. (2021). Role of knowledge management in developing higher education partnerships: Towards a conceptual framework. *Systems Research and Behavioral Science*, 38(3), 279–293. <https://doi.org/10.1002/sres.2782>
- Galison, P. (1997). *Image & logic – A material culture of microphysics*. Chicago, IL: The University of Chicago Press.
- Gourlay, L. (2024). Surveillance and datafication in higher education: Documentation of the human. *Postdigital Science and Education*, 1039–1048. <https://doi.org/10.1007/s42438-022-00352-x>
- Guthrie, S., Wamae, W., Diepeveen, S., Wooding, S., & Grant, J. (2013). *Measuring research: A guide to research evaluation frameworks and tools*. RAND Corporation. <https://www.rand.org/pubs/monographs/MG1217.html>
- Hacking, I. (1999). *The Social construction of what?* Harvard University Press.
- Huvila, I. (2011). The politics of boundary objects: Hegemonic interventions and the making of a document. *Journal of the American Society for Information Science and Technology*, 62(12), 2528–2539. <https://doi.org/10.1002/asi.21639>

- Huvila, I. (2012). Authorship and documentary boundary objects. 2012 45th Hawaii International Conference on System Sciences, Article 6149084. <https://doi.org/10.1109/HICSS.2012.126>
- Huvila, I. (2013). How a museum knows? Structures, work roles, and infrastructures of information work. *Journal of the American Society for Information Science and Technology*, 64(7), 1375–1387. <https://doi.org/10.1002/asi.22852>
- Huvila, I., Anderson, T. D., Jansen, E. H., McKenzie, P., Westbrook, L., & Worrall, A. (2014). Boundary objects in information science research: An approach for explicating connections between collections, cultures and communities. *Proceedings of the American Society of Information Science and Technology*. 51(1), 1–4. <https://doi.org/10.1002/meet.2014.14505101003>
- Huvila, I., Anderson, T. D., Jansen, E. H., McKenzie, P., & Worrall, A. (2017). Boundary objects in information science. *Journal of the Association for Information Science and Technology*, 68(8), 1807–1822. <https://doi.org/10.1002/meet.2014.14505101003>
- Huvila, I., Enwald, H., Eriksson-Backa, K., Liu, Y. H., & Hirvonen, N. (2022). Information behavior and practices research informing information systems design. *Journal of the Association for Information Science and Technology*, 73(7), 1043–1057. <https://doi.org/10.1002/asi.24611>
- Huvila, I., Andersson, L., & Sköld, O. (2024). Patterns in paradata preferences among the makers and reusers of archaeological data. *Data and Information Management*, 8(4), <https://doi.org/10.1016/j.dim.2024.100077>
- Huvila, I., Enwald, H., Eriksson-Backa, K., Liu, Y., & Hirvonen, N. (2022). Information behavior and practices research informing information systems design. *Journal of the Association for Information Science and Technology*, 73(7), 1043–1057. <https://doi.org/10.1002/asi.24611>
- Kelly, W.B., & Given, L.M. (2023). The community engagement for impact (CEFI) framework: An evidence-based strategy to facilitate social change. *Studies in Higher Education*, 49(3), 441–459. <https://doi.org/10.1080/03075079.2023.2238762>
- Leitch, S., Warren, M.J. (2010). ETHICS: The past, present and future of socio-technical systems design. In: Tatnall, A. (eds) *History of Computing. Learning from the Past*. 2010. IFIP Advances in Information and Communication Technology, vol 325. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-15199-6_19
- Lippell, H. (2022). *Taxonomies: practical approaches to developing and managing vocabularies for digital information*. Facet Publishing. <https://doi.org/10.29085/9781783304837>
- Lykke, M., Amstrup, L., Hvidtfeldt, R., & Pedersen, D. B. (2023). Mapping research activities and societal impact by taxonomy of indicators: Uniformity and diversity across academic fields. *Journal of Documentation*, 79(5), 1049–1070. <https://doi.org/10.1108/JD-06-2022-0131>
- Milat, A. J., Bauman, A. E., & Redman, S. (2015). A narrative review of research impact assessment models and methods. *Health Research Policy and Systems*, 13, 1–7. <https://doi.org/10.1186/s12961-015-0003-1>
- Miller, F. Q. (2015). Experiencing information use for early career academics' learning: A knowledge ecosystem model. *Journal of Documentation*, 71(6), 1228–1249. <https://doi.org/10.1108/JD-04-2014-0058>

- Morton, S. (2015). Progressing research impact assessment: A “contributions” approach. *Research Evaluation*, 24, 405–19. <https://doi.org/10.1093/reseval/rvv016>
- Nickerson, R.C., Varshney, U., & Muntermann, J. (2013). A method for taxonomy development and its application in information systems. *European Journal of Information Systems*, 22(3), 336–359, <https://doi.org/10.1057/ejis.2012.26>
- Pedersen, D. B., Grønvald, J. F., & Hvidtfeldt, R. (2020). Methods for mapping the impact of social sciences and humanities—A literature review. *Research Evaluation*, 29(1), 4–21. <https://doi.org/10.1093/reseval/rvad011>
- Pedersen, D. B. & Hvidtfeldt, R. (2024). The missing links of research impact. *Research Evaluation*, 33, Article rvad011. <https://doi.org/10.1093/reseval/rvad011>
- Polkinghorne, S., & Given, L.M. (2021). Holistic information research: From rhetoric to paradigm. *Journal of the Association for Information Science and Technology* 72(10), 1261–1271. <https://doi.org/10.1002/asi.24450>
- Lewis, J. & Ritchie, J. (2013). Generalising Qualitative Research. In J. Ritchie, R. Ormston, C. McNaughton Nicholls, & J. Lewis (Eds.), *Qualitative research practice: A guide for social science students and researchers* (pp. 263–286). Sage Publishing.
- Sawyer, R. & Norris, J. (2015). Duoethnography: A retrospective 10 years after. *International Review of Qualitative Research* 8(1), 1–4. <https://doi.org/10.1525/irqr.2015.8.1.1>
- Smit, J. P., & Hessels, L. K. (2021). The production of scientific and societal value in research evaluation: A review of societal impact assessment methods. *Research Evaluation*, 30(3), 323–335. <https://doi.org/10.1093/reseval/rvab002>
- Smith, K. E., Bandola-Gill, J., Meer, N., Stewart, E., & Watermeyer, R. (2020). *The impact agenda: Controversies, consequences and challenges* (1st ed.). Policy Press. <https://doi.org/10.2307/j.ctv11g95dd>
- Spaapen, J. & van Drooge, L. (2011). Introducing ‘productive interactions’ in social impact assessment. *Research Evaluation*, 20(3), 211–218, <https://doi.org/10.1093/reseval/rvab002>
- Star, S.L. (2010). This is not a boundary object: Reflections on the origin of a concept. *Science, technology, & human values*, 35(5), 601–617. <https://doi.org/10.1177/0162243910377624>
- Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, translations and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39. *Social studies of science*, 19(3), 387–420. <https://doi.org/10.1177/030631289019003>
- Steinerová, J. (2019). The societal impact of information behaviour research on developing models of academic information ecologies. *Proceedings of CoLIS, the Tenth International Conference on Conceptions of Library and Information Science*, Ljubljana, Slovenia, June 16–19, 2019. *Information Research*, 24(4). Retrieved from <http://InformationR.net/ir/24-4/colis/colis1905.html>
- Tan, C. N. L. (2016). Enhancing knowledge sharing and research collaboration among academics: The role of knowledge management. *Higher Education*, 71(4), 525–556. <https://doi.org/10.1007/s10734-015-9922-6>

- Veer-Ramjeawon, P., & Rowley, J. (2019). Embedding knowledge management in higher education institutions (HEIs): A comparison between two countries. *Studies in Higher Education*, 45(11), 2324–2340. <https://doi.org/10.1080/03075079.2019.1608431>
- Watermeyer, R., & Tomlinson, M. (2022). Competitive accountability and the dispossession of academic identity: Haunted by an impact phantom. *Educational Philosophy and Theory*, 54(1), 92–103. <https://doi.org/10.1080/00131857.2021.1880388>
- Willson, R. (2018). “Systemic Managerial Constraints” How universities influence the information behaviour of HSS early career academics. *Journal of Documentation*, 74(4), 862–879. <https://doi.org/10.1108/JD-07-2017-0111>
- Willson, R., & Given, L. M. (2020). “I’m in sheer survival mode”: Information behaviour and affective experiences of early career academics. *Library & Information Science Research*, 42(2), <https://doi.org/10.1016/j.lisr.2020.101014>

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