

Telling citizens how to vote: voting advice applications as a boundary object for political influence and discussion

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Abstract

Previous research on Voting Advice Applications (VAAs) has focused on the characteristic of users and the electoral outcomes, but the social and public role of VAAs remains unexplored. This article studies VAAs as platforms that shape political discussion during elections. We conceptualize VAAs as technical artifacts that act as boundary objects between candidates, voters, and the media during the campaigning period. Using a large data set of tweets and a set of six thematic interviews with VAA designers, we demonstrate how VAAs work as interfaces that reside between different communities and that enable the transfer of knowledge and views across community boundaries. In the light of our analysis, VAAs are performative platforms, who facilitate the voter's decision-making, offer technological affordances to shape this activity more public, and encourage interaction between voters and candidates. For voters they also appear as resources used to construct political identities. Finally, our analysis reveals the political and purposeful nature of VAAs: they are used by both NGOs and by media as promotional vehicles for agenda-building and marketing.

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Introduction

Recent studies of new media have pointed out the role of platforms in shaping, constraining and enabling social action and participation in the online public sphere (e.g., Gillespie, 2015; Hands, 2013; Helmond, 2015; Lievrouw, 2014; van Dijck, 2013). In this paper we study Voting Advice Applications (VAAs) as platforms that shape political discussion during elections. VAAs disclosed aim is to help citizens to choose who to vote. This is done through a series of questions asked from the citizen, each also answered by the candidates. Based on the answers, the most like-minded candidates are shown as a recommendations, as well as the candidates with the most differing set of opinions. In 2015 45 percent of Finns aged 18–89 reported using VAAs before the Parliament Elections (Official Statistics of Finland, 2015).

In Finland, VAAs have traditionally been constructed by media companies, and appeals for their utilization are widely promoted. Usually, the results can be easily shared in social media, where people can, for example, promote their own closest candidates in their own social networks. Therefore, for traditional news media, VAAs also act as commodities to attract people to try out their applications in an attempt to persuade people to visit their news sites. Further, an increasing amount of NGO's and other interest groups have started building their own applications with a specific set of questions related to their own societal area. Thus, VAAs cannot be seen as giving purely objective voting guidance for citizens. Besides serving as promotional messages for the news sites, different political agendas can be disclosed within these platforms.

Due to their popularity it can be assumed that VAAs have a significant role in political discussion ahead of elections. This, in turn, may influence voting behavior. For example, in countries where list elections are used, parties are of higher importance than candidates, whereas VAAs may promote the candidate specific personal aspects influencing the voting decisions. Similarly, seeing VAA's as "dating applications" between candidates and the electorate, they are likely to have an effect on how people comprehend the process of candidate selection, as well as as how candidates use the applications as promotional tools within their campaign. The current academic studies on VAA have focused, for instance, on the citizens' information seeking and voting behavior (e.g., Fivaz & Nadig, 2010; Garzia, 2010; Walgrave, Soroka, & Nuytemans, 2008), as well as on the algorithms that conduct the recommendations (e.g., Gemenis & Ham, 2014; Mendez, 2014). However, there is little knowledge on the role of these platforms in the public discussions during the pre-election period, and the ways how VAAs are used by different individuals and organizations.

To track this influence we conceptualize VAAs as technical artefacts that act as boundary objects between politicians, voters, and media actors. Boundary object is a sociological concept to describe a commonly shared, abstract or concrete object that translates information between different communities (Star & Griesemer, 1989). Boundary objects are entities that link communities together as they allow different groups to collaborate on a common information task (Wenger, 1998), i.e. objects that are shared and shareable across different problem solving contexts (also Latour, 1996; Orlikowski, 2002). We posit that as boundary objects VAAs contribute to the spread and circulation of political messages and opinion formation in social and traditional media during the pre-election period. Beyond seeing VAAs as technological boundary objects (cf. Garrety & Badham, 2000), in our analysis we

are interested in the meanings that are constructed in relation to these boundary objects within different communities (see Gal, Yoo, & Boland, 2004), and the different knowledge transformation processes that VAAs enable (Carlile, 2004). More specifically, we present the following research question:

1. RQ1. What is the role of VAAs in the public discussion around the elections and how do they enable knowledge transmissions or translations between different communities?

The paper proceeds as follows. We first introduce the work focused on voting advice applications (VAA), demonstrating that to date, the research focus has been on individuals' VAA use. Therefore, we proceed to discuss VAAs as technical artifacts, constructed and used by individuals. Through this literature, we link VAAs to the research on boundary objects, artifacts which help to establish common ground between different communities. After discussing the theoretical background, we will introduce our two datasets: a twitter data of 10 396 tweets and a set of six thematic interviews with VAA designers in media and NGO organizations, as well as our methodological approach. Then move on to discuss our findings with descriptive statistics, network analysis and a qualitative review of emergent categories in the Twitter data. We conclude by discussion how our findings relate to the theoretical and empirical discussions on boundary objects as well as critical platform studies.

Theoretical background: VAAs as technical artefacts helping citizens to make a choice

Research on VAAs can be separated in two different areas. First, a stream of research focuses on the users of VAAs, such as who use VAAs and what are their motivations. Second research stream looks at the impact of VAAs in the election process, such as linking VAA to turnout and election decisions.

In general VAA users can be characterized as citizens with high interest in politics and high education (e.g., Ladner & Pianzola, 2010). van de Pol, Holleman, Kamoen, Krouwel, and de Vreese (2014) have challenged this general assumption and have classified the Dutch VAA users into three groups: the checkers, the seekers and the doubters. The first group of already knows who to vote, but aim to confirm their experience. They are older, more educated and higher income than others. The seekers have certain party affiliation, but are still undecided of the voting choice. From a socio-economic perspective, they are rather similar to checkers. Finally, the doubters are undecided of the voting choice. This group of people is different in socio-economic terms; they are younger and have lower education. Thus, we acknowledge that while the VAAs have been used by 'the elite' citizens, more nuances can be found, in particular due to the overall increase of the VAA use.

Beyond studying the characteristics of users, a substream has focused on the people's motivations to use VAAs. The characterization of user typologies already highlight how different participants may have different motivations (van de Pol et al., 2014). Researchers have studied the perceived utility of VAAs, and observed that it was higher for females, younger votes and those with higher education. Furthermore, those who consider politics uninteresting or believe in technology experience more benefits from VAAs (Alvarez, Levin, Trechsel, & Vassil, 2013).

The second dominant question in VAA research has been the impact of VAAs on voter turnout and vote choice. For example, Ladner and Pianzola (2010) suggest VAA increased the voting activity by 1%. Finally, voters have said that two-thirds of VAA users feel that VAA had an impact on their voting decisions (Fivaz & Nadig, 2010). In Finland, 17 percent of VAA users reported that VAA results heavily affected their candidate choice, 38 percent reported it somewhat affected (Official Statistics of Finland, 2015). In addition, in the same research half of VAA users told VAAs to some extent increased their interest towards elections.

While both perspectives are fruitful, the focus in these studies remains heavily on the individuals. Hence, they do not provide insights on the social role VAAs may take during elections and electoral campaigning, nor do they illuminate the perspective of the producers of the VAAs. With the possibilities offered by online technologies the voting recommendations do not necessarily remain individual, but can be shared in public. To extend the current body of academic literature, we next examine how to conceptualize social functions for VAAs by building on science and technology studies.

Technical artefacts as a research object

In science and technology studies technologies, such as VAAs, are seen as artefacts constructed for certain purpose (see, e.g., Winner, 1985). as Gillespie (2014, p. 27) formulates, based on (Winner, 1980): "technological artefacts are the embodiment of the political economic, social, and cultural conditions of their development and creation. Once built, they are the physical manifestation of those conditions, and have both intended and unintended consequences to which users and society must adapt." Approaching VAA from this perspective, the research question related to public discussions becomes apparent. VAA is not only *a tool for voting choice*, but can be used – as all artifacts – *as a tool to establish and maintain power and status*.

In the larger realm of social studies this perspective relates to the more recent works on algorithms and platforms. First, algorithms have been under scrutiny in a growing body of literature focused on critical algorithm studies (for summaries, see Gillespie, 2012; Kitchin, 2014). To summarise the literature, one of the main claims related to algorithms – often in focus of the critical scholars – is the ‘objectivity’ of algorithmic decision making. This means, similar to literature on artefacts, algorithms are commonly seen as instruments of power Kitchin (2014). Neyland and Möllers (2016), however, remind that the assumed social power of algorithms only makes sense through their situatedness and that such power is constituted through associations between rules, people, processes and relationships. Second, there has been increasing work on platforms as performative infrastructures in our social realm (e.g., Gillespie, 2010, 2015; van Dijck, 2013). Performative here refers to the embedded agency platforms as technical artefacts have: rather than merely intermediating social action the mediate it: shape "the performance of social acts instead of facilitating them" (van Dijck, 2013, p. 29). That is, platforms guide users to certain courses of actions (Markham, 2016; van Dijck, 2013), and through this guidance technical protocols and solutions become embedded with political and economic protocols (van Dijck, 2013).

The research on technical artefacts, either in the original form in classical science and technology studies literature, or in current research, via algorithms or platforms, is vivid. Research on artefacts has focused on the creation of the artefacts, such as decisions and

values during this process, and the meanings users give to artefacts, known as social shaping of technology (MacKenzie & Wajcman, 1999; Nissenbaum, 2005). However, from the perspective of information transfer, artefacts have one more purpose: to regulate and support interaction between individuals (Fleischmann, 2006). Therefore, artefacts – especially VAAs – have properties of a *boundary object*, they help a group to create common ground and facilitate knowledge transfer between different groups. Considering our motivation to understand the social role of VAAs, we find boundary object a useful analytical concept for our purposes.

Understanding social interaction through boundary objects

When describing the formation and use of knowledge in different communities in intersecting social worlds, Star & Grieseman (1989) developed the concept of boundary object. By boundary they refer to a shared space between communities (Star, 2010) and “boundary objects are those objects that both inhabit several communities of practice and satisfy the informational requirements of each of them” (Bowker & Star, 2000), i.e. objects that are shared and shareable across different problem solving contexts (cf. Latour, 1996; Orlikowski, 2002). Boundary objects, thus, are either physical or abstract artifacts that reside on the interface between different communities, but who possess the capacity to bridge knowledge and differences among diverse communities (e.g., Gal et al., 2004; Karsten, Lyytinen, Hurskainen, & Koskelainen, 2001). Hence, boundary objects are devices that can facilitate cooperation and knowledge transfer between communities.

Empirical research on boundary objects has paid attention to different types of knowledge and boundaries as well as the dynamic nature of boundary objects. For example, Carlile (2002) distinguishes three different types of knowledge boundaries as well as different boundary objects and knowledge transfer processes to overcome these boundaries (cf. Carlile, 2004): syntactic, semantic and pragmatic boundaries and transfer, translation and transformation as respective processes. Syntactic boundaries relate to the classical theories of information processing (cf. Shannon and Weaver 1949), to transferring, storing and retrieving knowledge. Such a boundary is unproblematic as long as knowledge or information is transferred across it. According to Carlile (2004) syntactic boundary becomes syntactic when unclear dependencies or ambiguous meanings exist, a situation which is caused by the increasing novelty of the situation. Situation requires not only transferring but also translating knowledge and views, using communication to create shared meanings. Finally, a pragmatic approach acknowledges that knowledge is always embedded in practice. Therefore, knowledge needs to be transformed through learning and negotiation, by establishing common interests or making trade-offs (Carlile, 2002).

In the context of elections boundary objects are needed to transfer a very specific kind of information: political views and opinions. Following Carlile (2002) vocabulary, VAAs as technical artefacts are a syntactic and semantic boundary object: through the multiple choice questions they form a repository of political knowledge that is transferred and translated from politicians to voters through a standardized form. Transfer takes place through a developed syntax of quantifying political opinions to discreet choices and by allowing the politicians and voters to give weights to them. Translation, a capacity to develop common meanings and translate domain-specific knowledge is afforded by the text boxes where candidates can justify their choices.

However, building on the literature on technical artefacts, boundary objects are not only objective, neutral transmission devices. We highlight two perspectives that explicitly stress this notion. First, the proposition that boundary objects are always devices that relate to the exercise of power (Huvila, 2011). Second, they are artifacts that have a social function in the sense that they are used to create social identities of the actors using them (Gal et al., 2004).

Huvila (2011) reminds that boundary objects are always connected to the exercise of power or hegemony, even though they might appear as a seemingly consensual device. Therefore they are also devices for creating and maintaining hegemonies within communities and achieving authority over other intersecting groups of people. Hence, according to Huvila (2011), the creation and shaping of a boundary object is always an attempt to exercise power. Thus, they are political and purposeful devices (cf. Oswick & Robertson, 2009, p. 187-189), even though such aspects are often neglected in studies.

As our second starting point we follow the proposition made by Gal et al. (2004), who posit that boundary objects are not only translation devices but also resources that actors use to form and express their social identities. In the context of politics and elections these identities are political identities, identities of oneself as a voter and as a citizen. Further, Gal et al. (2004) suggest studying boundary objects also through their relationships with the social infrastructures in which they are embedded. Boundary objects are both enabled via interactions, but they also enable interactions (Gal et al., 2004) In this sense, they spread across several objective worlds. As Gal et al. (2004, p. 197) write: “Boundary objects have one objective manifestation. That is, they are embodied in a specific artefact (physical or conceptual) which is recognizable as such to members of more than one community. However, the meanings that are constructed in relation to boundary objects differ across communities (this illuminates the contextual nature of the infrastructure).”

Following these two perspectives we set out study how are VAAs used to enable social interaction and to promote power positions in the online discussion preceding the election date. Next, we will introduce our datasets and methods, and then move on to discuss our findings.

Data and Method

Our main data set consists of 10 396 tweets posted in January–April 2015, during the pre-electoral period of the Finnish Parliamentary Election 2015, in which the word “voting advice application” (*vaalikone*, “election machine” in Finnish) was mentioned (both with a hashtag and without a hashtag, see e.g., McKelvey, DiGrazia, & Rojas, 2014). The data was collected by 99Analytics, a Finnish social media tracking company, and was commissioned by the the research group. They have collected pool of Finnish tweeters, supplemented through following Twitter discussions through an API.

We answered our research question regarding the role of VAAs in public with this data using three sequential steps.

1. First, we explored how different actors make references to other users and themes (operationalised as hashtags) using network analysis. As our dataset has been filtered from Twitter API with a keyword, we know that each of these tweets includes some reference to VAAs and thus this network represents the various manners how VAAs

are used to support interaction in Twitter. The network is explored in terms of detecting different clusters and the flows of interaction between them (cf. Ausserhofer & Maireder, 2013; Bruns & Stieglitz, 2014). The network was built by extracting users or hashtags (i.e. disclosed themes) in the sample. A force-directed graph algorithm (ForceAtlas2) and a network analysis software Gephi (Bastian, Heymann, & Jacomy, 2009) was applied to it to display connections between users, other users, and hashtags. The force-directed graph algorithm places frequently recurrent user or hashtag nodes close to one another. Before calculating the network, central hashtag nodes of #vaalikone (VAA) and #vaalit2015 (the general hashtag for the current election) were removed in order to avoid giant components. Lastly, we used a modularity analysis to distinguish different clusters within this network (Blondel, Guillaume, Lambiotte, & Lefebvre, 2008): hence, the network analysis reveals the different emergent communities that exist in the public Twitter discussion concerning VAAs.

2. In the second step, these clusters were used to filter the dataset. To focus on the most central communities and VAAs, only those clusters whose activities account for more than 5 percent share of the total network activities were included in the next stage of analysis. In addition, since tweets with no hashtags or mentions are basically excluded in the network analysis, all tweets that mention the word VAA without a hashtag were included in the analysis to increase the contributions made by citizens. Such procedure is important also to get a broader picture of the studied interaction, as different Twitter users show very different patterns of using platform-specific features such as hashtags and mentions (McKelvey et al., 2014). To distinguish different users, this dataset was combined with another dataset that included a list of the account names of all 2015 candidates on Twitter as well as a large, yet not a comprehensive list of Finnish journalists' Twitter accounts. Finally, all nine included clusters were named according to the users and hashtags with largest degree values in the network, i.e. the most central actors and hashtags (see Table 2).
3. We ended up with a demarcated dataset consisting of 4092 tweets. To get a deeper view into the interactions actually taking place within the communities, interaction in them was scrutinized in terms of their message content through a theory-driven qualitative analysis. Each tweet in this filtered dataset was categorized first, according to the VAA mentioned and second, using a data-driven categorization to chart out different functions and meaning attached to the VAAs. Four major functional categories of tweets emerged in qualitative categorization phase: promotion, sharing results, evaluation and news production.

In addition, to **validate** our findings we use a data set of semi-structured interviews in five organizations (two media corporations, three NGOs). In these interviews we asked experts to elaborate through what kind a process their VAAs were generated and how they see VAAs integrate to their organizations activities. These interviews were transcribed verbatim and analyzed with a data-driven approach using the qualitative analysis software Atlas.TI. In particular, our analysis focused on the ways how interviewees describe the different functions of VAAs in the political process. After combining the codes to larger categories, we ended up with six codes to categorize the functions the interviewees attached

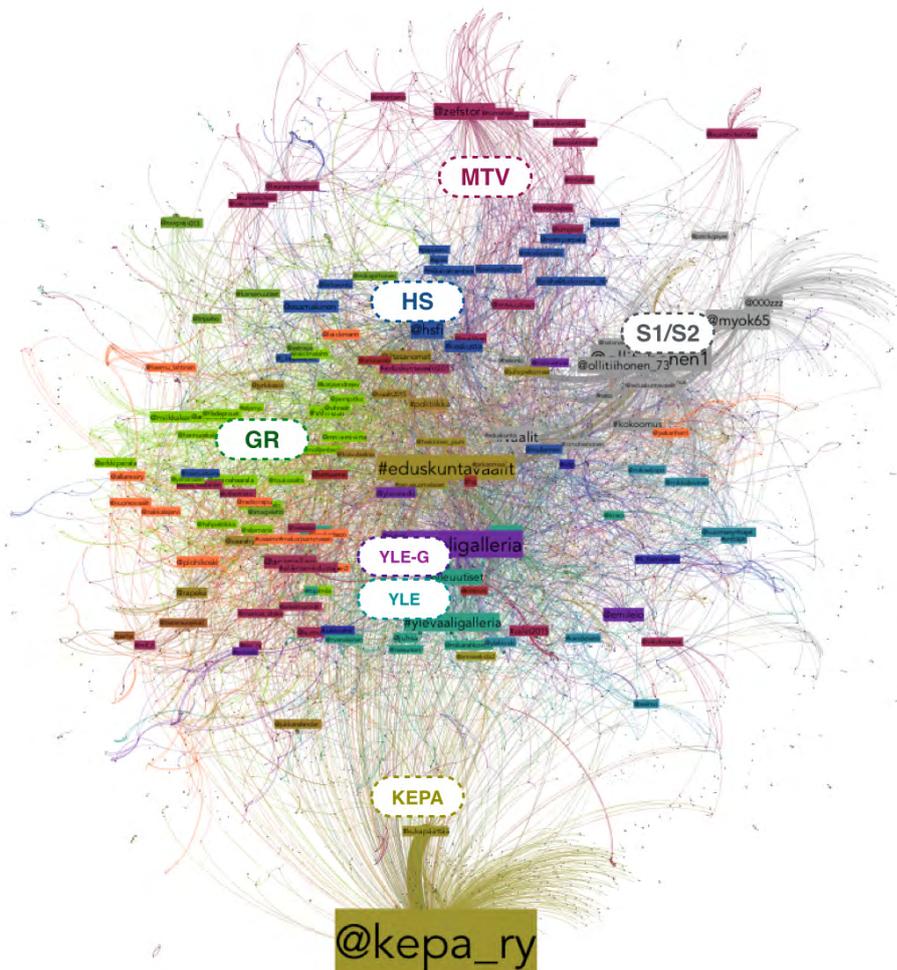


Figure 1. Network of 10 396 tweets mentioning the word “voting advice application”, clusters marked as GR = Green party, HS = Helsingin Sanomat media, S = spammer, KEPA = Kepa NGO, MTV = media, YLE = media, YLE-G = media election gallery

to VAAs: campaigning tool, decision making aid, educating and voting encouragement, news making tool, and watchdog. The notions of interviewees are briefly discussed when they connect to our observations in the Twitter data.

Analysis

Regarding the role of VAAs in the political discussion, the network analysis shows several different clusters or communities emerge in Twitter discussions on voting advice applications (see Figure 1, modularity value: 0.717). The total number of communities is 736, but only a few of them attract large amounts of users. The largest clusters are mostly formed around certain VAAs: four communities around the largest media organizations VAA’s, and one community around an NGO VAA. Each of these communities consists of tweeters with different backgrounds: candidates, journalists, and citizens (see Table 1) The NGO VAA community, clustered around user @kepa_ry in Figure 1, remains very separate

Table 1

User type composition in different clusters in the filtered Twitter data set (n=4092).

Cluster	User type					Total
	Advocacy	Journalist	Public Figure	Candidate	Other	
KEPA	526	3	1	158	128	816
N/H		2		62	641	705
GR	2	13	6	300	322	643
YLE		10	3	134	480	627
HS		29	4	138	454	624
S2				15	586	600
S1		12	1	52	519	584
MTV	3	39	24	67	424	557
YLE-G		16	3	73	151	243
Total	531	124	42	999	3705	5401

from other clusters, and the majority of tweets comes from the particular user. It mainly consists of tweets sent by the NGO to all candidates in order to encourage them to answer their Economic Policy VAA (Talouspoliittinen VAA). The communities that accounted for 5% or larger shares of the total datasets are marked in (see Figure 1) as well as included and named in Table 2, including the group of non-hashtag tweets.

In addition to the VAA clusters we observed four propagandist accounts that create their own two communities (marked gray in Figure 1). Counted together they account for over 10 % of the network. These accounts are most likely not bots, but information trolls who tweet to promote a certain (political) agenda and use all popular hashtags to spread their word. In a more popular language they could be referred to as spammers or trolls. In addition, a community consisting mostly of the Green Party candidates emerges separate of all VAAs. This is probably explained by their extremely active social media campaign during the election (cf. Marttila, Laaksonen, Kekkonen, Tuokko, & Nelimarkka, 2016), and recurrent practice of mentioning other candidates from their party. In general, tweeting activity is very accumulated. For the twenty most active accounts (see Table 3).

In Finland, VAAs are mostly portrayed as a media-led activity, and traditionally VAAs have been the product of media companies. However, notable for these elections was that tens of different NGOs and other actors also published their own VAAs. In total 32 different VAAs are mentioned in our Twitter data (see Table 2). Most often mentioned VAA, and hence also discussed topic, is the VAA of Yleisradio, the national broadcasting company of Finland. The tweets from candidates imply that there exist a strong pressure to answer at least all the biggest VAAs – they have clearly become an established practice of campaigning. However, given the large amount of different VAAs, the answering process is also criticized. In practice, then, there is not space nor demand for all the VAAs.

Regarding the role of VAAs, four major functional categories of tweets emerged in qualitative categorization phase: promotion, sharing results, evaluation and news production. Next, we will discuss our observations on Twitter conversations by focusing on these categories.

Table 2

Mentions of different VAAs in the 4092 tweets dataset. is VAA in Finnish.

VAA	Published by	Total
Yleisradio	media	951
Helsingin Sanomat	media	658
Talouspoliittinen vaalikone	NGO	591
MTV	media	262
Iltta-Sanomat	media	69
Liikunnan ja urheilun vaalikone	NGO	57
Auto- ja liikennealan vaalikone	interest group	40
Nuorten vaalikone	NGO	36
Keskisuomalainen konserni	media	34
Lännen median vaalikone	media	30
Seiska	media	27
Iltalehti	media	26
Maaseudun tulevaisuus	media	19
Kristillinen vaalikone	religion	14
Eläinpoliittinen vaalikone	NGO	13
Aamulehti	media	13
Karjalainen	media	11
Teosto	interest group	10
Lasten ja perheiden vaalikone (MLL)	NGO	9
Nukkuvien vaalikone	citizens	8
Avoin vaalikone	citizens	8
Supervaalikone	citizens	5
Huonon äidin vaalikone	blog	4
Kaakon viestinnän vaalikone	media	3
Suomen yrittäjien vaalikone	interest group	2
Työttömien vaalikone	interest group	2
Itä-Savo/Länsi-Savo	media	2
Metsästäjä-lehti	media	2
Metsälehti	media	2
Vammaisen vaalikone	NGO	1
Yksinkertainen vaalikone	blog	1
Kasper Diem	blog	1
Total		2908

Table 3

Most active tweeters in the VAA dataset.

User	Type	Retweets	Original tweets	Tweets total
kepa_ry	NGO	4	522	526
OlliTiihonen1	propagandist		334	334
MYOK65	propagandist	9	227	236
OlliTiihonen_73	propagandist	2	207	209
MarkoEkqvist	candidate		136	136
000zzz	propagandist	55	27	82
zefstories	company	56	17	73
UUTISET247	media		64	64
ScaniaTimpak	candidate		61	61
Juggiss	citizen	1	52	53
heikkinen_jouni	citizen	43	1	44
UudenmaanV	party		32	32
sumuvuori	candidate	11	18	29
testibotti	bot		29	29
rapeka	citizen	29		29
animaliary	NGO	4	25	29
MiikkaKeranen	candidate	7	20	27
kivxe	candidate		26	26
vskokoomus	party (local)	11	13	24
VesaSaa	citizen	21	2	23

Promotion

Tweets labeled as promotion were mostly tweets from organizational actors promoting VAAs as a tool or tweets from candidates promoting their own answers in a certain VAA, hence using the VAA platforms as campaigning tools. Firstly, media organizations are promoting their VAAs both through their organizational accounts as well as by individual reporters. In these tweets VAAs are offered as neutral tools to help voters find their candidate. A more practical goal, as described also by our interviewees, is that VAAs are an excellent tool to bring visitors to the media website.

”Check who to vote! Our VAA is open – here you will find a good candidate! LINK” (tweet from a media CR, Mar 12 2015)

”It is extremely important for the media, because it brings readers in, users, and through the VAA we can get them interested in other media content as well.” (15:27, media)

The interviewed media representatives also attach this purpose to the democratic potential of the media and the possibilities to educate citizens. In the interviews the media organizations also describe how the questions in VAAs are strategically selected in order to promote selected themes and to cover as many subgroups of the society as possible.

”That function also apparent for media, that if you think about ourselves, through that we can also take up some issues, topics to the discussions, we

get people to our own sites, we can use VAAs to promote politics and people's knowledge of politics and democracy and we can do our own good journalistic content from topics that people are interested in during the election." (I5:28, media)

Observing the amount of different VAAs published by other than media actors it seems that in the 2015 elections VAAs have emerged as a legitimate part of political campaigns of different interest groups. From the perspective of Twitter discussion and communities however, these VAAs remain marginal. Nevertheless, for some voters with specialized interest specialized VAAs serve a better purpose than media VAAs:

Finally I know who to vote, results from the sports and training VAA confirmed my choice. #electoraldistrictofoulu (tweet from a citizen)

The promotional practices are especially well shown in the community of KEPA. Kepa, a non-governmental organization that works as the umbrella organisation for Finnish civil society organisations who work with development cooperation or other global affairs, is the most active tweeter in the whole dataset with 524 unique tweets. A closer look to the tweets reveals that Kepa individually addressed each of the candidates and challenged them to submit their responses to their VAA. These interactions, however, did not lead to any discussions that would be visible in our data.

The promotional perspective is well recognized and admitted by our interviewees, who see the agenda-building function of VAAs as a central tool of campaigning: of influencing the political discussions, and moreover, as a means to directly contact the politicians and to present their views.

"It was a central part of everything else, so that we had a common election campaign of which the VAA was one part, then we had the voting agreement. Those were both communicated at the same time. We made background materials regarding our election themes, so that candidates could get more information from us and so on." (1:4, NGO)

"Well those push for one issue only. Most of them are only VAAs that stand behind one theme only. So you can also use these as a sort of propaganda tool." (I4:28, media, talking about NGO VAAs)

VAAs, thus, are used as promotional vehicles for different media and NGOs, they are purposeful devices for agenda-building, influencing, and persuasion. Still, looking at the content of promotional tweets, they are presented as neutral, "helpful" platforms that aid the voters to find a candidate that matches their preferences.

Sharing results

Sharing the results given by VAA was a very prominent practice in our Twitter data. Recently, there have been discussion related to possible problems of sharing one's voting decisions in social media (Bond et al., 2012; Taylor, 2015; Tombrakos, 2016). VAAs, quite the contrary, are encouraging such acts and offer direct buttons for users to share list of most

suitable candidates. For example with the two biggest Finnish VAAs, Helsingin Sanomat and Yleisradio, users were given the opportunity to share both the lists of candidates and the parties recommended by the platform. Further, one of these VAAs also generated ready-made tweet suggestions where the Twitter user names of the candidates were automatically included. Through this they also contribute in generating interaction between the voters and the candidates as well as setting the Twitter agenda.

Many tweeters, however, do not stick with the proposed formulation of the tweet but add their own comments on the results given and express either satisfaction or surprise.

"I played both HS and YLE VAAs. Both offered @party candidate Name Surname. Seems like a good option. #VAA" (tweet from a citizen 11 Mar 2015)

"VAA and the party with most different value propositions than mine is True Finns :D How am I not surprised :D" (tweet from a citizen 16 Feb 2015)

Even candidates share results from VAAs. Politicians use VAAs to test if they still agree with their own answers filled in a few months earlier. Further, they also use the public versions to create campaign messages and to position themselves politically.

"Yleisradio #VAA data confirms: I am the most liberal candidate in the Uusimaa district. For liberal Finland: candidate n.o. 108 LINK" (candidate, April 13, 2015)

"Now the HS VAA is open ja I did manage to give same answers than in my answers earlier... LINK" (candidate)

Through this practice VAAs emerge as identity building platforms: tools to first, test whether one's own political opinions correspond with the assumed party alignment; second, an indirect way to share one's political opinions to their followers and third, as a means to identify publicly as a person interested in politics.

Evaluation

Third prominent category of tweets was evaluation: different evaluative statements regarding VAAs, their questions and their functionality. There are three central themes evaluations and criticism are directed to.

First, VAA users evaluate the technology as such, the technical issues and general functionality of the VAA. From a technical perspective attention is pointed to things such as different implementations of the likert scale or different ways to show the results. Some commenters discuss the trustworthiness of VAAs and they ways how the recommendation algorithms actually work. All in all, the evaluative tweets are very much intertwined with the political views of the tweeters. VAAs are enacted as tool to aid in decision-making. However, for many there seemingly exists a set of results the VAA should be able to point them to. Hence, the VAA as an technical artefact is either right or wrong – it either succeeds in its knowledge transfer task or it fails:

"@hsfi #VAA offered a good test. Worked well. I got the "right results"."
(tweet from a citizen)

"Another VAA offered only National Coalition Party. Humm. Which one to believe – well neither, VAAs don't tell anything but are wrong." (tweet from a citizen 10 Apr 2015)

"Replied to two #VAA questions. Sanoma VAA gave a totally different results than earlier. Now more "normal"." (citizen)

Second, tweeters criticize questions that are regarded useless or stupid, or themes that are missing from VAAs. For example, one of the VAAs asked whether extraterrestrial life exists, and another had a question about the superiority of cats vs. dogs. Both questions elicited both critical comments and humorous responses. The pet question received a lot of comments already from the candidates when they were answering the VAA in February, and again from voters when the VAA was opened in March. Hence, it also generated a lot of buzz and promotion for the VAA, and it can be assumed that to some users with more interest in human interest news such questions might be a positive attraction.

"@user The HS VAA took up more important questions than culture. Such as are cats more intelligent than dogs and should one tell if one's unfaithful." (tweet from a candidate Feb 24, 2015)

Third, evaluations were targeted towards the candidates or parties *through* the technological artefact. Particularly of interest for tweeters was the election gallery ("vaaligalleria") of Yleisradio, i.e. videos shoot of each candidate and published with their VAA. The videos, presented aside the VAA application, elicited a large amount of evaluative tweets, where people often are making fun of the candidates. In fact, some of the videos started circulating as internet memes. This explains why the gallery emerged as the most discussed topic in the overall data.

"Evidence that such people actually exist. We disagree on every single thing. LINK VAA" (citizen, Feb 16 2015)

"@yleuutiset #electiongallery is apart from its entertainment value also a fabulous service for voters. LINK VAA" (citizen, March 12 2015)

"If one can draw any conclusions from the view counts of the @YLE videos, it will be a smashing victory for The Pirates and Change 2011. LINK VAA" (citizen March 10 2015)

A typical test made for a VAA when they are released is clicking "No opinion" to each of the questions and checking which party is then recommended. This allows a detour to express one's political alignment through sarcastic criticism. Also, the tweets reporting the results express a general mistrust in politics:

"Just for fun I answered each question "no opinion" and here's the result: #VAA #centreparty LINK" (tweet from a citizen)

"#VAA shows: #centreparty approaches the elections with "no opinion" policy. Again #Vanhanen and #Väyrynen in the government. What changes?"

Such critical tweets, where the VAA is used as a vehicle to express their political opinions regarding certain candidates or parties through criticism, are almost the only notions of political thematic discussions in the data. They, however, can be qualified as examples of semantic translation processes facilitated by the VAAs, who act as boundary object bridging the individual political views to the public realm.

News production

For media organizations VAAs appear as a powerful tool to spin the news cycle during the electoral period. First, the media generates data journalism based on the candidate answers. Second, news are created based on the second dataset, the the answers given by voters. Our dataset contains several examples of tweets linking to news generated using the VAA data, from reporting the most controversial VAA questions to pointing out the most NATO critical candidate.

"Answers taken from our VAA have been used in tens of articles, both in digital and in print. And after the election the opinions of the selected candidates have been widely presented. We've been sort of building our VAA and results service together." (9:15, media)

Third, the two biggest media organizations and a few smaller organizations chose to release their datasets in the public domain for anybody interested to use. This generated several spin-off analysis of the data and brought more visibility to the VAA.¹

"A 5 minute statistical analysis of HS.fi VAA data. Respondents explained using 2 dimensions. @reporter LINK" (citizen)

"HS.fi #VAA data produces thus a familiar value map even with a pure statistical analysis. Very good data!" (citizen)

This illuminates two forms of the VAA as a boundary object. First, the VAA itself as a device that translates political knowledge from one party to another, but second, on a more technical level, the VAA data becomes a boundary object between coder communities, citizen activists and journalists as it is released in the public domain. Such collaboration, however, still remains a rather small scale activity.

Discussion and Conclusion

In this paper we started from the premise that Voting Advice Applications are boundary objects that enable knowledge transmission, interaction and cooperation between candidates, voters, and the media during the campaigning period. Based on our analysis on the tweets concerning VAAs we conclude that VAAs are boundary objects that on an ideal level are a standardized semantic method to translate voter opinions to political views and voting decisions. From the perspective of the voters they appear as boundary devices that able them to both test and express their political alignment, hence, they are resources used

¹Major Finnish media sites, such as YLE and Helsingin Sanomat, have during recent years provided the candidate answers as open data for civic hackers to build on-top of this data source.

to construct political identities (cf. Gal et al., 2004). In addition, through the interactive affordances built into most of these systems, they act as tools to promote or criticize candidates, and promote citizen-candidate interaction on social media platforms.

Further, our analysis showed how in different social communities VAAs play distinct roles. The network analysis shows how clusters of Twitter users emerge around different VAAs and each of these emergent communities consist of tweeters, who represent different existing communities: voters, politicians, journalists, organizational actors. Thus, in the light of Twitter discussion VAAs work as boundary objects, interfaces that reside between different communities and that enable the transfer of knowledge and views across those boundaries. The nature of this knowledge, however, to a large extent does not correspond to the democratic ideals often attached to VAAs. Thematic political discussions are very marginal in the Twitter discussion. Instead, most of the discussions move on a meta-level and concern the VAAs themselves, the results they give, or politicians and candidates on a general level. Hence, VAA does act as a boundary object that offers a platform to perform a transfer of political knowledge, to express one's political views. Through this practice VAAs emerge as identity building platforms, tools to test and compare voters' own political perspectives and to share their political views publicly. This is a semantic translation process (Carlile, 2004) facilitated by the VAAs, who act as boundary objects bridging the individual political views to the public realm.

Most of the ways how people cross this boundary of coming to public political realm is by referring to their own VAA results and through them, mentioning politicians or parties. Therefore the knowledge transfers encouraged by VAAs (e.g., the practice of adding candidates names to the suggested tweets) seem to mostly support the trend of personification of politics (e.g., Karvonen, 2009). Conversations on actual political topics are not — at least not directly — inspired by the VAA. Hence, VAAs do not work as pragmatic boundary objects (Carlile, 2002) that would enable common learning and knowledge-building through negotiation and collaboration. Voters, however, and their subsequent discussions online and offline of course can still be affected by the questions they are presented in the VAAs. In addition, we can speculate that for the tweeting citizens, expressing one's political views through a candidate is a safer, indirect way of making political claims in public. In such a case, also the candidate can be regarded as a boundary object.

A different knowledge transfer pattern is observed in the network cluster of Kepa. The distribution of contributions in this cluster as well as the content of the tweets imply that the voting advice applications administered by NGOs or advocacy groups do not play a similar role as boundary objects as the VAAs of the media do. They do not produce interaction among different communities or encourage voters to tweet about their themes. Instead, they do work as a boundary object that allows the transmission of knowledge from the advocacy organization to candidates or to the publics. Kepa created a large community within the network, but this is not a reciprocal community: all candidates who have no other tweets but who are mentioned by Kepa end up in this cluster. Hence no social interaction or identity building can be traced to take place within this community.

In particular, our analysis reveals the political and purposeful nature of VAAs as boundary objects (cf. Huvila, 2011): they are used by both NGOs and by media as promotional vehicles, as devices for agenda-building, influencing, and persuasion and as a tool to lure visitors to the organizations' sites. This perspective is especially highlighted in the

clusters around the VAAs of NGOs and other advocacy organizations. However, even if not as emphasized, the practice of influencing also becomes visible in the ways how the media uses VAAs, and is particularly present in the interviews. The hopes of influencing public discussion are related not only to the competitive aspects of the media system (to get more visitors and to generate more news) but also to the ideology of journalism as the promoter and supporting force for democracy and citizenship.

From the perspective of algorithm and platform studies VAAs are performative platforms, who not only facilitate the voter's decision-making but also use technological affordances to shape this activity more public, and who encourage interaction between voters and candidates, and act as agenda-building devices for different organizations. Further, from the viewpoint of media organizations an additional performative function relates to the business models of online media, where VAAs function as lures for visitors. Hence, following the conceptualization of van Dijck (2013), VAAs emerge as platforms as multilayered microsystems of both techno-cultural constructs and socioeconomic structures. The social role of VAAs, thus, emerges only as distributed and embedded in a wider social, economical and cultural context. A VAA may only play its aforementioned role due to its entanglement with different technologies, identities and political ideologies which are embedded in a larger configuration that makes up the elections (cf. Neyland & Möllers, 2016). In other words, any agency that VAA has and makes possible is distributed, and is relevant only as long as the connections between the entities making up the elections are upheld. As Neyland and Möllers (2016, p. 9) put it: "Here again it becomes clear that anything that algorithms were able to 'do' was situated in continual reconfigurations of the entities involved, and that the agency of algorithms thus needs to be understood as distributed."

As a final note, our study supports several changes in the political media landscape in which VAA's play a role. Most notably, VAA's can be seen to drive the personalization of politics (e.g., Adam & Maier, 2010; Bennett, 2012; Enli & Skogerbø, 2013; Karvonen, 2009; Mcallister, 2009) and campaigning, as voters are given more opportunities to disclose and promote their own political opinions and favourite candidates. This also represents a change in which elections are becoming less private than before. In addition, VAA's can serve a democratic function in that they make the knowledge sharing between politicians and citizens easier and possible without a direct contact. By the aid of digital media such as Twitter they also encourage voters to interact with the candidates and in the best case, to bring about political conversations in the digital public sphere. As a limitation, however, it should be noted that the Finnish Twitter user base is rather biased and known to consist of politically active people instead of average Internet users. Figuratively the service has been entitles as the "elite media" (Vainikka & Huhtamäki, 2014). Therefore, we need to keep in mind these results reflect the use patterns of the digitally and probably also politically active minority of the Finnish voters.

References

- Adam, S., & Maier, M. (2010). Personalization of Politics. A Critical Review and Agenda for Research. In *Communication yearbook* (pp. 213–257).
- Alvarez, R. M., Levin, I., Trechsel, A. H., & Vassil, K. (2013, 12). Voting Advice Applications: How Useful and For Whom? *Journal of Information Technology & Politics*(January 2014), 131213092326006.

- Ausserhofer, J., & Maireder, A. (2013). NATIONAL POLITICS ON TWITTER: Structures and topics of a networked public sphere. *Information Communication & Society*, 16(3), 291–314.
- Bastian, M., Heymann, S., & Jacomy, M. (2009). Gephi: An Open Source Software for Exploring and Manipulating Networks. *Third International AAAI Conference on Weblogs and Social Media*, 361–362.
- Bennett, W. L. (2012). The Personalization of Politics: Political Identity, Social Media, and Changing Patterns of Participation. *The ANNALS of the American Academy of Political and Social Science*, 644(1), 20–39.
- Blondel, V. D., Guillaume, J.-L., Lambiotte, R., & Lefebvre, E. (2008). Fast unfolding of communities in large networks. *Journal of Statistical Mechanics: Theory and Experiment*, 10008(10), 6.
- Bond, R. M., Fariss, C. J., Jones, J. J., Kramer, A. D. I., Marlow, C., Settle, J. E., & Fowler, J. H. (2012). *A 61-million-person experiment in social influence and political mobilization* (Vol. 489).
- Bowker, G. C., & Star, S. L. (2000). *Sorting Things Out Classification and Its Consequences*. Cambridge, MA: MIT Press.
- Bruns, A., & Stieglitz, S. (2014). Metrics for Understanding Communication on Twitter. In K. Weller, A. Bruns, J. Burgess, M. Mahrt, & C. Puschmann (Eds.), *Twitter and society* (pp. 69–82). New York: Peter Lang.
- Carlile, P. R. (2002, 8). A Pragmatic View of Knowledge and Boundaries: Boundary Objects in New Product Development. *Organization Science*, 13(4), 442–455.
- Carlile, P. R. (2004, 10). Transferring, Translating, and Transforming: An Integrative Framework for Managing Knowledge Across Boundaries. *Organization Science*, 15(5), 555–568.
- Enli, G. S., & Skogerbø, E. (2013). Personalized Campaigns in Party-Centred Politics. *Information, Communication & Society*, 16(5), 757–774.
- Fivaz, J., & Nadig, G. (2010, 12). Impact of Voting Advice Applications (VAAs) on Voter Turnout and Their Potential Use for Civic Education. *Policy & Internet*, 2(4), 167.
- Fleischmann, K. R. (2006, 4). Boundary Objects with Agency: A Method for Studying the Design–Use Interface. *The Information Society*, 22(2), 77–87.
- Gal, U., Yoo, Y., & Boland, R. J. (2004). The dynamics of boundary objects, social infrastructures and social identities. *Sprouts: Working Papers on Information Environments, Systems and Organizations*, 4(4), 193–206.
- Garrety, K., & Badham, R. (2000). The politics of socio-technical intervention: An interactionist view. *Technology Analysis & Strategic Management*, 12(1), 103–118.
- Garzia, D. (2010). The effects of VAAs on Users' Voting Behavior: An Overview. In L. Cedroni & D. Garzia (Eds.), *Voting advice applications in europe. the state of the art*. (pp. 13–34). Napoli: ScriptaWeb.
- Gemenis, K., & Ham, C. (2014). Comparing methods for estimating parties' positions in Voting Advice Applications. In D. Garzia & S. Marschall (Eds.), *Matching votes with parties and candidates. voting advice applications in a comparative perspective* (pp. 33–48). United Kingdom: ECPR Press.
- Gillespie, T. (2010). The Politics of "Platforms". *New Media & Society*, 12(3), 347–364.
- Gillespie, T. (2012). The relevance of algorithms. In *Media technologies: Essays on communication, materiality, and society* (pp. 167–194).
- Gillespie, T. (2014). The relevance of algorithms. In T. Gillespie, P. J. Boczkowski, & K. Foot (Eds.), *Media technologies: Essays on communication, materiality, and society* (pp. 167–194).
- Gillespie, T. (2015). Platforms Intervene. *Social Media + Society*, 1(1).
- Hands, J. (2013). INTRODUCTION : POLITICS , POWER AND 'Platformivity'. *Culture Machine*, 14, 1–9.
- Helmond, A. (2015). The Platformization of the Web : Making Web Data Platform Ready. *Social Media + Society*, 1(July-December 2015), 1–11.

- Huvila, I. (2011). The Politics of Boundary Objects : Hegemonic. , *62*(2007), 2528–2539.
- Karsten, H., Lyytinen, K., Hurskainen, M., & Koskelainen, T. (2001). Crossing boundaries and conscripting participation: representing and integrating knowledge in a paper machinery project. *European Journal of Information Systems*, *10*(2), 89–98.
- Karvonen, L. (2009). *The Personalisation of Politics: A Study of Parliamentary Democracies*. Colchester: ECPR Press.
- Kitchin, R. (2014). Thinking critically about and researching algorithms. *The Programmable City Working Paper 5*, *4462*(October), 1–29.
- Ladner, A., & Pianzola, J. (2010). Do Voting Advice Applications Have an Effect on Electoral Participation and Voter Turnout ? Evidence from the 2007 Swiss Federal Elections. *Ifip International Federation For Information Processing*, 211–224.
- Latour, B. (1996). On interobjectivity. *Mind, culture, and activity*, *3*(4), 228–245.
- Lievrouw, L. A. (2014). Materiality and Media in Communication and Technology Studies: An Unfinished Project. In *Media technologies: Essays on communication, materiality, and society* (pp. 21–51). Cambridge MA and London UK: MIT Press.
- MacKenzie, D. A., & Wajcman, J. (1999). The social shaping of technology. In D. A. MacKenzie & J. Wajcman (Eds.), *Introductory essay: The social shaping of technology* (2nd ed., pp. 3–27). Buckingham, UK: Open University Press.
- Markham, A. N. (2016). Ethnography in the digital era: From fields to flow, descriptions to interventions. In N. Denzin & Y. Lincoln (Eds.), *The sage handbook of qualitative research, 5th edition* (5th ed.). Thousand Oaks, CA: Sage Publications.
- Marttila, M., Laaksonen, S.-M., Kekkonen, A., Tuokko, M., & Nelimarkka, M. (2016). Digitaalinen vaalitelta: Twitter politiikan areenana eduskuntavaaleissa 2015. In K. Grönlund & H. Wass (Eds.), *Eduskuntavaalitutkimus 2015: Poliittisen osallistumisen eriytyminen*. Helsinki: Oikeusministeriö / Ministry of Justice.
- McAllister, I. (2009). The Personalization of Politics. In *The oxford handbook of political behavior*.
- McKelvey, K., DiGrazia, J., & Rojas, F. (2014). Twitter publics: how online political communities signaled electoral outcomes in the 2010 US house election. *Information, Communication & Society*, *17*(4), 436–450.
- Mendez, F. (2014). What’s behind a matching algorithm: A critical assessment of how Voting Advice Applications produce voting recommendations. In S. Marschall & D. Garzia (Eds.), *Matching voters with parties and candidates* (pp. 49–66). Colchester: ECPR Press.
- Neyland, D., & Möllers, N. (2016). Algorithmic IF ... THEN rules and the conditions and consequences of power. *Information, Communication & Society*, *4462*(May), 1–18.
- Nissenbaum, H. (2005). Values in Technical Design. In C. Mitcham (Ed.), *Encyclopedia of science, technology, and ethics* (p. lxvi-lxx). New York: MacMillan.
- Official Statistics of Finland. (2015). *3. Vaalikoneet suosittuja vuoden 2015 eduskuntavaaleissa*. Helsinki: Tilastokeskus.
- Orlikowski, W. J. (2002). Knowing in practice: Enacting a collective capability in distributed organizing. *Organization science*, *13*(3), 249–273.
- Oswick, C., & Robertson, M. (2009, 6). Boundary Objects Reconsidered: from Bridges and Anchors to Barricades and Mazes. *Journal of Change Management*, *9*(2), 179–193.
- 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.
- 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.
- Taylor, A. (2015, 5). *British people are sharing how they voted on social media — and it could get them in trouble - The Washington Post*.
- Tombrakos, J. (2016, 3). *To Share or Not to Share: Social Media and Decision 2016*.
- Vainikka, E., & Huhtamäki, J. (2014). Tviittien politiikkaa – poliittisen viestinnän sisäpiirit Twit-

- terissä. *Media & viestintä*, 165–183.
- van de Pol, J., Holleman, B., Kamoen, N., Krouwel, A., & de Vreese, C. (2014). Beyond Young, Highly Educated Males: A Typology of VAA Users. *Journal of Information Technology & Politics*, 11, 397–411.
- van Dijck, J. (2013). *The Culture of Connectivity: A Critical History of Social Media*. Oxford: Oxford University Press.
- Walgrave, S., Soroka, S., & Nuytemans, M. (2008). The Mass Media 's Political Parliament , and Government. *Comparative Political Studies*, 41(6), 814–836.
- Wenger, E. (1998). *Communities of practice : Learning, meaning and identity*. New York: Cambridge University Press.
- Winner, L. (1980). Do artifacts have politics? *Daedalus, Modern Technology: Problem or Opportunity*, 109(1), 121–136.
- Winner, L. (1985). Do artifacts have politics? In D. MacKenzie & J. Wajcman (Eds.), *The social shaping of technology* (pp. 26–38). Buckingham: Open University Press.