

# Designing a Gateway Influencer Recruitment Plan to Accelerate Adoption and Diffusion

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**Abstract**—Science gateways adoption and diffusion can be increased and accelerated through influence and outreach by using opinion leaders or gateways influencers. In this paper, we describe how influencers can help accelerate the spread of technology and how they can be utilized in a gateways context. Specifically, we identified how current gateway staff can be trained to identify and recruit influencers and how to systematically prepare an ‘influencer recruitment plan’; we explained how influencers might differ across domains (e.g., science vs. humanities); and we offer suggestions on how influencers can be integrated into the gateways workforce. Our framework for identifying influencers could aid in ensuring the continued growth and sustainability of the gateways community in the long term.

**Keywords**—*influencers, opinion leaders, diffusion of innovations, Science Gateways*

## I. INTRODUCTION

Influencers are individuals within a community who naturally and informally influence their near peers and lead others’ opinions about something new. In the research literature, influencers have a long history, including being studied as opinion leaders as early as 1906 about law and opinion in England [1], later as market mavens in marketing research in 1987 [2], and more recently the concept has also made its way into the social studies of science gateways in 2021 and 2022 [3,4]. Different terms invoke different bodies of literature, although there is much overlap. In this paper, we choose to use the term ‘influencers’ to encompass research on opinion leaders, market mavens, etc. At the heart of these research studies is the identification of socially influential individuals from within a target community to help rally a new idea, new technology, or simply anything perceived as new to the masses.

In technology and marketing research, ‘market mavens’ know a lot of information about products in the marketplace and they know how to look and shop for new products [2]. A unique aspect of market mavens is that they also know products that they do not personally use, so their friends and family members often turn to them for advice whenever someone is looking to

purchase a new product [5]. In mass communication research, influencers are regarded as important gatekeepers. Katz and Lazarsfeld argued that broadcast news information often flows to the influencers first, who then pass it on to others in their social networks, but often coupled with their personal opinions about the news [6]. Therefore, they informally influence many others about how to think about the news. In public health research, influencers have been regarded as partners in cultural communities if change agencies want to promote a new health behavior. For example, Kadushin reported that influencers (e.g., religious leaders, village elders) often represent the cultural norms of a community, so change agents (i.e., professionals coming from outside to introduce an innovation to a community) can strategically partner with influencers to help promote a new health behavior that otherwise would face skepticism and resistance, or simply be ignored [7].

According to Dearing et al., influencers often make up about 5% to 8% of any given population in a community and enjoy the respect of others in the community [8]. It is therefore important to consider that influencers can be for or against an innovation. When they are against an innovation, they can also influence others in their community to reject the innovation. However, when they are pro innovation, change agents can often introduce the innovation, carry out the initial intervention and support, and eventually leave the community, while the influencers can facilitate a self-sustaining innovation in the community for the long term. In this paper, we seek to answer two new questions: (a) How gateway staff can be trained to identify and recruit influencers to help spread gateways?, and (b) How might influencers differ across domains (e.g., science vs. humanities)?

## II. HOW GATEWAY STAFF CAN RECRUIT INFLUENCERS

At Mini Gateways 2022, we outlined 12 techniques for identifying influencers, building on a framework by Valente and Pampuang [9]. In this new paper, we reorganize the 12 techniques into four broader approaches to highlight the common knowledge and/or skill sets that gateway staff could develop in order to be effective at employing the techniques. We introduce the four approaches here to also suggest a progression

of how gateway staff can start with the observational approach, and then progress to the self-directional approach, before adding the qualitative approach, and finally the social network approach. During each progression, certain social science methods could be learned, as they are the foundation of the suggested approaches and techniques. We also add some practical recommendations to help explain how to carry out the 12 techniques, with the goal of helping gateway staff and center administrators consider how to systematically prepare an ‘influencer recruitment plan.’

#### A. The Observational Approach

First, gateway staff can rely on **observations**. For example, they can contact the individuals occupying a leadership position at universities (e.g., chairs, deans, provosts) and/or professional associations (e.g., presidents, elected leaders). Using what is known as the ‘positional technique,’ individuals who occupy some administration and leadership positions are automatically recruited as influencers. Also, gateway staff often already have existing contacts on campus or in disciplinary domains. These individuals can be easily recruited to play the influencer roles, reflecting what is known as the ‘staff-selection’ technique. These techniques are easy to get started by gateway staff without much preparation and social science training.

#### B. The Self-Directional Approach

Second, gateway staff will rely on influencers’ **self-direction**. To begin, gateway staff can put out a call for anyone interested in helping to volunteer as influencers. In this case, little to no screening needs to take place, as those who are motivated to help would be taken as influencers immediately. This is known as the ‘self-selection’ technique. This approach is similar to the Campus Champion program and the Gateway Ambassador program. Members of these networks are often volunteers.

Moreover, gateway staff can also systematically screen for potential volunteers using the ‘self-identification’ technique by asking existing and/or new gateway users to fill out a questionnaire designed to identify certain influencer qualities. For example, Boster and colleagues designed a 15-statement questionnaire to measure a respondent’s **connectedness** (e.g., “The people I know often know each other because of me,” **persuasiveness** (e.g., “When in a discussion, I’m able to make others see my side of the issue”), and **mavenness** (e.g., “When I know something about [an innovation], I feel it is important to share that information with others”), measured on a 5-point Likert scale from strongly disagree (1) to strongly agree (5) [10]. This questionnaire can be given to participants at one-on-one consultations, training workshops, etc., on an ongoing basis, so potential influencers (those who score at least 60 points or higher out of a total of 75 points maximum) can be identified and recruited on a regular basis. The first two approaches of observations and self-directions can be done easily by any gateway staff without any specialized training. The next two approaches may require some social science training.

#### C. The Qualitative Approach

The third approach is what we call the **qualitative approach**. Within this approach, the gateway staff can talk to domain users and/or attend domain-specific conferences to identify the visible

researchers and high-flyers in the field. Once identified, these high-flyers can be recruited to serve as gateway influencers. This technique is known as ‘celebrity endorsement.’

Next, if the high-flyers turn down serving as gateway influencers, gateway staff can ask them to identify who they would regard as influencers in their domains. In this case, the first round of high-flyers serve as the ‘judges’ of who may be the influencers in their own domains. This technique is known as ‘judge’s ratings.’ During this process, some of the statements from Boster and colleagues can be utilized as prompts [10]. For example: “*In your field, who would you say are the common connectors, so the people they know often know each other because of these connectors?*”; “*When in a discussion, who in your field are able to make others see their side of the issue?*”; and “*Who in your domain would feel that it is important to share the information with others when they know something about [an innovation]?*”

Moreover, gateway staff can also ask the ‘judges’ simply, “*If you want to spread some gossip in your field, who would you go to spread it quickly and naturally?*” The names provided in response are referred to as the ‘gossip seeds,’ another technique to identify gateway influencers.

Lastly, gateway staff that have gone through all the techniques at this point would probably have developed a lot of knowledge about a particular campus or domain. Given this, they themselves have developed a certain level of expertise and insights. In this case, they (as reasonable experts) can nominate individuals that they believe to be potential gateway influencers. This technique is known as ‘expert identification.’ According to Valente and Pumpuang, ‘experts’ are also ethnographers and social scientists brought into studying the community as objective outsiders [9].

#### D. The Social Network Approach

The fourth approach relies on **social network analysis**. Under this category, a gateway staff can start with a convenience sample of informants (or index cases) on a campus or domain to nominate potential influencers. The sample is called a ‘convenience sample’ because the selection of the index cases is simply the easiest to recruit without using any inclusion/exclusion criteria. Then these influencers are asked to nominate additional influencers. This process will be repeated multiple rounds until a certain number of individuals have received a high number of nominations (e.g., five nominations; having been nominated by at least five others as potential influencers). This is called the ‘snowball’ technique.

Next, the gateway staff can be more sophisticated about the initial sample, by ensuring some ‘representativeness’ into the sample. For example, the gateway staff may think through how many departments and colleges there are on campus, or how many divisions and interest groups exist in a professional association. Then the gateway staff may also take into consideration ensuring gender and ethnic representation. In this case, the inclusion/exclusion criteria are unit membership, gender, ethnicity, etc. So the ‘representative sample’ may include a spread of individuals from all the departments (in the case of a campus) and divisions (in the case of an association), and also ensuring that there is enough gender and ethnic

representation (or any other appropriate group memberships) in the sample. Then everyone in the sample will be surveyed once (and only once) to nominate influencers. The names that receive the highest nominations (it could be the top ten individuals with the highest nominations, or all the individuals who receive at least five nominations, or some predetermined threshold) will be recruited as gateway influencers. This is called the ‘sample sociometric’ technique.

Furthermore, a particular unit (e.g., an academic college with multiple departments) can be interviewed for nominations with all or almost all members of the unit. Then the same criteria as described for ‘sample sociometric’ will be applied to select potential gateway influencers. This is called the ‘sociometric’ technique. Note that this technique may be the most time-consuming technique, with the difficulty of reaching a high response rate to make this a census study or near census status.

Finally, individuals with the largest number of followers or who receive a high number of interactions on social media posts can be considered influencers in the digital sense. We call this the ‘social media’ technique.

**Table 1.** Influencer Recruitment Approaches and Techniques

Approach	Technique	Description
Observational Approach	Staff Selection	Leaders selected based on community observation
	Positional Approach	Leadership positions such as HPC Administrators, etc.
Self-directional Approach	Self-Selection	Volunteers are recruited through solicitation
	Self-Identification	Surveys use a leadership scale to determine leaders
Qualitative Approach	SG/CI High-Flyers	Recruit well-known people who are SG/CI high-flyers
	Judge’s Ratings	Knowledgeable community members identify leaders
	Expert Identification	Trained social scientists study communities to identify leaders
Social Network Approach	Snowball	Leaders are interviewed until no new leaders are identified
	Sample Sociometric	Frequent nominations from random respondents are selected
	Sociometric	Frequent nominations from all (or most) respondents are selected
	Social Media	Largest number of social media followers
	Gossip Seeds	Identifying the gossip “social butterflies” in different communities

As can be gleaned from the discussion above, start-up efforts for enlisting gateway influencers would depend on whether the staff members are familiar with the methodologies and some of these techniques suggested for identifying influencers (e.g., sociometric method requires understanding of social network analysis). However, personnel can be trained on these methods, which could then be implemented in a relatively short timeframe. In an ideal situation, someone willing to learn quickly can get the basics in two weeks to a month. In addition to training gateway staff to carry out these techniques, they can also partner with social scientists who have expertise in influencer research and/or relevant methodological techniques. Research computing center administrators on campuses, science gateways community institutes, funders, domain experts, gateway champions in various domains, and other gateway stakeholders could be some of the parties involved in creating and/or reviewing influencer plans.

### III. THE DIFFERENCES IN INFLUENCERS ACROSS DOMAINS

#### A. Co-Authored Scientists vs. Solo Authors in the Humanities

Several important distinctions exist in the practicalities and perspectives of different domains, such as the humanities and sciences, which may impact adoption of gateways. This section aims to highlight a few distinctions that gateway staff can keep in mind when recruiting influencers. Given that scientists (as a group) may typically have more training in statistics and programming than humanities scholars (a broad and general

assumption), science influencers may be more quantitatively and technically oriented than humanities influencers. While co-authorship has grown in the humanities during the last decade, traditionally the humanities tended to produce single-authored publications more than science [11]. Despite the recent increases in co-authorship, humanities influencers may still tend to publish with fewer co-authors than science influencers due to the entrenched workflows, philosophies, and realities of the fields. Relating to funding, the data that scientists work with tend to require expensive instruments for data collection, requiring both more funding and collaboration. Likewise, scientists tend to hire many graduate students to work in a research lab model, which requires a certain level of funding to support a lab. In contrast, humanities tend to work with textual data and/or other cultural artifacts (i.e., images, recordings) in a more isolated setting. Thus, one can expect that science influencers would tend to have large research funding, while a high level of funding may not characterize humanities influencers, who instead may be prominent voices in their field, with high citations, and/or who spark discussions. However, such trends may be beginning to change with the rising interest and funding for digital humanities projects, which support at least basic introductions to statistical and programming knowledge as well as large, interdisciplinary collaborations, and presents an opportunity to blend traditional science tools with humanities research. We provided some examples in this paragraph to point out that while looking for influences in the humanities, a big number of co-authors, a high level of funding, etc., may not apply to them.

#### B. Science Influencers Are Users While Humanities Influencers May Not Be Users Yet

From a disciplinary standpoint, the sciences lead the way of gateway adoption compared to the humanities. This is a notable consideration because the science influencers are likely to be existing gateway users (simply because there is a community of science users already). However, the effective humanities influencers may not yet be gateway users at this point. So, gateway staff need to proactively identify effective influencers in the humanities, and introduce gateways to them, with the intention to recruit them as gateway influencers to the larger community of humanities scholars. Let us elaborate on the rationale behind this recommendation.

The defining characteristics of influencers include relatedness, community respect, representing the community norms, well-connectedness, persuasiveness, and mavenness. Given this, domain differences are critical. As Dearing et al. noted, influencers comprise about 5% to 8% of a community population [8]. They also importantly note that influencers are often not found in the first group of adopters (i.e., the first 2.5% of users in any community; or ‘lead users’), but in the second group of adopters (i.e., the next 13.5% of users; or ‘early adopters’). Why? They explained that the first group of lead users are venturesome and often risk takers, thus they do not represent the norm of the community. The lead users are often perceived by the rest of the community as deviants or socially too different from themselves and the ‘normal’ masses. The second group of who we call early adopters are not always on the cutting-edge, but they adopt after the first 2.5% of lead users, so they are still very early in their adoption relative to the masses [8]. They also have another advantage, which is they are more

relatable to the majority of the community by not being the first group of adopters (i.e., lead users). When the masses consider adopting an innovation, it is usually a decision of high uncertainty. Potential adopters often find the opinions and experiences of those who are slightly ahead of them but still relatable to be more persuasive than the lead users who are on the cutting-edge.

If the ultimate goal of gateway staff is to promote gateways such that they saturate a campus and/or domain, it is important for gateway staff to not be overly dependent on the lead users, who may be regarded as ‘die hard fans’ too deviant for the masses to relate to. Therefore, we recommend that: (a) gateway staff look beyond the group of lead users easiest to recruit and look into the early adopters for gateway influencers; and (b) gateway staff can reach out to non-users who have a high potential for serving as gateway influencers and begin introducing them to gateways with the intention of building gateway influencers in the long-term. The key argument here is that gateway influencers for the humanities may not be gateway users yet at this point, and they need to be strategically identified and recruited. Also, some users deserve intentional and extra efforts for recruitment because of their potential to further promote gateways. Consequently, we would suggest using the observational and self-directional approaches for recruiting science influencers, but using the qualitative and social network approaches to recruit humanities influencers.

#### IV. CONCLUSION

In this paper, we describe how influencers or opinion leaders can accelerate the spread of innovations and how they can be used in a gateways context. Specifically, we identified how current gateway staff can learn social scientific methods to identify and recruit influencers, how to systematically prepare an ‘influencer recruitment plan,’ and how influencers might differ across domains (e.g., science vs. humanities). In conclusion, we would like to offer suggestions on how influencers can be integrated into the gateway workforce.

Traditionally in influencer research, there is a clear boundary between change agents and influencers. This clear distinction is the rationale behind why change agents can leave a cultural community after the innovation has reached critical mass in the community, and with the help of local influencers, the innovation can be self-sustaining. However, the case of gateways may be different, in that the change agents and influencers often work at the same universities, trained in similar domains (especially when certain gateway staff have obtained graduate training in certain domains other than computer science). Given these, the boundary is not as clear cut.

Partly based on observations of certain innovative ideas attempted by some other gateways, computing, and community programs, we suggest that high performance computing centers (HPC) can consider having a ‘fellow program,’ where they invite potential influencers from across colleges on campus to join their center as ‘faculty fellows’. These fellows can then serve as liaisons or bridges between gateway (and cyberinfrastructure, HPC) with their domains, departments, and/or colleges. A similar approach can be done with professional associations as well. While these fellows can serve in a voluntary capacity, if the goal is to secure a certain level of

commitment and time investment from them, some tangible or intangible benefits or rewards should be considered.

Our goal is to provide a framework to help increase adoption and diffusion of gateway technology, especially within fields that may be lagging behind gateway adoption, such as the humanities. Distinctions between the sciences and the humanities, such as differences in authorship collaborations and levels of funding, may impact influencer status within the scholarly communities. Our strategies for recruiting influencers are intended as a guide rather than a rigid set of methods and are not intended to be an exhaustive inventory of techniques. Flexibility in strategies may be necessary to take into account the scope and context of different domains and researcher needs. However, our flexible framework provides a starting point for identifying influencers who could aid in gateway adoption while extending past diffusion scholarship on opinion leadership and influencers.

Further, ensuring a sustainable, robust, and growing workforce is key to maintaining support and development of gateway tools for research communities. Attracting more individuals to enter the gateways workforce requires influence, promotion, and recruitment efforts among potential users or developers. Thus, using influencers would serve as an effective tool for accelerating and expanding adoption and diffusion of gateways to more domains by influencing others to adopt gateways as well as potentially joining the gateway workforce.

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