

Competitive exposure and existential recognition: Visibility and legitimacy on academic social networking sites

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Abstract

Over the past decade, academic social networking sites, such as ResearchGate and Academia.edu, have become a common tool in academia for accessing publications and displaying metrics for research evaluation and self-monitoring. In this conceptual article, we discuss how these academic social networking sites, as devices of evaluation that build on both traditional values, objects, and metrics in academic publishing and on social media logics and algorithmic metrics, come to fulfil a need in the current academic (publishing) ecosystem. We approach this issue by identifying key affordances that arise in the interaction between platform and user. We then position these affordances in relation to potential needs of academics in today's publishing landscape by drawing on Hafermalz's metaphor of the 'fear of exile', which provides an alternative way of understanding the importance of visibility in the networked world, as a combination of *competitive exposure* and *existential recognition*. We end by considering the grounds on which the platforms may be attributed some level of legitimacy. This is done in order to understand the inherent contradiction between the broad use of the platforms and the fact that their integrity has been questioned repeatedly. We seek an answer to a legitimacy for the platforms in the fact that a pragmatic, mutual benefit exists between them and the research community; a benefit that is enhanced by the audit society influencing current academia.

Key words: academic social networking sites; devices of evaluation; affordances; legitimacy; fear of exile; metrics

1. Introduction

Parallel to the rise of social networking sites in society, specialized networking platforms targeted at academics have developed, such as *ResearchGate* and *Academia.edu*. The sites are simultaneously a place for academics to showcase their work, to build networks, and to compare themselves with others—something encouraged by the platforms' marketing models (Hammarfelt, de Rijcke and Rushforth 2016; Duffy and Pooley 2017; Delfanti 2021). The platforms are also used by others, such as colleagues, university management, and future employers, to evaluate researchers (Nández and Borrego 2013; Greifeneder et al. 2018; Jordan 2019a; Radford et al. 2020). Furthermore, the platforms collect large amounts of data from the users; data that in turn form the basis for feeding information back to users and to third parties (Kohljenovic 2019; Fourcade and Kluttz 2020). As on general social networks, the researcher will

maintain a profile on the platform, where they will be encouraged to upload metadata about or full-text versions of publications and other academic achievements. These lists of achievements and publications are combined with the possibility to follow and—to some extent—interact with other researchers. On the academic social networking profiles, the publication becomes a node which combines the values and valuations of the traditional academic system with the logic of social media, especially the algorithmic use of agents' interactions with content and with each other.

The most important and apparent content on the researcher profiles on these platforms is thus lists of publications and other academic output, such as pre-prints, presentations, and projects. In this article, we will take a point of departure in two platforms (ResearchGate and Academia.edu) with a particular interest in how the platforms, through the lists of publications, utilize the ways in

which reputation is built in academia, particularly in terms of peer-reviewed publications and measurements of impact (cf. Nicholas et al. 2014; Herman and Nicholas 2019; Kjellberg and Haider 2019). Based on how such impact metrics are measured and displayed on the academic social networking platforms, we view them as potential devices of evaluation for both individual researchers and for others who evaluate the researcher (colleagues, employers, funders, etc.).

Much has been said about the increasing pressure on researchers to publish and to publish in the right places, and about the importance of the publications being countable (Burrows 2012; de Rijcke et al. 2016; Hangel and Schmidt-Pfister 2017). Bibliometric indicators are commonly used as a basis for research evaluation, at national, institutional, and sometimes individual levels (e.g. Aksnes, Langfeldt and Wouters 2019). Both journals and conferences keep careful track of acceptance rates, often with the aim of not being too inclusive (mega journals such as *PLoS ONE*, *Scientific Reports*, and *BMJ Open* form an exception). Being read and acknowledged by others in the form of citations is crucial, both for individual researchers, their employers, and for journals, and measured through indicators such as the Journal Impact Factor (JIF) and the h-index. Socio-cultural differences exist to some degree, with regard to norms, assessments of worth, and systems of evaluation, for instance depending on discipline and country, but it may not be too bold a statement to claim that this is a global trend. At the same time, much bibliometric research has pointed to the limitations involved in using bibliometric indicators to evaluate and compare researchers at the individual level, and calls have been issued to limit such use (see DORA 2012; Hicks et al. 2015). Despite such calls, however, the claims made by both the academic social networking sites themselves (e.g. Niyazov et al. 2016; see also Duffy and Pooley 2017) and by research on open access citation advantage (see Copiello 2019b¹) indicate that researchers may be ‘better safe than sorry’ in choosing to upload their output to the platforms and to engage with other researchers and their work there. Duffy and Pooley (2017: 5) note that ‘In effect, Academia.edu has taken a pair of professorial pain points—attention/citation scarcity and closed-access barriers to research—and harnessed one to resolve the other, in an autopoietic coupling’.

Academic social networking sites have been studied from a range of different perspectives due to the many roles—social interaction, searching for sources, and assessment—they play in the lives of academics (Jordan 2019b). In this conceptual article, we discuss how the academic social networking sites, as devices of evaluation that build on both traditional values, objects, and metrics in academic publishing and on social media logics and algorithmic metrics, come to fulfil a need in the current academic (publishing) ecosystem. Following a brief introduction to the platforms, we approach this issue by identifying key affordances that arise in the interaction between platform and user. We then position these affordances in relation to potential needs of academics in today’s publishing landscape by drawing on Hafermalz’s (2021) metaphor of the ‘fear of exile’, which provides an alternative way of understanding the importance of visibility in the networked world, as a combination of *competitive exposure* and *existential recognition*. Finally, we consider the grounds on which the platforms may be attributed some level of legitimacy. This is done in order to understand the inherent contradiction between the broad use of the platforms and the fact that their integrity has been questioned repeatedly (Duffy and Pooley 2017; Delfanti 2021). We seek an answer to a legitimacy of the platforms

in the fact that a pragmatic, mutual benefit exists between them and the research community; a benefit that is enhanced by the audit society influencing current academia. Our perspective is primarily on the purposes served by the platforms for the members of a research ecosystem characterized by a culture of (mutual) evaluation. These researchers are often simultaneously those producing worth that will be evaluated (e.g. grant or employment applicant) and those doing the evaluations (e.g. reviewer, employer, or manager). Towards the end of the article, we expand this perspective to one of academic communities, who collectively and in interaction with policy makers and the surrounding society form field-specific valuation and evaluation practices. A limitation in the article is that we do not focus on the perspective of the platform producers and their business associates. Another is that although we refer to work that applies a critical perspective on the platforms, we do not ourselves provide a critical study of the platforms’ business models and ethics, as our focus is on understanding why researchers use the platforms rather than on why they ought not to.

Our analysis builds on readings of previous research as well as analyses of the two main platforms that are currently in use (ResearchGate and Academia.edu). In practice we do this by highlighting specific features and services provided by these platforms. In this effort we partly rely on previous empirical studies (Hammarfelt and Haddow 2018; Francke 2019) as well as on current observations of qualities and features on the platforms.

2. Academic social networking sites as devices of evaluation

The two platforms for academic social networking in focus for our analysis, ResearchGate and Academia.edu, were launched in 2008. Today, these services have become important infrastructures in the communication of research, and for many scholars the platforms are part of everyday life. In 2021, ResearchGate claimed to have 20 million members, and Academia.edu counted 170 million registered users.² While these numbers are unlikely to reflect the actual number of active users, they highlight the considerable influence that these services have.

Similarly to social media platforms like Facebook, these academic networking sites are built around individual researcher profiles. This distinguishes them from other services, such as Mendeley, which primarily focus on sharing and organizing academic content (Jordan 2019b). The focus on the researcher profile, for instance, means that the combination of features on the profiles, which to some degree are possible for the researcher to influence and to some degree are shaped by the system and by other users’ actions, can be used for assessments of credibility and attributions of trust in the researcher (Francke 2019; Francke in press). Furthermore, users of the platform may interact with each other and each other’s work. Not surprisingly, when asking researchers active on ResearchGate, Muscanell and Utz (2017) found that sharing papers, networking, and self-promotion were the most commonly mentioned reasons to use the platform (see further discussion of motivations below). These findings resonate with the three main types of activities or actions on social media platforms identified by Haustein, Bowman and Costas (2016): accessing, appraising, and applying (see also Francke 2019). Accessing captures such activities as following other researchers or publications, or being followed by others. Appraising connotes a fairly shallow engagement with a researcher or their work, for example by endorsing them, or ‘recommending’ their

work; an activity that is encouraged by the platforms through various functions. Applying, on the other hand, indicates a deeper level of engagement in the form of comments, discussions, and messages. Notably, many of these activities are automated on the platforms, as researchers to follow and publications to recommend or comment on are suggested through algorithms. Moreover, the platforms encourage deeper levels of engagement, for example by suggesting that you motivate the author why you downloaded a specific publication. The overarching goal is thus to get users to spend more time on and add more material to the platforms, in order to attract more users and in turn make the platforms more attractive to advertisers. In achieving this goal, the services draw both on publications and metadata provided by users, and on already established infrastructures, journals, and publishers when forming connections between entities on the sites.

As noted by [Duffy and Pooley \(2017\)](#), the platforms adhere to core conventions of how social media platforms are structured. ResearchGate and Academia.edu both feature profile pictures, curated news feeds, lists of followers, and ways of recommending, sharing and ‘liking’. A difference compared to social and professional networks like Facebook and LinkedIn is that connections do not need to be reciprocal. Hence, you have the option to ‘follow’ a researcher who does not ‘follow’ you back. One can also access profiles without being a member of the platforms, although downloading publications requires a login. However, what really distinguishes the platforms is the extensive emphasis on various metrics. As expressed by [Duffy and Pooley \(2017: 6\)](#), emphasis in original) in their analysis of Academia.edu, ‘the news feed and the profile page [...] are plastered with *numbers*, some of them algorithmically generated. The point, in the site’s profusion of figures, is to quantify the gauziest of academic qualities: influence’. In order to ‘measure’ influence, Academia.edu and ResearchGate make use of already established ways of assessing research, which are incorporated into their own systems of rating and appraising. Moreover, in order to motivate users to add content and engage with others through the platforms, features such as ‘ratings’ and ‘achievements’ are used. For example, the user might be notified when one of their publications has reached a certain number of users: ‘Great job, Your article reached 700 reads!’ Users’ engagement with the platform contributes to platform-specific metrics such as ResearchGate’s RG score, thus marrying ‘social media metrics [with] academic measures of quality’ ([Komljenovic 2019: 159](#); see also [Orduna-Malea et al. 2017](#)). Scoreboards, ratings, metrics, and achievements are all examples of how these platforms contribute to a ‘gamification’ of research. Gamification, in short, suggests that features from games are used in contexts which are not in themselves oriented toward leisure or play ([Raczkowski 2014](#)). Gamification can motivate by providing instant feedback to the individual scholar, and for some it might even provide a sense of meaning. However, gamification in the context of academic research is often discussed in terms of unwanted goal displacement (doing what counts instead of doing good) and it might lead to unsustainable or even unethical behaviour ([Hammarfelt, de Rijcke and Rushforth 2016](#)).

Through these various functions, the academic social networking sites can be said to build on and remediate earlier infrastructures in various ways. In providing lists of publications and full-text documents they build on bibliographic databases, such as library catalogues, and on full-text databases. They share the paywall-free accessibility to bibliographic records and full-texts with institutional or subject repositories. However, to an even larger extent than the

repositories, they are unpredictable in what posts they include. The lists of both publications and other types of ‘biobibliographic information’ ([Kaltenbrunner and de Rijcke 2019](#)) also remediate the researcher CV, in that they provide information which can be used to assess the researcher’s career and productivity. In fact, the profiles on the platforms sometimes act as full-fledged CVs with information on past employers, competencies, languages spoken, etc. Furthermore, ResearchGate to some degree provides competition to citation indexes through its inclusion of citations and metrics built on citations. Thus the platforms build on and make use of the established academic publishing system in several ways while at the same time combining these traditional genres with a social media logic based on accessing, appraising, and applying both documents and agents (researchers). In the remediation described above, the social media logics of networking and quantifying activities in the form of altmetrics can be said to recontextualize ([Bolter and Grusin 2000](#)) traditional devices of evaluation.

3. Visualizing academic worth through capitalizing on platform affordances

Studies of what motivates researchers to create and maintain a profile on academic social networking sites have shown that the platforms fulfil at least four different needs: they allow the researcher to make their publications (and possibly other work) visible and to promote them, sometimes to a larger audience than through other means; they provide networking opportunities and, to some, the sense of belonging to a community; they enable the researcher to monitor news and updates or to find information; and they can both increase impact and help the researcher display that impact to evaluators in different situations (e.g. [Nicholas et al. 2014](#); [Van Noorden 2014](#); [Meishar-Tal and Pieterse 2017](#); [Greifeneder et al. 2018](#); [Jordan and Weller 2018](#); [Kjellberg and Haider 2019](#); [Jordan 2019a](#)). These features contribute to making the platforms attractive to researchers in an increasingly complex academic landscape, in which researchers often are employed at many different institutions during their career. A profile at an academic social networking site might then provide a stable ‘home’ for the nomadic academic. Furthermore, the platforms allow researchers to increase their visibility to colleagues, employers, and other stakeholders in research and society. This is perceived to be of increasing importance in an academic system where both individuals and organizations are expected to build name recognition and a strong metric track record.

One way of approaching the relation between the possibilities for action offered by the platforms and how researchers perceive their usefulness is through the concept of *affordances*. A number of studies have developed this concept (originally from [Gibson 1986](#)) to discuss the intersection of how social media allow users to act and how these possibilities are perceived and acted upon (e.g. [boyd 2011](#); [Treem and Leonardi 2013](#); [Bucher and Helmond 2017](#); [Mansour 2021](#)). These studies generally emphasize the relational character of this potential interaction between people and technology or material thing ([Treem and Leonardi 2013: 146](#)). [Bucher and Helmond \(2017\)](#) suggest an even more symmetrical understanding of affordances in relation to social media, pointing out that the platforms may afford changes to people’s actions, but that people’s actions may also afford changes to the platform’s technologies. In terms of academic social networking sites, one way in which the latter takes place is how researchers’ interactions on the platform

influence their algorithms' development and their way of structuring social relations (Komljenovic 2019).

In social networking site research, affordances have been suggested that can be useful for understanding why the academic social networking platforms are used by researchers in the ways outlined above. These include *visibility/scalability*, *broadcasting*, *searchability*, and *associations*.

Visibility (Treem and Leonardi 2013) and the related *scalability* (boyd 2011) capture the potential for content published on the platforms to reach a larger audience than would, in this case, be possible through the journal's web site, citation indexes, or institutional repositories (cf. Duffy and Pooley 2017), with the potential effect of attracting more attention and subsequently citations (see Copiello 2019b). There are several reasons why the platforms may be particularly efficient in making publications visible, including the fact that the publications are often made available in full-text without a pay-wall (sometimes in pre-print versions or without the proper distribution rights), and that the platform pushes information about what its recommender algorithms consider relevant publications to other members (cf. Treem and Leonardi 2013). The latter is related to the opportunity offered by the platforms to quickly disseminate content to one's network by uploading, for instance, a new publication. Vitak and Ellison (2013) refer to this as a *broadcasting* affordance, which may be supported by the platform not only in the form of a notice to the researcher's network accounts, but also as e-mails to followers informing them of new, potentially relevant uploads. Visibility and broadcasting thus support researchers in their endeavour to promote their work to a large audience. The broadcasting affordance furthermore facilitates researchers' monitoring of new, relevant publications or other information that may help them keep updated in their field and to keep an eye on what colleagues are publishing. However, the broadcasting can verge on spamming, and often causes vexation. Visibility is thus of importance for self-promotion; a possibility of attracting activities that may generate value in the form of reads and citations. At the same time, the platforms' possibilities to provide this service depend on their ability to recruit a large number of members as well as these members' inclination to report, upload, or at least claim publications on the sites.

By being visible, the publications and the researcher's profile become searchable, including being indexed in search engines, something that boyd (2011) views as a separate affordance: the profile's *searchability*. Connecting visibility and searchability is *discoverability*, which can be said to take place when researchers follow other researchers and thus get updates about what is added to their profile, in the form of publications, projects and, sometimes, endorsements. Of course, not only publications and projects but also metrics become visible on the profiles. Thus, various stakeholders (potential collaborators or employers, reviewers, and funders) may find, gain access to, and evaluate a researchers' work. Searchability, too, helps researchers stay informed as well as make their publications visible also to audiences beyond the academic social networking site's members.

The networking function of the platforms afford the profile to make links between the researcher and their co-authors, followers, and those being followed. The affordance of making such connections between people visible and actionable has been termed *association* by Treem and Leonardi (2013). This is a key feature of social media (boyd 2011) and contributes to the visibility, information sharing, and networking that are listed by researchers as benefits of academic social networking platforms. Not least, it is likely an

important aspect of what makes researchers feel that they are part of a community when interacting with and on a platform.

We suggest that in addition to the affordances mentioned in previous studies of general social media, academic social networking platforms offer particular possibilities for action through (at least) two more affordances, namely *computability* and *comparability*.³ These two affordances are closely related, but distinct, in that on the one hand they build on the platform's computations of metrics—a unique source of evaluation—and on the other hand on the possibilities these metrics afford in terms of comparing one researcher's productivity and reception over time or comparing the achievements with those of other researchers. Such comparable metrics take the form of reads/views, followers, and citations, but also include various established or platform-specific indicators, for instance the h-index, 'author rank' (Academia.edu), and 'total research interest' (ResearchGate). These affordances are to varying degrees available on (other) citation indexes and social media, in the form of citation-based indicators, altmetrics, and expressions of engagement and support (e.g. 'friends' and 'likes').

As is the case with visibility, the comparability of personal metrics is facilitated on the platforms because they are available to the researcher without a paywall (even though the services arguably have a cost for the member in the form of expectations on providing user-generated content and affordances to the platform owners and third parties, see also Bucher and Helmond 2017; Delfanti 2021). Visibility and searchability may contribute to publications becoming discovered, read, and cited, or in other ways have an impact on future research or other activities and knowledge production in society, which is mentioned by researchers as a reason to use the platforms. Computability and comparability, however, afford the researcher to track, evaluate, and compare this impact, as well as make it visible to others who may formally or informally be evaluating the researcher's work and worth. Membership on the academic social networking sites is primarily individual. Compared to the legacy citation indexes, which are used for comparison and evaluation not only of individuals but also of researchers as collectives at various levels (school, institution, country, or discipline), the networking sites are primarily suitable for comparing single researchers,⁴ and provide a range of new and traditional indicators for doing so. However, many of the platform-specific indicators are black-boxed (Hammarfelt, de Rijcke and Rushforth 2016; Copiello 2019a; Copiello and Bonifaci 2019) and thus can be problematic as a basis for evaluation and comparison of researchers, since it is not clear what data are compared, and the evaluator ends up with a 'black-box evaluation machine' (Hicks et al. 2015: 430). For example, the ResearchGate score featured beneath the name of each member on the site has been suggested as 'a good example of a bad metric' (Kraker, Jordan and Lex 2015). Attempts at 'reverse engineering' of the score found that it relied heavily on the impact factors of journals, but that the users' engagement on the platform, through comments and other interactions, also affected the score. Hence, ResearchGate rewarded those being more active on the site with a higher score (Jordan 2015; Orduna-Malea et al. 2017), a step which may contribute to boosting their advertising appeal.

In affording a combination of *visibility*, *searchability*, *associations*, *computability*, and *comparability*, the academic social networking sites draw on the logic of such traditional comparative tools as citation indexes; tools that provide access to metadata and texts, such as bibliographic and full-text databases; and on the logic of social media. Although the affordances could be argued to exist

in all of these other tools, and the types of content on which the academic social networking sites are primarily dependent—publication metadata and full-texts—are shared with the academic tools for searchability, visibility, computability, and comparability, there are also aspects of the logic of social media which contribute to the attractiveness of the academic social networking sites. These include the *associations* affordance which is key to social networking sites, and which makes associations more transparent, more individual, and more easily influenced by the individual than is the case in traditional academic databases. Furthermore, visibility of both publications and metrics is enhanced by the ‘paywall-free’ business model of social media. At the same time, the platforms are based on user-generated content or on content that has been algorithmically collected. This means that there is less control over the quality of the content, both in terms of the quality of the research and how it is presented in the publications included on the sites, of the completeness of a researcher’s work, and of the quality of the metadata, than is the case in legacy citation indexes and full-text databases. While this may make the services less reliable—or, as we discuss elsewhere in the article, impact legitimacy—at the same time these less controlled tools offer a broader scope of publications, which could mean that high quality publications are rewarded or even simply become visible (Harsh et al. 2021) regardless of where they have been published.

In conclusion, the analysis above indicates that it is this combination of affordances that makes the academic social networking platform an attractive tool for researchers who are active in an academic environment that requires them to prove their worth in terms not only of publications but also citations and other forms of impact. The next section will further explore how this combination of affordances can serve various purposes for the contemporary academic.

4. A tool for the exiled academic

Above, we developed an understanding of how academic social networking sites can be of use to researchers because of the affordances they offer with regard to broadcasting one’s work to an audience on the platforms and making it searchable for them and everyone else. Other features that are mentioned as motivations for using the platforms are their function as devices for comparability and evaluation and the networking opportunities they provide. This indicates a complex conceptualization of visibility, which is broader than the affordance of visibility outlined above. We will draw on Hafermalz’s (2021) approach for understanding the importance of visibility to individuals in a competitive, networked environment to better comprehend the role visibility plays in the academic system and how the academic social networking platforms can support various perceived needs.

In the context of ‘new culture’ organizations, Hafermalz (2021) introduces the metaphor of ‘fear of exile’ to discuss the role of and need for visibility among distributed employees and how such visibility can become an instrument of control. Exile is presented as an alternative metaphor to the ‘Panopticon’—made well-known through the works of Michel Foucault—in order to capture how the logic of visibility has shifted in online work. Hafermalz (2021: 703) explains that ‘Seeking opportunities to be seen may still result in surveillance, but it is not always the experience of employees that their visibility is “guaranteed” or even sufficient’. In particular, the metaphor is used to capture visibility as on the one hand *competitive*

exposure, connected to accelerated competition and the idea of an entrepreneurial self (Bröckling 2016), and on the other hand as a response to a need for *existential recognition*, the feeling of belonging and getting attention from others. Researchers share similarities with the distributed employees in focus for Hafermalz’ theory in that they act on an often competitive and distributed market, sometimes in precarious employment, and that they often rely on collaborations with remote others. Whereas distributed employees may be exiled from the head office, researchers fear exile from their (potentially global) research community, while at the same time experiencing a need to be visible to funders, evaluators, and current and future employers, not least in upper management. Although such visibility may be achieved through an active presence on general social media sites, it can also be more focused on publications and metrics (cf. Hafermalz 2021: 711), as in the case of academic social networking sites.

These platforms provide sites for competitive exposure, where the achievements of researchers can be made visible, but also potentially make the platform useful as an instrument of control. Researchers contribute (generally) by uploading publications (affording *visibility*), which can then form the basis for calculating various indicators, such as the h-index based on citations, reading and downloading scores based on attention, or the RG score that is based on a combination of publications, attention, and activity (Jordan 2015; Copiello and Bonifaci 2019; affording *computability* and *comparability*). The *associations* made to others on the platform, for example in the form of followers, requests for the sharing of a full-text version, or citations, can contribute to the sense of being seen and receiving attention as part of a community. One feature that is particularly striking in this regard is the option to ‘request feedback’ from other ResearchGate users when uploading a new document. Indeed, the sharing of publications on the platforms is simultaneously a contribution to the development of knowledge in the community, a means to become visible as an individual researcher, and a way to display data that can form the basis of evaluation and comparison. In addition, the quantitative aspects of associations, such as number of reads or downloads, may contribute to competitive exposure as well as to a sense of recognition as part of a community. Andersen and Lomborg (2020: 43) consider the metrics available on academic social networking sites (and increasingly on web sites by publishers or Current Research Information Systems) not only as competitive self-tracking devices, but also as serving communicative functions in ‘a codified process of meaning-making’ that makes the researcher a student of him- or herself as well as part of a conversation with peers and of the systems of scholarly communication (including publishers and platforms). This view relates the metrics more closely to existential recognition, combining the affordances of *associations* and *computability* to provide a sense of community belonging as well as an illustration of one’s position in the community. In this sense, the ‘fear of exile’ metaphor serves to extend the analysis of academic social networking sites as evaluative devices beyond the evaluative and comparative feature associated with an entrepreneurial self to include a more community-oriented understanding of what drives visibility and comparability.

Importantly, reputation and recognition on these platforms, and in academia more generally, are largely derived from appreciation by peers. Recommendations, downloads and, even more so, citations are deemed to provide worth as they represent recognition from colleagues. The infrastructures and social settings provided by the academic social networking platforms are highly used, and thus

arguably endorsed, and at the same time, as has been illustrated above, they do not build on a systematically and transparently collected set of data and indicators, and they profit from the user-generated content provided by researchers. In the article's final section, we will therefore address the question of whether there is a case for claiming legitimacy for the platforms within the academic community in order to better understand why the platforms are used extensively.

5. Any potential legitimacy is based on mutual benefit

A classic departure for a discussion of legitimacy in sociology is Max Weber. In his rich work on legitimacy, Weber (1968: 34) identifies two different types of legitimate order, namely convention and law. An entity's or organization's inscription in a legal framework is important for many ways of conceptualizing legitimacy, and such features may indeed be relevant for academic social networks. The most obvious example, which speaks against legitimacy, concerns infringement on the copyright of publications, which has been an item for discussion and legal action (Jamali 2017). However, for the purpose of this study we draw on a view of legitimacy as the result of a process of social (Suchman 1995) or professional (Deephouse and Suchman 2008) endorsement and as based in acceptance within particular contexts or practices (Deephouse and Suchman 2008: 53). Suchman's (1995: 574) oft-quoted definition of legitimacy as 'a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions' captures the situated and socially attributed character of the concept. The use of 'generalized' in the quote should be interpreted as referring not only to the fact that 'legitimacy is resilient to particular events, yet it is dependent on a history of events' (p. 574), that is, one mistake does not necessarily undermine an entity's legitimacy, but also to the fact that the legitimacy needs to be acknowledged by a social community (or 'collective audience'), such as a profession. It is not something attributed to an entity by an individual.

Of relevance to an analysis of academic social networking sites is the view of legitimacy as stabilized by convention or tradition (Weber 1968), which is illustrated on the platforms by their focus on publication genres and such established metrics as numbers of publications and citations (on ResearchGate). Suchman (1995) points to the dimensions of continuity (persistence) and credibility (meaning) as potentially mutually enhancing aspects of organizational activity, which despite this may invite an organization to focus on one or the other. A community is likely to invest in an organization they perceive as legitimate, which will lead to persistence. Here, the fact that research funders have invested in ResearchGate and that universities advertise open positions on the sites are tokens of financial investment in the platforms (Komljenovic 2019). Further, Suchman (1995: 575) suggests that the entity's meaning relies on 'the existence of a credible collective account or rationale explaining what the organization is doing and why'. Such a rationale can be argued to be found in the tradition of research publishing and evaluation.

Traditional academic publications, in particular the peer reviewed journal article, often published by legacy publishers, display strong legitimacy in the academic community, across disciplinary fields (Borgman 2007; see also Delfanti 2021). The same is true for certain types of evaluative indicators and metrics. In terms of the two dimensions identified by Suchman, the genres of academic

publications and the citations to previous literature that are an important part of anchoring claims and values, provide persistence to the academic system, despite the occasional occurrence of retracted or sub-standard articles. Features that have repeatedly been identified in previous research as associated with trust and credibility by researchers include devices of evaluation such as peer review, number of citations, and the JIF (Nicholas et al. 2014; Tenopir et al. 2016; Herman and Nicholas 2019; Kjellberg and Haider 2019). Moreover, these are features that are taken into account in research evaluation (de Rijcke et al. 2016) and in assessments of individual researchers (Hammarfelt and Rushforth 2017; Joelsson, Nelhans and Helgesson 2020).

As discussed above, the academic social networking sites build strongly on publications and on metrics, including altmetrics. A difference between the two platforms used as examples in this study is that ResearchGate provides indicators based on citations (e.g. number of citations and h-index), which Academia.edu does not. This may be related to the partly differing membership groups of the two platforms, with a larger proportion of articles from science than from the humanities and social sciences uploaded to ResearchGate compared to how the field is represented in Scopus (Thelwall and Kousha 2017), and Academia.edu on the contrary more popular among humanities and social science scholars (Thelwall and Kousha 2014). The difference between the two platforms may reflect a difference in the perceived importance and legitimacy of citation counts across disciplines. A study by Nicholas et al. (2014) showed that whereas scientists tolerated metrics as useful, humanists and social scientists were more hesitant about what metrics contribute, but in many cases allowed evaluative uses of metrics to influence their publishing choices. Indeed, the overall use of Academia.edu and ResearchGate is rather low in the humanities, but there are examples of scholars who see such services as alternatives to citation metrics for monitoring the dissemination of research:

[...] academia.edu allows me to see that my work is being widely looked at or read. Academia.edu also has the advantage [that] I can see the country of origin of those who have viewed my publications (Australian, associate professor, History and Archaeology). (Quote from questionnaire, Hammarfelt and Haddow 2018: 929)

Whereas peer review and established publication and citation metrics are generally important for stabilizing worth in academia, the view of the value of altmetrics is more scattered, although researchers are not necessarily dismissive of the claim that, for instance, social media mentions, likes, and usage metrics may offer some indication of quality and credibility, not only of popularity (Tenopir et al. 2016). As illustrated by the quote above, these indicators of attention may, however, contribute to a sense of existential recognition, even if they do not carry the weight of the established bibliometric indicators.

The academic social networking sites are widely used, which indicates that they are found to be useful, or that there is a sense that one misses out on something by not being visible on the platform(s). Yet, they are not necessarily completely accepted as stable, credible, or ethical (e.g. Bond 2017; Duffy and Pooley 2017; Copiello 2019a; Delfanti 2021), even though, as argued above, they largely build on features with a long history of legitimacy in academia. This critique indicates that the platforms cannot be considered legitimate fully on the bases of convention and the tradition of the academic publishing system. How then understand the conflict

between extensive use and lack of credibility? If a claim to legitimacy can be made for the platforms as tools for dissemination of publications, for self-promotion, and as tools for comparison and evaluation, it is drawn from the pragmatic, mutual benefit that arises between the platforms and the research community. A pragmatic view of legitimacy occurs when considering legitimacy as something that is attributed to an entity when there is an interdependence between it and a community in that the community can benefit from the entity (Suchman 1995: 578). In this case, legitimacy could be argued to stem from the platforms' capacity as socio-technical infrastructure as well as commercial product. Relevant benefits to the academic community as well as the individual researcher have been illustrated above in terms of affordances and tools for visibility, and include:

1. the *visibility* that the platforms offer for both researchers and their publications (driven by the platforms' business models), including promises of free access to publications;
2. the *usability* (ease of use), including the possibility to upload pre-prints or even published versions of publications (Jordan 2019a);
3. the *computability* that allows the researcher and evaluator to view metrics such as readers, downloads, and citations;
4. the *comparability* that allows both temporal comparisons of metrics and the comparison with colleagues (Andersen and Lomborg 2020). The latter two affordances are both encouraged by the platforms' gamification design (Hammarfelt, de Rijcke and Rushforth 2016) and, not least, by the academic system's reliance on worth as evaluated in terms of metrics and indicators.
5. Finally, the platforms' visualizations of *associations* contribute to a sense of being part of a community—of *existential recognition*—in a distributed work environment and connected world of scholars that for many may be accompanied by a 'fear of exile'.

The above-mentioned benefits can be said to contribute to needs experienced by researchers regarding both *competitive exposure* and *existential recognition*. Moreover, the popularity and legitimacy of these platforms are dependent on a research community that is increasingly employing judgment devices to compare and evaluate its own members. While the pragmatic legitimacy draws heavily on established and recognized genres and publishers, not least on the peer reviewed journal article, which Borgman (2007: 66) has identified as 'the fixed point' where legitimization occurs in scholarly communication, one could even argue that it supports Delfanti's claim that 'Academic social media [...] obliterate any "fixed point" other than the production of scholarly objects that can be dated and then valued algorithmically' (Delfanti 2021: 7).

6. Conclusion

The popularity of academic social networking sites indicates that these platforms have come to fulfil a need in the academic (publishing) ecosystem. We have argued above that the platforms draw heavily on the legitimacy and importance associated in academia with peer-reviewed publications, indicators that have become institutionalized, such as number of publications and citations or the JIF, and employment at reputable institutions. By drawing on these accepted indicators of worth in the research community, profiles on academic social networking sites serve not only to display researchers' worth, but also to build it by attracting readers of their work and, as a

consequence, potential future citations. Thus, the platforms become part of a cyclic movement with already established and more respectable devices of evaluation, such as the citation indices.

However, the academic social networking sites can be said to transform such bibliographic and bibliometric devices through its use of social media logics and algorithms. The ways in which the platforms, in particular ResearchGate, afford associations between platform users contribute, we have argued, to their supporting not only *competitive exposure* (which includes being able to compare oneself and be compared to others), but also *existential recognition* through which researchers can stay connected to others in their field, both known and unknown others. At the same time, the associations seem to be primarily superficial and oriented towards the dissemination of publications and on the equivalents of 'likes' (Van Noorden 2014; Francke 2019). Another element of social media logic that characterizes the academic social networking sites, and that differentiates the sites from many other devices of evaluation, is the fact that they build on user-generated content; on publications, biobibliographic information, and associations willingly provided by the researcher, although sometimes through prompting from the platforms. Any academic librarian or university middle-manager will attest to the difficulties of getting all faculty members to volunteer information about their publications to the Current Research Information System or publication database at the end of the year. Yet a large number of researchers eagerly upload their publications to their academic social networking profile as soon as they have been published. Similarly to such subject repositories as arXiv, which provides exceptional visibility to researchers in some disciplines, the visibility offered on the platforms and amplified by their broadcasting affordance bring exposure to the researcher's work and the worth it represents. The broadcasting draws heavily on the platforms' algorithms and their aggressive marketing to the platform members.

Our interpretation is that the extensive use of academic social networking sites is due to their being attributed a certain legitimacy by large parts of the research community. This legitimacy is, however, pragmatic and grounded in mutual benefit. Researchers draw on the visibility, computability, and comparability of the platforms to self-monitor their performance as authors and to take some control over how they are represented and assessed (Hammarfelt, de Rijcke and Rushforth 2016). As reviewers, managers, and potential collaborators or competitors, they draw on the accessibility of the platforms to compare and evaluate other researchers. The platforms thus form part of a culture of mutual evaluation. Alongside this pragmatic legitimacy, the value of the platforms is clearly contested, and the popularity of the platforms, for instance, is associated with, and sometimes seen to enhance, notions of a neoliberal academia inhabited by researchers that act as entrepreneurs of themselves (Gill and Donaghue 2016; Duffy and Pooley 2017). Moreover, it has been argued that these platforms value speed, numbers, and visibility over more in-depth conversations and critical evaluations (Djonov and Van Leeuwen 2018), thus contributing to what are often considered as the negative aspects of evaluation. Whether one focuses on the benefits or downsides of academic social networking sites, the metrics generated and visualized through their various affordances contribute to the performance of both individual researchers and the academic ecosystem. In this way, the sites largely build on, remediate, and sometimes even strengthen, already established ways to categorize, organize, disseminate, and evaluate research.

Notes

1. Capiello's (2019b) table 1 provides an overview of studies indicating an open access citation advantage, whereas table 2 lists studies showing a lack of such citation advantage.
2. Academia.edu/about (accessed 27 November 2021) and Researchgate.net/about (accessed 27 November 2021).
3. These draw to some extent on another dimension of *associations* introduced by Treem and Leonardi (2013), namely how the platform establishes an association between the agent (researcher) and content (publications, etc.). The importance of the existence of various metrics on Academia.edu has been discussed in depth by, e.g., Duffy and Pooley (2017).
4. Although see e.g. Thelwall and Kousha (2015) for an example of how ResearchGate can be used for analysis at the institution and country levels and Harsh et al. (2021) who used Academia.edu as an additional source to Web of Science and Scopus to capture a richer view of computer science research conducted in Sub-Saharan Africa and published in local and regional journals and conferences.

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References

- Aksnes, D. W., Langfeldt, L., and Wouters, P. (2019) 'Citations, Citation Indicators, and Research Quality: An Overview of Basic Concepts and Theories', *SAGE Open*, 9:1–17.
- Andersen, J., and Lomborg, S. (2020) 'Self-Tracking and Metric Codification in Digital Infrastructures for Scholarly Communication', *The Information Society*, 36: 43–52.
- Bolter, J. D., and Grusin, R. (2000) *Remediation: Understanding New Media*. Cambridge, MA: MIT Press.
- Bond, S. (2017) 'Dear Scholars, Delete Your account at Academia.Edu', *Forbes* (pubd online 23 January 2017) <<https://www.forbes.com/sites/drsar/ahbond/2017/01/23/dear-scholars-delete-your-account-at-academia-edu>> accessed 23 Feb 2021.
- Borgman, C. L. (2007) *Scholarship in the Digital Age: Information, Infrastructure, and the Internet*. Cambridge, MA: MIT Press.
- boyd, d. (2011) 'Social Network Sites as Networked Publics: Affordances, Dynamics, and Implications', in Z. Papacharissi (ed.) *A Networked Self: Identity, Community, and Culture on Social Network Sites*, pp. 39–58. New York, NY: Routledge.
- Bröckling, U. (2016) *The Entrepreneurial Self: Fabricating a New Type of Subject*. London: SAGE.
- Bucher, T., and Helmond, A. (2017) 'The Affordances of Social Media Platforms', in J. Burgess, A. Marwick, and T. Poell (eds) *The SAGE Handbook of Social Media*, pp. 233–53. Thousand Oaks, CA: SAGE.
- Burrows, R. (2012) 'Living with the H-Index? Metric Assemblages in the Contemporary Academy', *The Sociological Review*, 60: 355–72.
- Capiello, S. (2019a) 'Research Interest: Another Undisclosed (and Redundant) Algorithm by ResearchGate', *Scientometrics*, 120: 351–60.
- Capiello, S. (2019b) 'The Open Access Citation Premium May Depend on the Openness and Inclusiveness of the Indexing Database, but the Relationship Is Controversial Because It Is Ambiguous Where the Open Access Boundary Lies', *Scientometrics*, 121: 995–1018.
- Capiello, S., and Bonifaci, P. (2019) 'ResearchGate Score, Full-Text Research Items, and Full-Text Reads: A Follow-up Study', *Scientometrics*, 119: 1255–62.
- Deephouse, D. L., and Suchman, M. (2008) 'Legitimacy in Organizational Institutionalism', in R. Greenwood, C. Oliver, R. Suddaby, and K. Sahlin-Andersson (eds) *The Sage Handbook of Organizational Institutionalism*, pp. 49–77. London: SAGE.
- Delfanti, A. (2021) 'The Financial Market of Ideas: A Theory of Academic Social Media', *Social Studies of Science*, 51: 259–76.
- de Rijcke, S., Wouters, P., Rushforth, A., Franssen, T., and Hammarfelt, B. (2016) 'Evaluation Practices and Effects of Indicator Use: A Literature Review', *Research Evaluation*, 25: 161–9.
- Djonov, E., and Van Leeuwen, T. (2018) 'Social Media as a Semiotic Technology and Social Practice: The Case of ResearchGate's Design and Its Potential to Transform Social Practice', *Social Semiotics*, 28: 641–4.
- DORA (2012) *San Francisco Declaration on Research Assessment* <<https://sfdora.org/read/>> accessed 23 Feb 2021.
- Duffy, B. E., and Pooley, J. D. (2017) "'Facebook for Academics": The Convergence of Self-Branding and Social Media Logic on Academia.edu', *Social Media + Society*, 3:1–11. DOI: 10.1177/2056305117696523
- Fourcade, M., and Kluttz, D. N. (2020) 'A Maussian Bargain: Accumulation by Gift in the Digital Economy', *Big Data & Society*, 7:1–16. DOI: 10.1177/2053951719897092
- Francke, H. (2019) 'The Academic Web Profile as a Genre of "Self-Making"', *Online Information Review*, 43: 760–74.
- Francke, H. (in press) 'Trust in the Academy: A Conceptual Framework for Understanding Trust on Academic Web Profiles', *Journal of Documentation*, DOI: 10.1108/JD-01-2021-0010
- Gibson, J. (1986) *The Ecological Approach to Visual Perception*. Hillsdale, NJ: Lawrence Erlbaum.
- Gill, R., and Donaghue, N. (2016) 'Resilience, Apps and Reluctant Individualism: Technologies of Self in the Neoliberal Academy', *Women's Studies International Forum*, 54: 91–9.
- Greifeneder, E., Pontis, S., Blandford, A., Attalla, H., Neal, D., and Schlebbe, K. (2018) 'Researchers' Attitudes towards the Use of Social Networking Sites', *Journal of Documentation*, 74: 119–36.
- Hafermalz, E. (2021) 'Out of the Panopticon and into Exile: Visibility and Control in Distributed New Culture Organizations', *Organization Studies*, 42: 697–717.
- Hammarfelt, B., de Rijcke, S. D., and Rushforth, A. D. (2016) 'Quantified Academic Selves: The Gamification of Research through Social Networking Services', *Information Research*, 21 <<http://informationr.net/ir/21-2/SM1.html>> accessed 23 Feb 2021.
- Hammarfelt, B., and Haddow, G. (2018) 'Conflicting Measures and Values: How Humanities Scholars in Australia and Sweden Use and React to Bibliometric Indicators', *Journal of the Association for Information Science and Technology*, 69: 924–35.
- Hammarfelt, B., and Rushforth, A. (2017) 'Indicators as Judgment Devices: An Empirical Study of Citizen Bibliometrics in Research Evaluation', *Research Evaluation*, 26: 169–80.
- Hangel, N., and Schmidt-Pfister, D. (2017) 'Why Do You Publish? On the Tensions between Generating Scientific Knowledge and Publication Pressure', *Aslib Journal of Information Management*, 69: 529–44.
- Harsh, M., Bal, R., Weryha, A., Whatley, J., Onu, C. C., and Negro, L. M. (2021) 'Mapping Computer Science Research in Africa: Using Academic Networking Sites for Assessing Research Activity', *Scientometrics*, 126: 305–34.
- Haustein, S., Bowman, T. D., and Costas, R. (2016) 'Interpreting "Altmetrics": Viewing Acts on Social Media through the Lens of Citation and Social Theories', in C. R. Sugimoto (ed.) *Theories of Informetrics and Scholarly Communication*, pp. 372–405. Berlin: De Gruyter Mouton.
- Herman, E., and Nicholas, D. (2019) 'Scholarly Reputation Building in the Digital Age: An Activity-Specific Approach: Review Article', *El Profesional de la Información*, 28: e280102.
- Hicks, D., Wouters, P., Waltman, L., de Rijcke, S., and Rafols, I. (2015) 'Bibliometrics: The Leiden Manifesto for Research Metrics', *Nature*, 520: 429–31.
- Jamali, H. R. (2017) 'Copyright Compliance and Infringement in ResearchGate Full-Text Journal Articles', *Scientometrics*, 112: 241–54.

- Joelsson, E., Nelhans, G., and Helgesson, C.-F. (2020) *Hur värderas publiceringsmeriter i det svenska akademiska systemet? En undersökning av värderingen av befordran till docent med särskilt fokus på betydelsen av Öppen Tillgång* [How are Publishing Qualifications Evaluated in the Swedish Academic System? A Study of the Evaluation of Promotion to 'Docent' with a Special Focus on the Significance of Open Access]. Stockholm: Royal Library of Sweden.
- Jordan, K. (2015) 'Exploring the ResearchGate Score as an Academic Metric: Reflections and Implications for Practice', in *Quantifying and Analysing Scholarly Communication on the Web (ASCW'15)*, Oxford, UK, 30 June 2015.
- Jordan, K. (2019a) 'From Finding a Niche to Circumventing Institutional Constraints: Examining the Links between Academics' Online Networking, Institutional Roles, and Identity-Trajectory', *International Review of Research in Open and Distributed Learning*, 20: 96–111.
- Jordan, K. (2019b) 'From Social Networks to Publishing Platforms: A Review of the History and Scholarship of Academic Network Sites', *Frontiers in Digital Humanities*, 6:1–14. DOI: 10.3389/fdigh.2019.00005
- Jordan, K., and Weller, M. (2018) 'Communication, Collaboration and Identify: Factor Analysis of Academics' Perceptions of Online Networking', *Research in Learning Technology*, 26:1–13. DOI: 10.25304/rlt.v26.2013
- Kaltenbrunner, W., and de Rijcke, S. (2019) 'Filling in the Gaps: The Interpretation of *Curricula Vitae* in Peer Review', *Social Studies of Science*, 49: 863–83.
- Kjellberg, S., and Haider, J. (2019) 'Researchers' Online Visibility: Tensions of Visibility, Trust and Reputation', *Online Information Review*, 43: 426–39.
- Komljenovic, J. (2019) 'Big Data and New Social Relations in Higher Education: Academia.edu, Google Scholar and ResearchGate'. In: R. Gorur, S. Sellar, and G. Steiner-Khamsi (eds) *World Yearbook of Education 2019: Comparative Methodology in the Era of Big Data and Global Networks*, pp. 148–64. London: Routledge.
- Kraker, P., Jordan, K., and Lex, E. (2015) 'The ResearchGate Score: A Good Example of a Bad Metric', *LSE Impact Blog* (9 Dec 2015). London School of Economics and Political Science. <<https://blogs.lse.ac.uk/impactofsocialsciences/2015/12/09/the-researchgate-score-a-good-example-of-a-bad-metric/>> accessed 23 Feb 2021.
- Mansour, A. (2021) 'Affordances Supporting Mothers' Engagement in Information-Related Activities through Facebook Groups', *Journal of Librarianship and Information Science*, 53: 211–24.
- Meishar-Tal, H., and Pieterse, E. (2017) 'Why Do Academics Use Academic Social Networking Sites?', *International Review of Research in Open and Distributed Learning*, 18: 1–22.
- Muscanell, N., and Utz, S. (2017) 'Social Networking for Scientists: An Analysis on How and Why Academics Use ResearchGate', *Online Information Review*, 41: 744–59.
- Nández, G., and Borrego, Á. (2013) 'Use of Social Networks for Academic Purposes: A Case Study', *The Electronic Library*, 31: 781–91.
- Nicholas, D., Watkinson, A., Volentine, R., Allard, S., Levine, K., Tenopir, C., and Herman, E. (2014) 'Trust and Authority in Scholarly Communications in the Light of the Digital Transition: Setting the Scene for a Major Study', *Learned Publishing*, 27: 121–34.
- Niyazov, Y., Vogel, C., Price, R., Lund, B., Judd, D., Akil, A., Mortonson, M., Schwartzman, J., and Shron, M. (2016) 'Open Access Meets Discoverability: Citations to Articles Posted to Academia.edu', *PLoS ONE*, 11: e0148257.
- Orduna-Malea, E., Martín-Martín, A., Thelwall, M., and López-Cózar, E. D. (2017) 'Do ResearchGate Scores Create Ghost Academic Reputations?', *Scientometrics*, 112: 443–60.
- Raczkowski, F. (2014) 'Making Points the Point: Towards a History of Ideas of Gamification', in M. Fuchs, S. Fizek, P. Ruffino, and N. Schrape (eds) *Rethinking Gamification*, pp. 141–60. Lüneburg: Meson Press.
- Radford, M. L., Kitzie, V., Mikitish, S., Floegel, D., Radford, G. P., and Connaway, L. S. (2020) "'People Are Reading Your Work," Scholarly Identity and Social Networking Sites', *Journal of Documentation*, 76: 1233–60.
- Suchman, M. C. (1995) 'Managing Legitimacy: Strategic and Institutional Approaches', *The Academy of Management Review*, 20: 571–610.
- Tenopir, C., Levine, K., Allard, S., Christian, L., Volentine, R., Boehm, R., Nichols, F., Nicholas, D., Jamali, H. R., Herman, E., and Watkinson, A. (2016) 'Trustworthiness and Authority of Scholarly Information in a Digital Age: Results of an International Questionnaire', *Journal of the Association for Information Science and Technology*, 67: 2344–61.
- Thelwall, M., and Kousha, K. (2014) 'Academia.edu: Social Network or Academic Network?', *Journal of the Association for Information Science and Technology*, 65: 721–31.
- Thelwall, M., and Kousha, K. (2015) 'ResearchGate: Disseminating, Communicating, and Measuring Scholarship?', *Journal of the Association for Information Science and Technology*, 66: 876–89.
- Thelwall, M., and Kousha, K. (2017) 'ResearchGate Articles: Age, Discipline, Audience Size, and Impact', *Journal of the Association for Information Science and Technology*, 68: 468–79.
- Treem, J. W., and Leonardi, P. M. (2013) 'Social Media Use in Organizations: Exploring the Affordances of Visibility, Editability, Persistence, and Association', *Annals of the International Communication Association*, 36: 143–89.
- Van Noorden, R. (2014) 'Online Collaboration: Scientists and the Social Network', *Nature*, 512: 126–9.
- Vitak, J., and Ellison, N. B. (2013) "'There's a Network out There You Might as Well Tap": Exploring the Benefits of and Barriers to Exchanging Informational and Support-Based Resources on Facebook', *New Media & Society*, 15: 243–59.
- Weber, M. (1968) in Roth G. and Wittich C. (eds) *Economy and Society: An Outline of Interpretive Sociology*. New York, NY: Bedminster Press.