Deliberation and Decision Making Online: Evaluating Platform Design

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By

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Abstract

This thesis explores the potential of ICT and online communication to deepen democracy and support large scale online deliberation. It draws together the most promising current practices in online deliberation, presenting a theoretical and empirical exploration of innovative online deliberation platforms. ICT and online communication is increasingly sophisticated and ubiquitous in public life yet its democratic impact is ambiguous. Online engagement is characterised by low quality, disorganised deliberation. Experimental platforms have emerged which utilise novel design, argument visualisation, and machine learning to support large scale deliberation. The fields of informal logic and collective intelligence have been influential on the developments of these platforms. But the platforms and the perspectives that influence them have been neglected by wider research into online deliberation. The thesis seeks to address the question: to what extent can developments in informal logic and collective intelligence address problems in the theory and practice of online deliberation? The theoretical analysis explores the insights that emerge from a comparison of the approaches of informal logic, collective intelligence and deliberative democratic theory. Models of argumentation and reasonableness from collective intelligence and informal logic reveal ways in which deliberative theory is under-defined, as well as providing techniques to structure, support and analyse deliberative processes. The empirical element draws together and analyses the experiences of online deliberation practitioners to provide a deeper understanding of the opportunities and challenges ICT presents for democracy. These novel technologies indicate how challenges associated with knowledge coordination, participant behaviour and information overload can be ameliorated. Yet analysis of the platforms also identifies resourcing, recruitment, collective attention and the application of AI as barriers to developing effective online deliberative spaces.

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Declaration

I declare that all the material contained in this thesis is my own work.

Introduction

Advances in ICT offer new opportunities to support large scale public deliberation. Despite this potential, research has highlighted various challenges facing current online communication, which inhibit efforts to realise high quality, large scale deliberation online (Davies and Chandler 2011). Online communication has been characterised as disorganised, preventing citizens or governments deriving meaningful information from the vast amount of potential knowledge available. Research has observed how citizen engagement, capacity and behaviour often falls short of the standards associated with high quality deliberation. Challenges of polarisation, trolling and a failure to engage respectfully with opposing viewpoints have been cited as common issues in online communication (Sunstein 2002, Manin and Lev-On 2009). This has led to a growing consensus that the open internet is not conducive to high quality deliberation (Davies and Chandler 2011). A range of innovative and experimental platforms have sought to address these issues and realise the democratic potential of technology and online communication. These platforms draw on techniques and perspectives found in the fields of informal logic and collective intelligence, and utilise novel design choices, argument visualisation techniques and machine learning to support large-scale deliberation.

Experimental online deliberation platforms, and the theories that influence them, have received little attention in online deliberation literature (Pingree 2009). This thesis seeks to address this by exploring the following research question: to what extent can developments in informal logic and collective intelligence address problems in the theory and practice of online deliberation? The thesis offers a theoretical discussion exploring the relationship between deliberative theory, informal logic and collective intelligence. These approaches share many common objectives and areas of interest, yet there has been little communication between them or research exploring the potential insights such comparisons may offer (Curato 2004, Kock 2007). The thesis then provides an empirical analysis of exemplary cases

of online deliberation in practice. These cases explore platforms that have utilised novel design choices and demonstrated a capacity to address the challenges of, and support, large scale deliberation. The empirical analysis explores the role of design and the insights these platforms provide to our understanding of the opportunities and challenges technology presents for democracy.

The "deliberative turn" in democratic theory has positioned deliberative democracy as the primary approach to understanding the legitimation crisis (Habermas 1973) and other challenges encountered in contemporary democracies (Bachtiger et al 2010). Deliberative democracy can be understood as an approach to democratic legitimacy that emphasises accountability through reason giving and citizen participation in deliberative decision making (Dryzek 2010, Gutman and Thomspon 1996). Cavalier et al (2009) describe deliberation as "informed, well-structured debate with the capacity to influence policy" (Cavalier et al 2009:71). Gutman and Thompson (2008) credit Habermas as a major influence on deliberative thinking, alongside the contributions of Manin (1987) and Cohen (1989). Deliberative democracy can be understood as a response to perceived limitations in earlier democratic thought, offering a more just way of dealing with pluralism than aggregative models of democracy (Chambers 2003), as well as a way of deepening democracy beyond liberal individualist conceptions that place emphasis on rights, and elitist concepts of democracy advocated by Schumpeter and other "democratic realists" (Manin 1987, Macedo 1999, Dryzek 2002).

Key concepts in deliberative theory include Habermas' (1962) account of the public sphere, a space in which individuals can engage as a public in reflective-critical discourse to resolve social problems. Habermas has further sought to account for the procedures and regulative norms that constitute genuinely deliberative communication. Habermas' theory proceeds from an account of universal pragmatics, and the suggestion that each speech act raises and presupposes validity claims (Habermas 1981a). Discourse ethics describes an account of the regulative ideals that are relevant to understanding democratic legitimacy on the occasion that communication breaks down or a decision has to be made. This includes the

requirement that the deliberation process be open and inclusive, that no argument or participant is suppressed by internal or external coercion, that no force other than the force of the better argument is exerted on participants, that participants are free to introduce any claim and challenge the claims of others, but that crucially participants are open to other arguments, to changing and refining their preferences, and committed to the pursuit of the common good and agreement (Habermas 1991). Advocates of deliberative theory attribute a number of personal, social and democratic goods to deliberative processes. The deliberative process is claimed to benefit individual's critical capacity, knowledge and understanding of their own preferences (Rosenberg 2005:220, Gutman and Thompson 1996). Deliberation is expected to produce social benefits, such as a greater understanding of others, leading to more empathetic, tolerant and humanising engagement with those of different views (Mendleberg 2002, Cohen 1989, Fishkin 1995). Citizens will have greater faith in the political process; feel greater efficacy and willingness to participate in future public decisions (Rosenberg 2005, Mendleberg 2002). The decisions made will be better informed and have greater legitimacy following the deliberative process, and produce a more cohesive society (Mendleberg 2002, Cohen 1989, Fishkin 1995).

Increased interest in deliberative theory has led to an "empirical turn", producing attempts to apply theory to practice and explore theoretical claims empirically (Dryzek 2010). This increased attention and empirical exploration of deliberative democracy has helped to highlight the diversity of thinking within the field and potential challenges for the approach (Hangartner et al 2007, Naurin 2007). Macedo (1999) warns against talking of deliberative democracy in monolithic terms, and theorists differ in their approaches to the conceptual criteria, evaluative standards and empirical conditions of good deliberation (Thompson 2008). Key debates concern the role of story-telling and emotion relative to traditional argumentation, and the position of respect, sincerity and truthfulness in deliberation (see Markovitz 2004, Mansbridge and Flaster 2005, Young 1996, Neblo 2007, Morrell 2010). These debates are driven by a concern with exclusion, and the anxiety that rules and norms developed to preserve inclusive debate may be inadvertently applied in ways that

discipline, exclude voices and privilege communicative styles and cultures of particular groups (Young 1996). Reflecting on empirical applications of deliberative theory, Bachtiger (2010) highlights the problem of moving from counter-factual ideal criteria to talking about "good", "bad" or "good enough" deliberation. Neblo describes deliberation as having an "evaluative-descriptive quality" such that very bad deliberation might not be deliberation at all (Neblo 2007:529). The issue of evaluative criteria raises a tension between avoiding a tautologous definition of deliberation on the one hand and what Steiner (2008) describes as "concept stretching" of deliberation on the other. Kies (2010) and Naurin (2007) discuss the challenges in empirically identifying and operationalising criteria such as sincerity, respect, and good justifications.

Interest in the empirical application of deliberative theory has highlighted a number of critiques and challenges. A common concern, often drawing on research in cognitive psychology, questions whether citizens are able and inclined to engage in high quality deliberation (Rosenberg 2005, Ryfe 2005). Conflict, challenging others and having one's own beliefs challenged, is experienced as stressful and avoided by many citizens (Hibbing and Theiss-Morse 2002, Mansbridge 1980). It is claimed citizens are "cognitive misers" who avoid reflective reasoning, take short cuts (Ryfe 2005), rely on social cues (Mendleberg 2002), and are often limited in their capacity to subject beliefs to the abstract argumentation associated with deliberation (Rosenberg 2005). Delli-Caprini et al (2004) suggest "deliberation is infrequent, unrepresentative, subject to conscious manipulation and unconscious bias and disconnected to decision making, that it is at best an impractical method for determining the public will and at worst misleading and dangerous" (Delli-Caprini et al 2004:321). Thompson (2008) introduces potential tensions and trade-offs between different values in deliberative democracy. For example, as participants engage respectfully with those they disagree with they are likely to treat their opponents views as more legitimate and reasonable. Increased tolerance, empathy and moderation towards political opponents is said to decrease the motivation to engage in political activity (Mutz 2006). This research does not serve to prove or disprove the normative claims of deliberative democracy as such, but rather point to a need for

greater consideration of the empirical conditions for better deliberation (Bachtiger et al 2010, Dryzek 2010, Rosenberg 2005). Other critiques reject the project of deliberative democracy. Pennington (2003) argues that much knowledge relevant to a decision is tacit in nature, and cannot be easily accessed and coordinated through conscious collective decision making. On this view, deliberative approaches are inappropriate for coordinating tacit knowledge and managing epistemological complexity.

There is a persistent concern with the practical application of deliberative democracy. The argument follows that even if we suppose citizens are inclined towards deliberative behaviour, and are motivated to participate in political decision making, the organisational demands and costs remain prohibitive (Wright and Street 2007). Chambers (2003) discusses how experiments in deliberative democracy have focused on mini-publics and small scale forums, partly because they are relatively less expensive and easier to study, however they have limited application outside of the experimental conditions. Goodin and Niemeyer (2003) suggest there is a gap between these small scale and costly experiments, and the broader interest in fostering large scale public engagement in deliberation, the suggestion being that there are various structural and practical barriers that exist in broader society, and that deliberation may be unrealistic (Dryzek 2010). The recent systemic turn in deliberative theory further argues against focusing on individual forums, and consider how they interact with other elements of a democratic system, and the deliberative quality of the broader system (Mansbridge et al 2012, Owen and Smith 2015). In view of these arguments, the promise of ICT and online communication can be understood in terms of its capacity to overcome costs, geographical and temporal barriers to deliberation, and realise large scale deliberation. There is a need to consider both the design of individual platforms, in terms of their capacity to coordinate knowledge and support accountable and transparent large scale deliberation, but also, following the arguments of the systemic turn, how these platforms operate or may operate within the context of the broader democratic system and political context.

The field of online deliberation has emerged as the study of the opportunities and challenges presented for deliberative democracy by ICT and online communication. Research has considered the extent to which we can speak of the existence of a public sphere or public spheres, and the opportunities that ICT provide for the expansion of the public sphere (Dahlberg 2001, Koopman 2009). The ubiquity of ICT and online communication and its significance for political life continues to grow more evident. Popular discussion of technology's perceived influence on the public sphere, deliberation and democratic processes highlights a number of key contemporary debates: the power and influence of services offered by Facebook, Google and Twitter (Yardi and Boyd 2010), the organisation of movements such as the Arab Spring (Pontin 2015, Pollock 2011) and the Occupy Movement (Costanza-Chock 2012), the distribution of "Fake News" and misinformation (Ember 2017), the rise of populism (Bartlett 2017), issues of polarisation (Sunstein 2001), trolling (Lev-On and Manin 2009) and the public shaming of individuals and organisations on social networking sites (Ronson 2015). These examples illustrate the power of ICT and online communication, the possibilities they present for disseminating ideas and organising collective action, and the significance of technology in many people's public and private lives. They also illustrate the limitations and ambiguity of technology, raising important questions concerning democracy. There is a need to consider how technology distributes power and enables actors, and whether this power is exercised in ways that are conducive to a healthy democracy. Researchers in the field of online deliberation have moved from an "early enthusiasm to pessimistic reaction" (Knox 2016: 478) to a more qualified and balanced exploration of the relationship between technology and democracy, and a growing consensus that the open internet is not conducive to deliberation (Davies and Chandler 2011). Advocates of online deliberation have increasingly focused on the potential of design and innovative developments of online deliberation platforms to help meet current challenges in online communication and deliberative democracy (Pingree 2009, Coleman and Moss 2012, Manosevitch 2014, Gangadharan 2009, Himelboim 2010, Davies 2009a).

A range of experimental online platforms and tools have been developed. These platforms use novel design choices and techniques to overcome the challenges of online deliberation and support large scale democratic processes. Approaches to design include the use of argument mapping and visualisation techniques that enable the organisation and coordination of the knowledge and preferences of large groups of people to give people voice and support collective action. Examples of these platforms include Pol.is which has been used by the Taiwanese government to support large scale deliberation processes and produce binding decisions on legislation (Berman 2017) and the argument mapping tool Debategraph, which has been used by organisations such as CNN, the White House (on open government), the UK Prime Minister's Office (on media policy), The Independent, Bill and Melinda Gates Foundation (on global health), and the Foreign Office (Bullen and Price 2015).

Although the online deliberation literature acknowledges the potential of design, experimental online deliberation platforms and the insights they offer have been little researched (Pingree 2009, Delbourne et al 2010, Davies and Chandler 2011, Towne and Herbslep 2012). It is also noteworthy that practitioners in this area are often influenced by fields outside deliberative democratic theory, notably informal logic and collective intelligence. Informal logic concerns the interpretation, analysis and evaluation of natural language arguments and argumentation, and has led to the development of argument visualisation techniques, computational models of argument, and defeasible artificial intelligence logics based on argumentation schemes. Collective Intelligence concerns the study of collective behaviour that appears intelligent. The field is commonly associated with the discipline of computer science and efforts to use ICT to augment human intellect (Englebart 1995), transform the web into a "global brain" (Heylighen 1999:223) and support cyber democracy (Pierre-Levy 2005). These fields share similar objectives and interests to deliberative theory and online deliberation, and may advance our understanding of issues encountered in deliberative processes. However, to date there has been very little communication between these fields (Curato 2008, Kock 2007).

This thesis addresses gaps in current research concerning experimental online deliberation platforms. It provides a theoretical analysis of the influences on experimental online deliberation platforms. The thesis explores the relationship between the approaches of informal logic, collective intelligence and deliberative theory, reflecting on the potential insights these approaches present to deliberative theory and to our understanding of the challenges of online deliberation. The thesis also presents an empirical analysis of current practices in online deliberation. The study focuses on exemplary cases of experimental online deliberation platforms and tools analysing them from a perspective informed by the lessons from theoretical chapters. The empirical analysis draws on interviews with developers and those involved in applications of the platforms, and provides novel insights into the potential of online deliberation platform design. The thesis addresses the advantages, disadvantages and trade-offs of different design choices, the feasibility of large scale deliberation and the future directions of the field in light of developments such as the increasing role of artificial intelligence. Through the theoretical and empirical analysis, the thesis contributes to ongoing debates on the opportunities and challenges presented by developments in ICT and communication for democracy.

Chapter 1 provides an overview of the field of online deliberation. The discussion outlines the history and development of the field and the variety in research topics. The discussion draws on previous studies to identify common issues encountered in online communication and online deliberation platforms. These issues are organised around four thematic challenges concerning (1) participant engagement, (2) participant behaviour and citizen capacity, (3) information representation and management, and (4) feasibility and scale. The chapter then considers the emergence of experimental online deliberation platforms, and the potential for design to address these challenges. Many experimental online deliberation platforms are influenced by theories outside of deliberative theory, notably informal logic and collective intelligence, theories that inform the chapters that follow.

Chapter 2 presents a review of the field of informal logic, outlining key concepts and debates in the literature. Informal logic explores the nature of argument and how we understand good reasoning and illative force in the context of real world argumentation. Research in informal logic questions how we develop non-formal standards for the interpretation, evolution and construction of natural language arguments. The field has produced a range of conceptual tools and techniques that have been influential amongst platform developers. These include approaches to argument mapping and visualisation, dialectical accounts of argumentation, and models of argument schemes and dialogue types. These theories have informed developments in online deliberation platforms, including choices around structure and visualisation, the development of computational models of argumentation and defeasible artificial intelligence logics based on argumentation schemes (Gordon et al 2007, Atkinson and Bench-Capon 2007, Walton and Godden 2007). The chapter goes on to discuss the relationship between informal logic and deliberative democratic theory, contrasting the theoretical approaches to the understanding of decision making and objectives of the fields. Comparing the theoretical perspectives offers insights into the nature of argument, the structure and process of deliberation, and standards for analysing, evaluating and supporting real world deliberation.

Chapter 3 reviews collective intelligence literature and related fields in computer science and information sciences that seek to understand and support collaborative behaviour and decision making. This literature provides a range of taxonomies for categorising group behaviour, identifying relevant variables in group performance and contexts of collective action. Research in this field has produced a range of techniques and tools for supporting the coordination of knowledge and collective action and decision making. These have been applied in the development of platforms and tools that represent some of the most promising developments in online communication deliberation. The chapter reflects on how understandings of decision making and collective behaviour in the collective intelligence literature may advance our understanding of deliberation, clarifying ambiguities in relation to the epistemological tasks and processes involved in deliberative processes.

Chapter 4 outlines the methodological approach to the empirical study of experimental online deliberation platforms. Due to the lack of existing research, the diversity of the design choices of platforms and the challenges in addressing confounding variables, the study adopts an exploratory case study approach. The cases represent exemplary cases of online platforms that support deliberation. These platforms utilise novel design choices to overcome the challenges of online deliberation, displaying evidence of successful applications, existing research and/or high levels of participation. The chapter offers a framework for the analysis of platforms, drawing on the thematic challenges outlined in Chapter 1. The main body of the chapter introduces each case, providing details on the background, design and objectives, illustrations of the interface and aesthetic design, and current research and applications of each platform.

Chapter 5 presents the findings from the comparison of these different platforms. The chapter is structured around the thematic challenges to online communication and deliberative processes that are discussed throughout the thesis. The chapter addresses each challenge, drawing on the findings and experiences of the platforms to explore the potential of design and structure. The chapter considers where platforms and design choices have been able to deal successfully with the challenges of online deliberation and areas where there has been less success. The discussion considers trade-offs in design, challenges and issues that are beyond the control of design choices and individual platforms. The chapter ends with an exploration of what the findings from the design and operation of these platforms tell us about future directions for the field.

The conclusion summarises the findings from the theoretical discussions of informal logic and collective intelligence and the empirical analysis of the online deliberation platforms. The discussion reflects on the current applications and experiences of practitioners in online deliberation, discussing opportunities and challenges presented by technology for large scale deliberation and deepening democracy as well as limitation of the study and areas of future research. The conclusion considers

what these findings suggest for future directions in the development of online deliberation platforms and future issues for the field of online deliberation.

Chapter 1: Online Deliberation Literature Review

Introduction

This chapter provides an overview of the field of online deliberation. The discussion traces the development of the field, outlines sources of variety in approaches to research and variety in the technology itself. The discussion will outline key issues and challenges that emerge from the findings of the research. This discussion will provide the context for considering the role of design and the emergence of experimental online deliberation platforms that offer potential insight into how technology may support large scale online deliberation.

As a helpful preliminary definition, we might characterize online deliberation as the interest in the capacity for information and communications technology (ICT) to support political debate and decision making. This may be contrasted with "e-government", a term used to identify the use of ICT to perform the administrative tasks of government (Michel and Kreziak 2009). A further helpful distinction may be made between the use of technology to support the functioning of representative democracy (e.g emailing representatives, online voting) and interest in the application of technology to support deliberative processes (e.g deliberation in online forums or the use of technology to support offline deliberative decision making) (Shane 2004).

Online deliberation is a relatively new field, characterized by wide variety and subject to rapid change and development (Davies and Chandler 2011). The field encounters variety in relation to the perspectives and approaches of researchers, the form that communication takes and the features and design of the technology used, and the context of its use, including institutional settings and the objectives of researchers, developers and participants (Davies 2009). Gangadharan (2009:329) observes online deliberation's "multiple histories", while Davies (2009:5) characterises the field of online deliberation as fragmented and notes the challenge of identifying and organizing the many strands of work relevant to the topic. Davies (2009) observes

that many scholars and practitioners work in isolation, resulting in duplicated efforts and missed opportunities to benefit from the insights of each other's work. It is possible to identify fundamentally different, in some cases conflicting, assumptions in the literature about the nature of online deliberation, the epistemological and normative demands of decision making, and how we ought to understand, operationalize and measure deliberation online (Coleman and Moss 2014). Researchers and practitioners draw on a variety of theoretical and methodological approaches from fields including political science, philosophy (Davies 2009), informal logic, education, communication technology and social psychology (Antin 2008). A range of alternative terms have been used to identify our area of concern, including cyber democracy (Shane 2004), e-democracy, e-engagement (Coleman and Gotze 2001), e-deliberation, virtual deliberation, computer mediated deliberation (Jonsson and Astrom 2014) e-governance, e-community (Davies 2009), and e-politics (Grima-Izquierdo and Insua 2008). In addition, Gangadharan (2009) observes the relevance of developments in different disciplines, even if they are not explicitly identified as online deliberation, notably developments in collective intelligence, computer supported cooperative work (CSCW), and group decision making.

In this sense, online deliberation does not emerge from a single discipline or perspective with a unified methodological approach. Instead it is perhaps more helpful to think of online deliberation as emerging from a recognition of the increasingly important role that online communication plays in public life and an anticipation of the potential for ICT to support decision making (Black 2011). Online deliberation research has moved from an "early enthusiasm to pessimistic reaction" (Knox 2016: 478) and, most recently, to a more qualified and balanced exploration of the relationship between technology and democracy. Early advocates of online deliberation responded enthusiastically to advances in ICT with accounts of how technology might be used to deepen democracy and support a virtual agora or e-government (see for example Rheingold 1993). Empirical research into online communication produced mixed results (see for example Yardi and Boyd 2010, Coleman and Goetze 2001), revealing a wide range of challenges encountered online. As advocates of online deliberation have continued to question how ICT can support

better and more democratic decision making, they have had to engage with many of the fundamental questions that occupy political scientists and democratic theorists; such as the nature of the public sphere (Koopman 2008, Dahlberg 2001, Papacharissi 2002), problems of political apathy and the motivation and capacity of citizens (Davis 2009, Himelboim 2011), free speech and polarisation (Sunstein 2001), privacy (Koopman 2008), and differing understandings of public participation (Coleman and Gotze 2001). These issues have been considered in the context of ever changing developments in technology and methods of communication. The increasing sophistication and ubiquity of technology the public and private lives of citizens, and the increasingly significant yet ambiguous relationship these developments have for democracy, have led to a more balanced and nuanced consideration of the conditions of high quality deliberation online and the opportunities and challenges presented by ICT in deepening democracy (Davies et al 2009, Pingree 2009). Davies and Chandler (2011) claim that there is growing consensus that the open internet is not conducive to deliberation, and advocates of online deliberation are increasingly focusing on the role of design and structure of deliberative forums (Pingree 2009). In response practitioners have developed innovative platforms and tools aimed at supporting large scale deliberation.

The discussion of online deliberation in this chapter is structured in four sections. The first section will outline the emergence of online deliberation as a topic of study, discussing the various ways in which scholars have engaged with the issue. The second section will discuss sources of variety in online communication and technology and the findings of research relevant to these areas. The third section will identify significant debates in the literature, highlighting key issues emerging from the research. This discussion will be organized around four thematic challenges; participant engagement, participant behaviour and citizen capacity, information representation and management, and feasibility and scale. The final section introduces the role of design and the emergence of experimental online deliberation platforms that utilize innovative designs and techniques to address these challenges and support large scale deliberation.

The Development of the Field of Online Deliberation

The Early History of Online Deliberation

Early discussions of the democratic potential of ICT can be found in the work of Etzioni (1972) and Robert Dahl's 1989 *Democracy and its Critiques* (Cavalier 2003). Davies (2009) cites Thomas Ohlin as an early advocate in the 1970s and Rheingold's 1993 "The Virtual Community: Homesteading on the Electronic Frontier" represents an early discussion of the ways ICT may support better and more deliberative decision making. For many, the democratic potential of ICT lies in its capacity to overcome challenges associated with geography, time and the cost of mass communication (Etzioni 1972, Rheingold 1993). A further source of optimism concerns the capacity of the internet to provide access to a wide range of information and diversity of views (Papacharissi 2002). Others have suggested that ICT can be used to supplement the memory and cognitive limitations of humans (Pingree 2009). Early discussions were characterized by speculation about how ICT could be used to support democracy. Etzioni (1972) outlines the components for an electronic town hall, detailing the organisational structure and voting systems that would support a virtual town hall facilitating large scale debate and participation. The image of the internet as a virtual agora or "virtual coffee house" (Connery 1997 in Price and Cappella 2002) supporting previously impossible mass participation has proven a very powerful image for many advocates of online deliberation (Gastil and Levine 2002). Corrado and Firestone argued that online discussions, such as those found on Usenet, will create a conversational democracy in which "leaders interact with citizens in new and exciting ways" (Corrado and Firestone 1996 in Himelboim 2010:641).

The early 2000s mark a period of increased interest in online deliberation and empirical study, with significant contributions from Lincoln Dahlberg, Stephen Coleman, Cass Sunstein and a major study by Vincent Price into online discussions during the presidential elections (Davies and Chandler 2011). The first of a series of academic conferences on online deliberation took place at Carnigie Mellon University in 2003. Dahlberg (2001) observes that the democratic potential of the internet has been explored from liberal individualist and communitarian perspectives, and advocates an exploration of the democratic potential of the internet from a deliberative perspective, specifically a Habermasian notion of the public sphere. He focuses on an analysis of Minnesota E-Democracy, as an early project attempting to foster public deliberation online. Dahlberg argues that liberal individualist perspectives on ICT developments assume a political subject who requires only information, and in contrast argues for the need to foster spaces for debate and a public sphere of rational critical discourse (Dahlberg 2001).

Coleman and Gotze's (2001) *Bowling Together: Online Public Engagement in Policy Deliberation* represents a significant early contribution to the field of online deliberation. The study discusses online deliberation in the broader context of debates in democracy and draws together contemporary experiments in online deliberation. Coleman and Gotze (2001) identify a crisis in contemporary liberal democracies and consider how online technologies may address this. They observe a growing interest, at least amongst policy makers, in the potential of ICT to support decision making and deliver better governance. All case studies explored represent government led projects, yet they vary greatly in respect to their scale, methods of participation, use of technology and the nature of their goals. They include a website set up in Estonia in which citizens comment on proposed laws and submit ideas for new ones, an e-consultation in the UK that addressed the issue of domestic violence, an interactive planning game introduced by local government in Finland, and a consultation in Scotland that sought the views of young people identified as a "hard to reach group" (Coleman and Gotze 2001). One of the main conclusions Coleman and Gotze (2001) observe from these studies is that such projects are frustrated by

the fact that too few people are aware of them, and the government does not integrate them properly into the policy process.

While Dahlberg (2001) and Coleman and Gotze (2001) focus on online deliberation in the context of government led events, Sunstein's (2001) *Republica.com* examines the influence of ICT on public life in the context of its typical use by citizens. Sunstein (2001) uses numerous examples to illustrate the sense in which media is becoming more "personalized" and self-directed. He argues that this development should concern us, as it has the potential to threaten two conditions which he feels are necessary to a healthy democracy. The first condition is that individuals are exposed to ideas and experiences that they have not already selected. The danger is that if people only interact with likeminded people, they will be vulnerable to extremism and polarization. The second condition is that within a heterogeneous society there is a need for a certain degree of shared experiences to form a "social glue" that allows individuals to understand each other and thus help them avoid fragmentation and deal with social problems (Sunstein 2001:9). Sunstein observes that filtering, self-selected or otherwise, is to some extent inevitable and necessary in the meaningful use of information, highlighting the need to think about what is realistic and desirable in terms of the way people are exposed to and engage with information online. In discussing polarization, homophily Sunstein introduces a major theme in the literature. As will be discussed, this issue is revisited by further research exploring algorithmic and self-selected filtering (Dahlberg 2001, Papacharissi 2002, Lev-on and Manin 2009, Freelon 2010, Black 2011, Chan and Fu 2017, and Strandberg et al 2017). Sunstein's work, along with other empirical work of the time highlights challenges and potential negative consequences of technological developments for democracy.

Rheingold (1993) observes the temptation to treat new technological developments as the solution to democratic challenges is not unique to the arrival of ICT and the internet. Intellectuals and journalists took a similar attitude towards television and other telecommunications. Papacharissi (2002) argues technology is likely to adapt to existing culture rather than fundamentally change it, expanding on this thought with a discussion of the forces of commercialization on determining the use of

previous media. On the potential of a virtual public sphere, Papacharissi (2002) questions the capacity to create something online that may never have existed offline. Early discussions of the democratic potential of ICT were optimistic in nature (Etzioni 1972, Rheingold 1993). Empirical research into online deliberation in the early 2000s reveals issues neglected in earlier discussions, challenging particular assumptions and encouraging greater caution. Much of the source of the early optimism focused on the advantages of ICT in overcoming practical barriers to deliberation relating to time, geography and cost, and the increased availability of information (Etzioni 1972). Price and Capella (2002) observe that the increased availability of information does not necessarily increase the use of such information. Scheufele and Nisbet (2002), Davis (2009), and Lusoli et al (2006) observe that citizens' use of technology reflects, reinforces and entrenches existing participation patterns widening the gap between the engaged and unengaged citizen. This research, alongside Sunstein's (2001) observations of polarisation and the mixed success of the cases studied by Coleman and Goetze (2001), highlight that while ICT removes barriers of time, geography and cost to deliberative processes many significant challenges remain. Furthermore, while ICT may facilitate greater access to information this is not necessarily sufficient for deepening democracy and may in some cases have negative consequences.

The early empirical literature helps to highlight two related points relevant to our understanding of the development of the field. Observations made about the democratic potential of ICT relate to an object that is diverse and subject to rapid change. Coleman and Goetze (2001) are writing in a context that predates the rise of social network sites such as Facebook and Twitter, and the increased accessibility and varied modes of online communication developed since 2001. Coleman and Goetze (2001) also draw attention to a tension in the literature between seeking to study the state of deliberation and political behavior as it exists in common forms of online communication and more speculative explorations of the democratic potential of ICT. They outline their desire to focus on real world examples and draw themselves away from the “speculative universe of futuristic schemes for the democratic use of ICT” (Coleman and Gotze 2001:7). This tension in the literature has

arguably produced a divide in the field of online deliberation in which democratic theorists have focused on research into common forms of online communication, while more exploratory work focusing on experimental applications of technology and the development of platforms has tended to take place separately, informed by disciplines outside of political science and neglected by wider online deliberation research.

Since the early 2000s research and interest in online deliberation has blossomed (Davies 2009), the significance of social media and ICT on news media and public life has increased (Davis 2009, Boyd and Ellison 2008), there are also increasing innovative developments aimed at supporting deliberation online (Davies 2009). The following section will seek to provide an overview of the ways in which online deliberation has been studied and discussed. This will be followed by a discussion of the key findings and themes that emerge from this literature.

Approaches to the Study of Online Deliberation

In the previous section, we identified a significant division between online deliberation research and exploratory work relevant to the field, notably practical efforts to design and develop tools and software that support deliberation (Shane 2004). Following this division in the field, this review of the literature will initially focus on the former online deliberation research. This concerns research conducted from a deliberative theory or political science background that has considered the democratic potential of ICT, typically focusing on common forms of online communication. The chapter will then identify a series of themes and challenges that emerge from this literature. The final section of this chapter re-engages with the exploratory work, and argues that the innovative design choices and techniques of practitioners' developing experimental online deliberation platforms may provide insights into how these challenges might be addressed.

As Davis (2009) observes, online deliberation is a fractured field and there are a number of significant points of contrast in the literature. Online deliberation has been discussed at different levels of scale, researchers have explored the issue using

different theoretical perspectives and criteria and with different understandings of how that criteria should be operationalised. It may be helpful to briefly elaborate on the significance of the sources of variety in the research, before turning to research findings and themes in the following section.

The levels of Scale of Online Deliberation

Online deliberation is discussed and researched in reference to different levels of scale. These may be helpfully broken down as:

1) Online deliberation studied as the totality of online communication and activity on the internet

2) Online Deliberation studied in relation to a particular platform or event

3) The study of aspects of online communication and the influence this has on the quality of deliberation.

Research that examines online deliberation as the totality of online communication or the collective impact of various websites, blogs and other forms of communication tend to be concerned with questions such as the potential of online deliberation to expand the public sphere (Papacharissi 2002, Dahlberg 2001, Koopman 2008). Davis (2009) discusses the desire to focus on the impact of ICT on complex societies and existing democracies, suggesting that the parameters of some research into online deliberation has been limited in focusing on mini-publics or technical aspects of deliberation at the expense of non-technical and social challenges. It has been broadly acknowledged that the behaviour of individuals and experience of online deliberation differs greatly depending on variables such as the technology used, the nature of the task, features of the group such as size, culture, and selection basis, and how deliberation is structured (Davies and Chandler 2011). In this sense, there are limits in how helpful discussions of online communication at this scale can be. Davies and Chandler (2011) suggests that there has been a move from thinking about online communication or ICT as a whole, towards reflection on how and when ICT can be used to support decision making, and how to address various problems associated with online communication (Davies and Chandler 2011).

Further research has focused on study of online deliberation at the level of individual platforms. Some of this research attempts to study online communication in naturalistic settings on popular platforms such as Usenet groups groups (Hindleboim 2010, Papacharissi 2004), Social network sites such as Twitter (Yardi and Boyd 2010) and Facebook (Grevet et al 2014), and comment sections on news sites (Trice 2010). Other research has focused on the use of ICT in specific consultations and experiments. For example, Iyengar et al's (2003) online deliberative poll, Price and Cappella's (2005) Healthcare Dialogue project, or the government led e-consultations discussed by Coleman and Goetze (2001). Research highlights a number of important variables to consider in relation to online deliberation platforms, this includes the range of forms of communication available on different platforms, the design and intentions of the developers of the platform, the goals and intentions of the participants or users of technology, the political context of its use and the tasks it is being used for.

Finally, research into online deliberation may focus on particular forms of ICT communication and design choices. Technology can vary in relation to synchronous and asynchronous communication, the modes of communication available for example, text, audio, image or video, with the terms rich and lean media used to describe the capacity for a particular mode of communication to communicate information (Davies and Chandler 2011, Black 2011). The use of ICT can also vary in relation to the specific interface, design choices and purpose of a given example of tool or software. Black observes that "different digital formats treat issues of time, identity and space very differently, and these differences matter for the quality of deliberation" (Black 2011:6). Research has explored the impact of anonymity and online identity on debate (Leshed 2009), the role of the facilitator and moderation (Wright 2010, Dearden and Light 2009) and the structure of the forum (Pingree 2009, Black 2011). These sources of variety need to be considered when reflecting on contrasting findings in research and different experiences of ICT.

The Criteria and Goals of Online Deliberation

There is significant variety in how researchers have understood the goals of online deliberation, the criteria by which online deliberation should be evaluated and empirical methods used to operationalise and measure deliberation (Freiss and Eilders 2014).

A significant issue concerns the relationship between online deliberation and actual decision making and democratic procedure (Hilbert 2009). Some research addresses online deliberation involving actual decision making, while other research addresses political discussion and online communication more broadly. These different contexts involve different understandings of deliberation, involving different demands and criteria for evaluation. Furthermore, research suggests participants perform differently in situations that require decision making compared to less directed political discussion (Thompson 2008, Rosenberg 2005). Some advocates of online deliberation assign a formal decision making role to online communication; this ranges from those advocating a form of direct democracy, to those advocating a more supportive role within representative democracy, typically e-consultations (Coleman and Gotze 2001). Focus on government led initiatives may be motivated by the desire to study online deliberation that can make some claim to impacting policy formation, while other researchers have stressed the importance of developing deliberative spaces autonomous from the government or corporate backing (Dahlberg 2001).

Online deliberation research involving decision making presents additional considerations for researchers and greater demands for platforms regarding accountability and legitimacy. This includes specific concerns around access and levels of participation (Davies and Chandler 2011), ensuring any voting mechanism or decision making process is robust and secure (See for example De Cindio et al 2008, Ohlin 2009), ensuring participant's privacy and safety are protected and they are free from coercion (for example, Hilbert (2009) discusses the difficulty in ensuring individuals at a computer are not being coerced by a third party).

Much research into online deliberation addresses online communication that is not expected to result in a decision and has no formal role in democratic procedure (for example, Papacharissi 2004, Trice 2010). In these cases, researchers typically focus on the "quality of deliberation", measuring the extent to which online communication reflects ideals associated with deliberation. Researchers have approached this in a variety of ways, reflecting the ambiguities and challenges of the empirical application of deliberative theory (see for further details, Neblo 2007, Naurin 2007, Bachtiger 2010). To illustrate this issue, studies have variously measured how many arguments are put forward for a position (Black et al 2011, Stromer-Galley et al 2007, Friess and Eilders 2014), the extent to which participants provide evidence for their claims (Stromer-Galley et al 2007) or request evidence (Friess and Eilders 2014), deliberation involves cross cutting debate (Davies 1999), participants are representative of the population (Scheufele and Nisbet 2002), communication is civil and respectful (Papacharissi 2004), the levels of equality in participation (Dahlberg 2001, Davies and Chandler 2011), preference change (Iyengar et al 2003), and the extent to which the experience promotes further political involvement (Ohlin 2009) or encourages idea sharing and idea generation (Klein and Iandoli 2008). These criteria have been operationalised and measured in various ways, including the use of content analysis (Misnikov 2010, Trice 2010) statistical analysis (Dearden and Light 2009), and surveys exploring the experiences of participants (Cabelle and Feldman 2008).

A number of platforms and tools discussed in online deliberation literature are concerned with specific tasks related to decision making or deliberation, and are therefore evaluated on a much narrower set of criteria. This includes tools to support rule making and procedural tasks in debate (Phair and Bliss 2009), platforms that try to provide an educative service by providing information and visualisations relating to debate, or tools for supporting the development of argumentation skills (Easterday 2007). Researchers have highlighted limitations in certain methods of measuring deliberative quality, for example Lupia (2009) notes that many studies will examine change in preferences without studying change in competency, or other potential motivations for preference change such as conformity. This variety in how

different studies understand and operationalise deliberative criteria presents issues for judging the success of different platforms and comparing performance across platforms (Friess and Eilders 2014).

Further research identified within the online deliberation literature has taken a far broader understanding of the goals of online communication and online deliberation platforms. For example, studies have explored online deliberation in terms of its ability to support activism and social movements (Dearden and Light 2009, Pickerill 2004, Kahn and Kellner 2003, Wellman et al 2001). Other research has examined the relationship between internet participation and social capital (Shah et al 2001, Wellman et al 2001, Davis 2009, Himelboim 2010). Svennson (2011) discusses the capacity for online deliberation to mobilise participation through political parties or social movements, and there is broader literature on how social movements have used ICT to help support their campaigns. However activism orientated literature on online deliberation has a tendency to adopt an "us vs them" attitude towards online interaction (for example see Dearden and Light 2009), and to view the use of ICT in terms of a capacity to promote a particular cause or viewpoint (Davis 2009), which in some cases can be extreme or anti-democratic (Schaffer 2002). This could be understood as a reflection of tensions between different ideals of deliberation, for example participation and reciprocity, and the assumptions of this literature or some of the activities focused on, may be in tension with other discussions in deliberative democracy which emphasise the exchange of viewpoints in a diverse and reflective environment (Dahlberg 2001, Sunstein 2001, Price 2002).

Online Deliberation Research Themes and Findings

The previous section outlined the early history of the field of online deliberation and important considerations concerning varieties in research approaches. The following section will introduce findings and themes from online deliberation research. The use of ICT in deliberative processes is characterised by a number of variables concerning the context and form that communication takes. The discussion of research findings will be broken down according to the significant sources of variety in these areas; the

institutional settings and political context of the application of technology, media rich and media lean communication, synchronous and asynchronous communication, variance in social identity and anonymity in online communication, variance in the role of facilitators, moderators and control of content, and finally the study of different platforms and systems such as message boards, social network sites and comments pages. After exploring findings addressing these sources of variety, the discussion will turn to key debates and themes emerging from the literature. These constitute common issues in the literature relating to our understanding of the opportunities and challenges ICT presents for democracy, such as polarisation, information overload and noise. These issues are organised around the themes of participant engagement, participant behaviour and citizen capacity, information management and representation and feasibility and scale.

Variety in Online Communication and ICT: Research and Findings

Institutional Settings and the Politics of Technology

Online deliberation research has taken place in the context of different institutional settings this includes different levels of government, political parties and social movements, private organisations in contrast to online deliberation on the open internet. Studies have examined the use of ICT at the level of national government, including examples in the UK (Coleman and Gotze 2001, Lusoli et al 2006, Coleman 2004), Brazil (Pogrebinschi and Ryan 2017) the U.S (Bimber 2003, Iyengar et al 2008) as well as Canada (Richard 2009). These studies have examined the potential for deliberative exchange between representatives and citizens through citizen panels, e-consultations and collaborative decision making processes. Studies have also explored online deliberation at the level of local government (Coleman and Gotze 2001, Wright and Street 2007, Dunne 2009, Torpe 2006, Polat 2005, Jensen 2006). Experiments at the local level have included novel uses of ICT, such as games aimed towards supporting planning policy (Coleman and Gotze 2001), Perez-Quinones and Javanaugh (2009) describe the development of Colloki, a platform developed to support local decision making. A smaller number of studies have examined ICT use in a supranational context, such as within the EU (Wilhelm 1999, Karlsson 2010).

Research has also explored online deliberation in the organisation of political movements and political parties (Lusoli and Ward 2004, Ward and Gibson 2000). Research relating to political parties and online deliberation has tended to focus on how ICT may improve falling membership, or connect party members to the policy making process within the party, for example Raynes-Goldie and Fono (2008) consider the Green Party's use of wikis. Further research has explored the use of ICT in supporting activism and social movements and the deliberative potential of the technology (Pickerill 2004, Kavada 2005). There is less consideration of the role of ICT in private organisations from a deliberative perspective; for example include Leshed (2009) who examines changes in behaviour on a company forum following changes in conditions of anonymity. Caballe and Feldman (2008) also consider the use of ICT in supporting communication across professions.

An important theme that emerges from these considerations is the political context of the use of ICT. The politics of technology can be understood in terms of literal ownership or control over the technology, for example who has ownership of the software or control over its use in a particular case (Dearden and Light 2009). Dahlberg for example discusses the tendency for new political sites to be corporately backed which potentially threatens their democratic potential as well as making it difficult for low budget, non-profit organisations to attract attention and support in their platforms (Dahlberg 2001: 619). It is also helpful to reflect on differences between the interests of the developers or commissioners of technology and the users of that technology; Wright and Street (2007) focus on the design choices of websites commissioned by local government, highlighting the significance of ownership, the commissioning process and design on the type of online communication that is fostered. The design choices of such websites, he argues, facilitate and encourage certain types of discussion and a particular relationship between councillors and citizens. For example most local government websites will limit the opportunity for feedback or general open discussion forums in favour of contact details for councillors or details on consultations (Wright and Street 2007). Wright and Street claim that "councils appeared to be opting for one kind of public

participation over another, and in so doing constituting a particular kind of relationship with their citizens" (Wright and Street 2007:858). Research into political parties use of ICT tends to observe that it has been used to distribute information rather than as part of a deliberative process engaging party members and allowing input into policy (Raynes-Goldie and Fono 2008, Ward and Gibson 2000). The concern over ownership and control over technology has also led to much discussion of the democratic potential of open source software (see for example Mussman 2010).

In addition to issues of ownership, control and the governing of the use of technology, there is discussion considering the relationship between technology and culture and the impact of presentation of information on individual behaviour. Scheufele and Nisbet (2002) for example argue that how information is presented influences how people process that information, their discussion defends advantages of hard media over television and by extension certain forms of information provision on the internet. Dahlberg (2001) describes different expectations with different technologies, for example willingness to accept rules through email communication in contrast to more typically anarchic spaces such as Usenet. Dahlberg (2001) discusses the pressure of liberal individualist uses of technology and the tendency for governments to seek to use technology to improve the efficiency of the existing liberal individualist system rather than the fostering of deliberative behaviour; using the case of Santa Monica's PEN project, he observes that local government played down deliberative aspects of the project. Papacharissi (2002) also discusses the broader pressures of commercialisation and capitalism on technology use, suggesting that it directs technology use to private, entertainment purposes, in opposition to the development of public spaces of autonomous deliberation. There literature also includes much broader discussions of the impact of culture on use of technology (Papacharissi 2002, Davis 2009) and the impact of different forms of communication on individual behaviour (Davies and Chandler 2011) which will be discussed later.

The Modalities of Communication, Synchronous and Asynchronous Communication

Communication in online deliberation can take various different forms. Research has distinguished between synchronous and asynchronous communication (Davies 2009), and different modalities of communication such as text, speech, image, video or some combination of these forms of communication (Davies and Chandler 2011). Discussions of platforms also appeal to a concept of media "richness", this relates to the platforms capacity to communicate or reproduce certain cues and forms of communication, such as tone of voice, facial expressions and gestures. A platform that allowed only asynchronous text based communication might be described as media lean, while a platform that facilitated video conferencing may be described as media rich (Davies and Chandler 2011). Davies and Chandler (2011) illustrate different modalities of communication can be used in both asynchronous and synchronous communication. For example, typical examples of synchronous communication could be video conferences, phone calls or text based communication such as chat rooms. Typically, asynchronous communication will be text based, for example newsgroups or message boards, however Davies and Chandler (2011) also point to answer phone messages as an example of asynchronous communication using speech. Increasingly platforms will accommodate different types of communication, for example forums that allow video clips or combinations of asynchronous and synchronous communication (Price 2002, Davies and Chandler 2011). Research has found that these variables in communication can present different issues for online deliberation and the quality of debate (Black 2011a, Davies and Chandler 2011). Furthermore different forms of communication make different demands on users and thus the method of communication is important in consideration of issues such as the digital divide and the feasibility of online deliberation (Davies and Chandler 2011).

Davies and Chandler (2011) observe a shortage of research comparing asynchronous and synchronous communication. Research has found that synchronous and asynchronous communication place different demands on deliberation and produce different experience of deliberation and behaviour amongst participants. Asynchronous communication is typically cheaper and requires less organisational

effort (Price and Capella 2002). Research has suggested that a further advantage of asynchronous communication is that participants offer longer, more thought out and clearer arguments than they would present in synchronous communication (Black 2011, Trice 2010, Janssen and Kies 2005). Furthermore asynchronous communication allows more opportunity for individuals to cite sources and link to further information (Black 2011). One might further argue that asynchronous forms of communication offer greater potential for the visualisation and manipulation of the structures in which information is presented (Pingree 2009). Some deliberative sites have also limited the number of contributions a person can make to two a day, thus encouraging participants to reflect on their contributions and avoid domination by one participant (Coleman and Moss 2012) Comparing synchronous and asynchronous communication, Price (2002) observes that chat rooms are more likely to include less serious conversation than news boards. Stromer-Galley and Martinson observe that "Synchronous chat seems especially problematic for creating quality interaction, because of its apparent lack of coherence" (Stromer-Galley and Martinson 2009 in (Friess and Eilders 2014). Some research has found that participants have more positive experience with synchronous discussion and are more productive, in the sense that organising thought and arguments in speech is less time consuming (Davies and Chandler 2011). Wright (2009) suggests that online deliberation in the form of synchronous communication is increasingly seen as unrealistic. Early experiments and discussions of online deliberation involve synchronous communication (Etzoni 1972, Iyengar et al 2003, Dahlberg 2001), however increasingly the focus has shifted towards asynchronous platforms (Price and Cappella 2002, Papacharissi 2004, Conklin 2008, Tauro et al 2009, Towne and Herbselp 2007).

It has been generally observed that lean media, text only communication is more closely associated with negative emotions (Davies and Chandler 2011, Baek 2011). Davies and Chandler (2011) observe that the question of emotion in deliberation is an issue shared by online and offline deliberative processes, but technology presents particular issues; for example it can facilitate communication without emotional cues presented by facial expressions, body language or tone of voice. Davies and Chandler

(2011) note that the relative isolation of communicating on the internet may encourage emotional responses that wouldn't be expressed in a group, face to face situation. In contrast media rich forms of communication, that allow non-verbal cues, have been found to provide a more positive experience of deliberation amongst the participants. Participants have reported to be as happy if not more so with online communication as with face to face communication (Iyengar et al 2003), participants of other studies have described video communication as the "next best thing" to face to face communication (Davies and Chandler 2011:55). A study conducted by Rivera et al found that participants were more satisfied in text based deliberation in which emoticons (pictorial representations of expressions) were available to them, this suggests the significance of emotion and non-verbal cues in the experience of deliberation (Rivera, Cooke and Bauhs 1996 in Davies and Chandler 2011). Davies and Chandler (2011) concludes that the choice of technology and modality should depend on the task one wishes to accomplish through a given decision making process, echoing this point, Delborne et al note the practice of combining synchronous and asynchronous and different modalities of communication to support deliberation (Delborne et al 2011).

Social Identity and Anonymity

The extent to which an individual is identifiable online can vary greatly and this can have an impact on the behaviour of participants and the quality of deliberation. Some research into online deliberation involves participants fully able to identify one another, for example in the use of video conferencing and the use of ICT to support offline deliberation (Shanks and Dahlstrom 2009). Some websites will require registration, which may allow participants to be traced and identified by those who run the website but not necessarily other users; indeed there are a number of studies that explore the issue of privacy on the internet in the context of online deliberation (Koopman 2008), as well as broader discussions on the impact of social media on individuals attitudes towards privacy (Boyd and Ellison 2007). Some sites allow totally anonymous contributions, however there is an increasing trend towards personalisation, many sites identify users through usernames and avatars that

participants can select and change as part of a personal profile (Black 2011). In this sense, participants in online discussion have much greater flexibility in terms of how they present themselves. Social identity and the representation of participants in online platforms is a significant design feature, and the literature reveals that it can have major impacts on who participates and how they participate. Research into this area has tended to treat social identity in binary terms, participants are either identifiable or anonymous, in practice however there is potential for further variety; for example some participants may be identifiable and other anonymous (for example, on social network sites and comment sections), it may be possible to trace participant's previous contributions or voting or this may be private, participants may only be able to interact with arguments or ideas rather than with other people directly.

Black (2011) observes that the nature of identity operates very differently online, Poster claims that online identities are fluid and not constructed to encourage compromise (Poster 1995 in Papacharissi 2004). Papacharissi (2004) suggests this is a potentially positive consequence of online communication. Research has suggested that media that supports anonymity promotes more egalitarian participation, greater idea generation and an increase in overall participation levels (See Ho and McLeod 2008). Coleman and Moss (2012) observe how research has found that anonymity allows for greater fluidity of identity, users can present themselves in different ways without feeling constrained by cultural cues. Koch argues that online communication removes markers of age, class, social status and race, and thus reduces subjective interpretations of arguments based on these markers (Koch 2005 in Saebo et al 2010), and many other studies have emphasised how anonymity can help overcome power inequalities associated with social status (Baek et al 2011, Himelboim 2011). However such observations should be considered within the context of findings relating to the digital divide and the sense in which social status already determines participation online (Davis 2009). For example, Jacobson (1999) observes how individuals will interpret social markers through choice of language, spelling, usernames and so on, and in this sense will still be applying the judgements associated with offline discussion. In some cases anonymity can be vital to allowing

certain individuals the opportunity to speak about certain experiences, for example an e-consultation consulting victims of domestic violence recognised the necessity of anonymity in encouraging participation (Coleman and Gotze 2001), the anonymity of internet communication can also provide a comparatively safe environment for individuals involved in activities that are illegal or considered socially or culturally taboo to talk about their experiences.

While many discussions emphasise the positive impact of anonymity and the removal of social markers, other research suggests more negative consequences of anonymity. Coleman and Moss (2012) discuss research supporting the view that when users are identifiable they take more responsibility for what they say and are less disruptive. Other research has suggested that both negative behaviour and perceptions of negativity online are influenced by anonymity (Santana 2014 in Kensiki et al 2017). Davies and Chandler (2011) discuss how the isolation and anonymity of internet communication and the various forms of distance between interlocutors can encourage less considerate behaviour and less sensitivity to and awareness of the impact of one's behaviour on others. This is particularly the case in communication that combines anonymity with lean media. Studies have found internet communication that lacks non-verbal cues, such as tone of voice and body language, to be associated with more negative emotions, and a tendency to interpret negative motivations in the messages of others (See Davies and Chandler 2011). The issue of "trolling" or "flaming" is a common theme in the literature. This can be understood as behaviour that wilfully attempts to provoke and upset others through personal attacks or posting controversial or offensive material (Price 2002). It is claimed that the fluidity and anonymity of identity in online communication facilitates this behaviour, allowing citizens the opportunity to transgress social norms and construct online identities distinct from their own (Black 2011). There is much debate on the research into trolling and flaming, it represents a significant issue in the literature and will be discussed in greater depth when discussing key challenges and themes.

A further consequence of anonymity and limited traceability of participants in online discussion are the various opportunities for deception (Black 2011). The term "sock puppet" has been used to describe accounts that have been set up to offer false support for a particular viewpoint or product, for example to provide positive reviews for a product. Alternatively sock puppets have been used to falsely represent opposing groups and discredit them resembling the "false flag" technique (Lorenzen 2006). The term "astro-turfing" has also been used to describe false grass roots support, typically for a commercial product or political group (Davies 2009a). In addition there has been similar concern over the reliability of online polling and voting systems and the desire to produce systems that are robust and not vulnerable to this sort of manipulation (De Cindo et al 2008). A further issue of interest concerns cases where participants differ in their ability to be identified. On social network sites such as Twitter, some people are readily identifiable, and may have a public profile that might attract interest in what they say and do online, while other participants may interact on the site in relative anonymity. This situation can create interesting power relations; since participants with a high profile may have a greater platform and status in debate, but are in some senses more vulnerable and have more at stake in their interactions.

Facilitators and Moderators and Control of Content in Online Deliberation

A further significant issue in the discussion of online deliberation platforms is the control of content on a given site and the role (or absence) of facilitators or moderators (Black 2011, Trenel 2009). Kelly et al (2009) discuss the concentration of control of content, they illustrate this issue with the following examples; at one extreme control over blogs is concentrated in one person, followed by moderated forums, group moderated forums, and the relative anarchy of unmediated forums such as Usenet (Kelly et al 2009:84). The facilitator or moderator can either be a person specifically employed by the people who run the website or discussion forum, on some sites the individuals who run the site might recruit trusted participants to act as moderators, or they might be appointed within the group (Black 2011). Davies and Chandler (2011) discuss the relationship between design and the role/necessity

of a moderator; for example a system in which users are rewarded or given ratings, popular messages are promoted, or certain messages can be hidden, might serve some of the functions that one might otherwise rely on a moderator for. In this sense design choices concerning moderation, control of content, reward systems and other factors influencing argument visibility can interconnect in interesting ways and may have unintended consequences on participant behaviour. A key concern in relation to the behaviour of moderators is the fairness and accountability of any control and authority in editing of content they assume, however one must also consider the demands of time and resources on individuals in any system. Naturally the use of moderators constitutes a cost to running the system, if the system is expected to accommodate mass participation and increasingly large amounts of information then the cost to the system and individuals will increase. Stromer-Galley et al (2010) have responded to this problem and the cognitive limitations of human facilitators by exploring the development of an artificial discussion facilitation agent and the potential use of artificial intelligence (AI) to address these issues.

Davies and Chandler (2011: 7-8) identify a number of common forms of facilitator

1. Greeter: Making people feel welcome
2. Conversation Stimulator: Posing questions and topics, playing devil's advocate
3. Conflict resolver: mediating conflicts towards collective agreements
4. Summariser of debates
5. Problem Solver: Directing questions to relevant people for response
6. Supporter: bringing external information to enrich debates and support arguments
7. Welcomer: Bringing in new participants, either citizens or politicians/civil servants
8. "Cybrarian": Providing expert knowledge on particular topics
9. Open Censor: Deleting messages deemed inappropriate, normally against pre-defined rules and criteria. Feedback is given to explain why
10. Covert Censor: Deleting messages without explaining why
11. Cleaner: Removing or closing dead threads, hiving off sub-discussions into separate threads

The role of the moderator as an open or covert censor has been found to have a major impact on the quality of deliberation. For example the use of a covert censor

on the UK's Home Office Forum and a Downing Street website provoked an antagonistic and conspiratorial relationship between participants and the moderators/organisers of the site (Wright 2006 and Coleman 2002 in Wright and Street 2007). Research has suggested the need for open moderation and clearly defined rules for any censorship (Black 2011, Wright 2009, Strandberg et al (2017) studied the relationship between polarisation and moderation; in the cases studied they found increased polarisation in unfacilitaited groups, while less extreme views and polarisation in moderated groups. Coleman and Moss (2012) also highlighted research into the positive influence of moderators, identifying their capacity to serve as helpers and facilitators of debate, introducing topics and responding to participant's questions, rather than acting as filters or censors. In an experimental study, Wise et al (2006:24) found that moderation influences willingness to participate; those viewing a moderated community reported significantly higher intent to participate than those viewing unmoderated forums.

Opening up the issue of moderation more broadly, there is a question of control of content on sites and power relations between participants, for example the relationship between journalists and participants on the comment sections on new sites (Trice 2010). On social networking sites such as Twitter the extent to which your views or messages are heard depends in part on the number of followers you have, and different participants will have very different numbers of followers, in this sense there are very clear inequalities that are made explicit in the participant's profile. One may speculate that these inequalities might impact participant's behaviour in deliberation and perceptions of authority and legitimacy during debate.

Online Platforms and tools: Different Designs and Different Goals

Online deliberation literature considers a range of platforms and tools. The space in which online communication and political debate takes place can vary greatly due to the design, purpose and forms of communication available on a given platform. It is important to consider the goals and intentions surrounding these platforms, including the aims of the developers of the platform, the users of the platform, and

the researcher wishing to examine the platform. In many cases the developers may not have intended the platform to be used for deliberation, or political communication, and many users may not use the platform for this purpose. This section will introduce common forms of online communication explored in the literature.

Message Boards and Forums

Message boards or forums, in particular Usenet, are one of the most commonly studied formats for online deliberation (see Himelboim 2011, Price 2002, Lewinski 2010). Message boards and forums allow groups of people to communicate online. Discussion is organised around central topics or threads introduced by participants, other participants can contribute to these topics by posting messages in response. The design and structure of message boards, their purpose and the motivations of participants is subject to wide variation.

Message boards and forums typically utilise asynchronous text based communication, though some incorporate other types of media such as image and video (Lewsinki 2010, Davies and Chandler 2011). Typically, participation is based on registering an account and creating a profile that identifies you within the discussion, though some forums allow total anonymity and social identity often remains flexible (Black 2011). Such forums vary in terms of the rules that govern them and the approach to moderation, Dahlberg (2001) describes them as potentially anarchic in their structure. Studies have examined varieties in the organisation of information, for example the use of threaded and unthreaded messages, as well as the control of information and moderation on such sites (Black 2011). There have also been studies into patterns of interaction, for example between those who agree on a position and those who disagree (Kelly et al 2009).

Message boards and forums can be organised around a wide range of different issues and topics. The purpose of message boards may be said to allow people to communicate online typically based on some shared interest or theme. Some forums will be organised explicitly to facilitate discussion of politics, policy or other social

issues, other forums may be organised around other subjects but include threads that allow for engagement with these issues, research has also been interested in the emergence of disagreement or political debate in unrelated discussions (Lev-On and Manin 2009). The platforms are not typically designed to support decision making per se, but rather discussion. Advocates of online deliberation often observe the limitations of message boards and forums in relation to organising information and supporting decision making (Black 2011).

Research into the intentions, motivations and behaviour of participants on message boards and forums have identified a wide range of different behaviours and issues. Message boards and forums are organised around themes that may be broadly or narrowly defined, the organising theme may be explicitly political, and it may take the form of partisan or even extremist political positions. In this sense participants are electing to participate in discussion where one may assume some level of agreement or shared interests, though the extent will vary depending on the particular forum or message board. This raises issues of self selection, the opportunity and willingness of participants to engage in cross cutting debate and problems of group polarisation (Sunstein 2001). Thus while participants may be motivated to engage in debate, the beliefs, values and assumptions concerning debate and deliberation held by participants and designers may not be aligned with the advocates of online deliberation. Research has identified trolls and the phenomenon of flaming on message boards, this describes participation aimed to upset others or disrupt debate (Kriplean et al 2012). Finally, research has identified lurkers as a group who visit but do not contribute to online discussion (Kriplean et al 2012).

Social Networking Sites

There is increasing interest in the study of social behaviour and political deliberation on social networking services, most notably sites such as Twitter and Facebook (Trice 2010, Boyd and Ellison 2007, Chan and Fu 2017, Heatherly et al 2016). Such sites have been characterised as spaces in which individuals construct profiles, make links with others with whom they share a connection, and produce content and interact around

those connections (Boyd and Ellison 2007). An important aspect of such sites is the process of making visible the individuals profile and their connections. There is much variety in terms of the organisation of these systems, how information is presented, and the controls that individual users have and the extent to which content is monitored and controlled by those who run the sites. There has been interest in who participates on these sites, and how they participate (Boyd and Ellison 2007). Focusing more on political deliberation, examples of research include Yardi and Boyd's (2010) study into interactions on Twitter between pro-life and pro-choice activists, and Halpern and Gibbs (2013) and Grevet et al (2014) studies into interactions on Facebook.

Many of the most popular social network services were not designed with the intention of facilitating political deliberation, and many of the users of such sites may not use the service for this purpose (Faridani et al 2010). Similarly to message boards and forums there has been concern with the design of such services in facilitating discussion (Yardi and Boyd 2010, Davies 2009). Research has also observed similar issues regarding the motivations of participants, identifying problems of polarisation (Yardi and Boyd 2010), Faridani et al (2010) contrast the desire to be liked and to be "a hero" for a group one identifies with to the desire to contribute originally to a discussion, suggesting that social networks reward the behaviour that does not necessarily contribute to better deliberative decision making. Further research has explored the issue of polarisation and cross cutting debate on Facebook (Heatherly et al 2016, Chan and Fu 2017). Chan and Fu (2017) explore polarisation on Facebook, and discuss research that suggests voluntary selective exposure has a stronger role than algorithmic personalisation on the reduction of information users are exposed to (Bakshy, Messing and Adamic 2015 in Chan and Fu 2017). Heatherly et al (2016) study cross cutting debate on Facebook in the U.S relative to membership of political parties; they find that republicans participate more frequently in cross cutting debate than democrats, and discussions amongst friends plays a mediating role on cross cutting debate and debate amongst like-minded people.

Comment Sections

Research has explored comment sections found on news sites (Trice 2010, Graf et al 2017) and Youtube (Effing et al 2011) as spaces for deliberation. Comment sections are relatively recent phenomena compared to other forms of online communication, for example many news sites began to introduce comment sections from 2009 onwards (Trice 2010). Discussion is organised around a single focal point, a news item or article. In this sense the format is similar to message boards, however there are a number of interesting points of consideration; the control that the news sites exercises over the content, both in the sense that editorial decisions guide what is discussed, but also in the choices it makes over moderation. Graf et al (2017) discuss examples of media outlets closing comments sections or limiting who can contribute due to personal attacks (Farhi 2014 in Graf 2017); Popular Science magazine banned online comments out of fears that uncivil and sceptical comments could influence the credibility of its science journalism (LaBarge 2013 in Graf et al 2017). Furthermore, the responsibility and impact that the organisation has in hosting claims and messages made in these spaces (Trice 2010).

A further consideration concerns the power relationship between the (often identifiable) journalists and authors of the article and the (often anonymous) participants who post messages; this raises issues of anonymity and perceived authority and legitimacy. Graf et al 2017 discusses research findings suggesting that uncivil comments on news sites are linked to the anonymity of commenter (Halpern and Gibbs 2013 in Graf et al 2017). Furthermore many attach significance to general news media as the main public forum through which the general public engage with politics (Davis 2009), and this feature can be understood as an interesting evolution in the way it is presented and consumed. Different news sites will have different policies over rules of moderation and the identity of participants and the issue of the power relationship between the journalist and participants can be influenced by this, as well as the involvement of the author in the discussion (Wright 2009). There is therefore interest in the quality of deliberation in these spaces, the variables influencing individual's behaviour, as well as questions such as who reads the

comment sections and what impact does this have on their understanding of the news article (Trice 2010).

Wikis

There is a vast amount of research into wiki's and Wikipedia (Black et al 2011). Wiki's have been studied as a tool for organising information (Klemp and Forchimes 2010) and as a means of enabling participation within political parties (Raynes-Goldie and Fono 2009), while Lindsay (2009) explores the potential for developing a "Wikipedia of Debates". Wikipedia itself involves collective decision making directed towards the creation of an encyclopedia. In this sense the aims are more restricted than the type of deliberation typically evoked when talking of deliberative democracy. Nevertheless, research has explored group behaviour on Wikipedia (Black et al 2011), the management of disputes (Kittur 2007) and how the community deals with problematic behaviour (Lorenzen 2006). This work has had a broad influence on the way collective behaviour is understood and organised online (Black et al 2011).

Political Blogs, Search Engines and Email

Online deliberation research has also considered various other platforms, that intuitively offer limited opportunities for direct deliberation between participants, but may nevertheless be considered relevant to the notion of a virtual public sphere. Research has considered the political blog format (Karlsson and Astrom 2014). Traditionally blogs have involved a single author with limited opportunities for participation on the part of the reader (Dearden and Light 2009), with the introduction of comment sections and multi author blogs this format presents further opportunities for those studying online deliberation (Karlsson and Astrom 2014). There has been some interest in search engines from an online deliberation perspective (See for example Sison and Sack 2008). Although the search engine may not constitute a forum for debate in the sense it is naturally understood, the focus in this area reflects a concern with homophily and the development of search engines that confront individuals with different perspectives (Manin and Lev-On 2009). There has been some interest in email as a method of supporting online deliberation and engagement between citizens and their representatives (Svensson 2011, Coleman

and Gotze 2001, Dahlberg 2001), however focus has tended to move away from this method in recent years in favour of websites (Davies and Chandler 2011). Similarly focus has moved away from video conferences, since while advantages include retaining the media rich experience of face to face communication (Iyengar et al 2003), they are perceived as offering limited opportunities in overcoming the practical problems associated with large scale deliberation (Davies and Chandler 2011, Pingree 2009).

Specialist Applications of Platforms and Tools

The discussion thus far has focused on political communication and the application of technology in a relatively naturalistic setting. The specific platforms considered are not designed to support political discussion and deliberation per se, and the participants are often not involved in a formal deliberative process or aware that they are being studied (for example Yardi and Boyd's 2010 study of Twitter). In contrast, further research has explored the application of technology in support of specific political projects or events (see for example, Wright and Street 2007, Dahlberg 2001, Coleman and Gotze 2001). Under these conditions the application of the technology is often based on the specific purposes and design of the project, participants are aware they are involved in a deliberative process, and frequently aware they are being studied. The design of the forums in these cases can vary significantly. Some projects repurpose common forms of online communication. In contrast, in response to challenges and issues experienced in common forms of online communication, other projects draw on or develop more innovative approaches to the design and structure of forums. These developments will be discussed in greater detail in the final section of this chapter. Furthermore, the thesis will focus on this area of platforms, exploring their theoretical influences and analysing experiences concerning how these platforms have performed in practice.

Themes and Challenges in Online Deliberation

Online communication is characterised by great variety and the discussion has organised the discussion of research findings around significant variables. Reviewing this literature, it is possible to identify common issues and key debates concerning

the opportunities and challenges ICT present for deliberative democracy. This section will now address these issues. The discussion is organised around four thematic challenges. Participant engagement deals with issues such as the digital divide and structural challenges in citizen engagement. Participant behaviour and citizen capacity addresses issues such as polarisation, trolling, and the challenge of ensuring respectful, cross cutting debate online. Information representation and management concerns issues such as noise and information overload, and challenges concerning the organisation of information and decision making processes online. Feasibility and scale addresses issues concerning the resourcing and sustainability of online deliberation and the demands placed on staff and participants.

Participant Engagement

The challenge of participant engagement can be understood on a number of levels. The literature appeals to a range of widely recognised issues concerning citizen participation, including a general decline in political engagement (Coleman and Goetze 2001) and inequalities in participation that correlate with factors such as wealth, education, race, gender, class and age (Davis 2009). Research has observed that such challenges and inequalities in participation persist online, and furthermore ICT and online communication may exacerbate such problems and present additional barriers to participation, notably through a "digital divide".

A common theme within the debate is the digital divide (Norris 2001, Rhee and Kim 2009, Albrecht 2006). The digital divide can refer to the literal lack of access to ICT, or to inequalities in use, knowledge or skills in relation to ICT. In 2002, it was reported that 6% of the population had access to the internet (Papacharissi 2002). As of 2017, 53.6% of households worldwide have internet access, in developed countries the proportion of households with internet access is 84.4%, around double that of developing countries, while in least developed countries only 15% of households had internet access. The speed, cost and penetration of broadband and mobile broadband also varies greatly between developed and developing countries. The proportion of men using the internet is higher than the proportion of women in two

thirds of countries worldwide. While the gender gap has narrowed in most regions since 2013, in Africa the gap has widened. There is a strong link between gender parity in internet use and gender parity in enrolment in tertiary education (ITU 2017).

At the scale of domestic politics, the issue of the digital divide is said to disadvantage ethnic minorities, women, the elderly, the poor and less educated (Rhee and Kim 2008, Day 2008). The method of communication and choice of design is significant. Brannon and Essex describe how synchronous text based communication such as chat rooms exclude the unskilled typist (Brannon and Essex 2001 in Davies and Chandler 2011). Davies et al (2009) also raise the issue of the digital divide in relation to special needs and disability affecting access and use of particular technologies. In addition to concerns around access and capacity to use technology, a further important consideration relates to how citizens use technology. Lusoli et al (2006) and Scheufele and Nizbet (2002) observe the propensity to use technology to access certain information and engage in political discussion is likely to reflect an individual's education, confidence and pre-existing sense of political efficacy and consequently re-enforce existing power inequalities rather than challenge them. Price (2002) notes that while more liberals access the internet, those engaging in online discussion are disproportionately conservative, his study also observes the general lack of participation in political discussion amongst women. Aeron Davis (2009) argues that technology is creating a "fat democracy" which broadens the capacity of a central core engaged group to participate further, but widens the gap between those engaged citizens and unengaged groups. Davis also raises the issue of the impact of ICT on hard media, suggesting that developments in ICT have undermined offline news and the financial model of print journalism, this in turn impacts the content and distribution of future news media. This raises the issue of broader (unintentional) consequences of the digital divide and the impact of ICT on public spaces (Baek 2011).

Further research considered how liberal individualist culture and commercial pressures may direct technology and disadvantage the development of public spaces for deliberation (Dahlberg 2001, Papacharissi 2002). We may develop this thought

by drawing on Sunstein's (2001, 2002) observations of polarisation and an online political culture in which arguments and political participation are understood in terms of ideological groups (Yardi and Boyd 2010, Davis 1999). It has been noted that some of the best resourced political websites are those advocating a particular viewpoint, for example the website of a political party or interest group (Schaffer 2002) in contrast to those offering non-partisan discussion. Similarly, participants may be drawn to services supporting discussion amongst like-minded individuals in contrast to discussion across political divisions. In this sense, political culture and the demands of participants may place pressures on the development of technology that is in tension with the objectives of advocates of online deliberation.

Participant Behaviour and Citizen Capacity

Many of the concerns expressed in online deliberation research relate to the behaviour and capacity of citizens and participants of online debate. Key issues relate to the characterisation of discussion online as polarised, suffering from a lack of cross cutting debate or exposure to alternative views, a tendency towards disrespectful engagement with others and problems of incivility and trolling.

A key debate in deliberative democratic theory literature concerns the deliberative capacity of citizens (see Mendelberg 2002, Rosenberg 2005). Deliberative procedural norms can be understood to place a number of demands on participants including the thought that participants should be respectful, open-minded, prepared to provide justifications for their preferences and seek the common good (Habermas 1981a). Debate over citizen behaviour and capacity is complicated by disagreement concerning the relevant conceptual criteria one should apply and how it should be measured (see Thompson 2008, Neblo 2007, Davies and Chandler 2011, Coleman and Moss 2012). There is particular controversy over how demands for truthfulness, sincerity and respectfulness should be understood and applied, and the extent to which these qualities can be meaningfully identified and evaluated empirically (see Markovits 2004, Mansbridge and Flaster 2005, Morrell 2010, Neblo 2007, Naurin 2007, Kies 2010).

Research drawing on cognitive psychology has challenged the thought that we should expect citizens to behave in a way that reflects deliberative ideals (Ryfe 2005). It is argued that good deliberative practice is rare (Dellie-Caprini et al 2004), with researchers identifying individuals' and groups' susceptibility to systematic cognitive bias and cues, inhibiting deliberative capacity (Mendelberg 2002, Ryfe 2005). Hibbing and Theiss-Morse 2002) observe that individuals avoid conflict, and find situations in which they are expected to challenge others or have their own beliefs challenged stressful. Mansbridge (1980) notes that some individuals will only speak when they are sufficiently uncomfortable or upset by something another person is saying, while Rosenberg (2005) discusses research challenging the assumption that many participants are capable of subjecting their beliefs to the type of abstract argumentation associated with deliberation. The field of online deliberation encounters these challenges, and the research has identified particular issues relating to the use of ICT and online communication.

Polarisation is one of the most common concerns within the literature (Chan and Fu 2017, Strandberg et al 2017, Heatherly et al 2016, Strandberg et al 2017), with much research examining how one brings together opposing views, and how one fosters positive communication between different groups (for example see Manin and Lev-On 2009, Wojcieszak and Mutz 2009). It is argued that exposure to information online, through social networking sites and online media, is characterised by a greater level of personal choice that allows individuals to select the news and viewpoints they wish to hear and ignore alternative viewpoints (Dahlberg 2001, Papacharissi 2002, Lev-on and Manin 2009, Freelon 2010). A related issue concerns Eli Pariser's notion of a "filter bubble" in which information is automatically filtered, via algorithmic personalisation of search engines such as Google, limiting individuals' exposure to different perspectives (Black 2011).

There is a perception that online communication is characterised by groups of likeminded people who never interact with individuals with opposing views (Karlsson 2010, Sunstein 2001). While there may be examples of this behaviour on specific sites

(See for example Schaffer's 2002 discussion of hate groups), much research suggests that this is not necessarily the case and the issue of polarisation is more nuanced. Empirical research has produced mixed results on the significance of polarisation online (Chan and Fu 2017, Strandberg et al 2017). Chan and Fu (2017) discuss research that finds voluntary self-exposure has a stronger role than algorithmic personalisation (or the filter bubble) on the information participants are exposed to, and by extension less influence on the problem of polarisation. Many studies have suggested that individuals are interacting with different opinions online (Kelly et al 2009), indeed studies have found that individuals are more likely to respond to posts they disagree with than ones they agree with during online discussions (Kelly et al 2009), and others have discussed how disagreement can be associated with increased participation and engagement with online forums (Price 2009, Karlsson 2010). Research by Lev-On and Manin (2009) and Wojcieszak and Mutz (2009) suggest that exposure to political difference tends to take place as a "happy accident", not in spaces where the central purpose is to discuss differing political views, but incidental conversations on politics amongst individuals who otherwise share particular interests or views. Davies and Chandler (2011) suggests that more research is needed in examining the issue of polarisation in online communication, and how to address it. Since much existing research only studies engagement with different views, for example in the form of replies to a post, it is limited in presenting a picture of the nature of that engagement (see for example, Karlsson 2010). Those studies that examine the content of exchange on the internet suggest that cross cutting debate does not take place in the form of reasoned discourse (Yardi and Boyd 2010, Davis 1999).

The question that emerges is not whether people are exposed to alternative viewpoints or disagreement, but the character of that exposure and how people interact. In his discussion of civility, Barber (1999) highlights the problem of public talk which finds 'people talking without listening, confirming rather than problematizing dogmas, convicting rather than convincing adversaries" (Barber 1999:40), and some studies into online deliberation affirm this characterisation of debate (Davis 1999). Yardi and Boyd's study into discussions between pro-life and

pro-choice individuals on twitter, following the shooting of Doctor George Tiller, revealed that while "Twitter is exposing people to multiple diverse points of view, the medium is insufficient for reasoned discourse and debate, instead privileging haste and emotion" (Yardi and Boyd 2010:23). Further research has explored how participant behaviour is influenced by variables in the identification of participants and the modes of communication. It is argued that participants who are anonymous online are less inhibited and therefore participate in discussion differently than they would if engaged in face to face communication (Davies and Chandler 2011). Similarly, other research has discussed the significance of media rich and media lean forms of communication and the impact this has on the nature of deliberation, for example the thought that text based online communication allows less opportunity for interpreting social cues, emotion or tone, and this has been found to lead to misinterpretation and increased hostility in communication (Price 2002, Davies and Chandler 2011). In other research, it is suggested that the literal and metaphorical distance presented by online communication means that some individuals feel less sensitive to/responsible for the impact of their behaviour on others (Davies and Chandler 2011). There is a debate in this literature over the extent to which these differences in behaviour constitute a positive or negative thing in relation to deliberative capacity, for example whether debate has become more liberated and honest, avoiding the pressures of conformity (Poster 1995, Papacharissi 2004), or whether it has become less respectful and oppressive excluding certain people and limiting the opportunity for meaningful exchange of ideas, or indeed whether some combination of these processes are taking place (Davies and Chandler 2011)

In exploring this issue, we encounter the challenge of establishing what constitutes good, reasoned discourse and how one measures and studies it. In Papacharissi's (2004) evaluation of 287 asynchronous text based discussion threads, she draws on a distinction between politeness and civility. Politeness is related to the use of vulgarity and name calling, while civility relates to the commitment of individuals to equality and democracy in discussion. In Papacharissi's account a white supremacist may express their argument in polite terms, but by definition they could not be civil, as they are rejecting the equality or rights of a particular group. Papacharissi draw's

on Lyotard's emphasis on the role of emotion, disagreement and anarchy in emancipation to justify her distinction and preserve the potential legitimacy of impoliteness. Papacharissi's (2004) findings point to the need to pay greater attention to the context of impolite or negative comments online, for example most of the name calling and impoliteness was found to be directed at individuals outside of the forum, for example individuals in powerful positions such as political leaders. The study also found that impoliteness towards other participants tended to take place in the context of greater familiarity, indicating relationships built within the online community, and should not necessarily be interpreted as genuine hostility or signals of bad quality deliberation. This resonates with a broader concern that attempts to identify respectful, open and inclusive deliberation across difference may result in advocating a form of political communication that is disciplining and biased towards privileged groups (Dahlberg 2007).

It is important to note that the terms civility and politeness have been used interchangeably amongst researchers (see Anderson et al 2013 and Ng and Detenber 2005 in Graf et al 2017) and there is some confusion in the application of the terms. Following Papacharissi's distinction, Kenski et al (2017) studied perceptions of incivility; they found that comments under the conditions of anonymity were more likely to be perceived as uncivil; they compared perceptions to various demographic criteria and personality traits, their findings revealed that as a group only women were significantly more likely to interpret a comment as uncivil, and agreeableness as a personality trait was also slightly positively correlated to perceptions of incivility. In further research, media lean websites and text based asynchronous discussion have also been found to encourage negative emotions and thus exacerbate problems of polarisation (Davies and Chandler 2011, Baek et al 2011). Price (2000) discusses the role of non-verbal cues in establishing trust between different participants, other research has emphasised the significance of the group involved in decision making in terms of culture, size of group and homogeneity and the nature of task or topic of conversation (Black 2011, Davies and Chandler 2011, Delbourne (2009).

Kenski et al (2017) also observed how participants' perceptions of incivility were linked to disagreement. They note that disagreement is an important part of a healthy democracy, yet individuals have a hard time coping with information that is inconsistent with the way they view the world, shaping their perceptions of incivility (Kenski et al 2017). Similarly, Price (2002) observes that levels of satisfaction in debate are found to be much lower in online communication than offline, noting that offline communication was characterised by greater homogeneity, suggesting levels of satisfaction may have reflected individuals' willingness to encounter difference and social awkwardness around disagreement. These findings resonates with the arguments of Hibbing and Theiss-Morse (2002), suggesting a challenge in citizens' capacity to distinguish between what is uncivil (inappropriate for debate) and what is disagreement (necessary for debate and a healthy democracy).

Finally, a common theme in the literature is the issue of "flaming" or "trolling", which arguably represent the more extreme examples of disruptive or disrespectful behaviour (Graf et al 2017, Cho and Acquisti 2013, Buckels et al 2014). Trolling can be understood as contributing personal attacks, offensive or controversial material with the intention of disrupting a conversation or provoking or upsetting others in contrast to a sincere intention to contribute to debate (Price and Capella 2002). It is often claimed that anonymity facilitates this behaviour, with a number of studies identifying trolling as a persistent problem in online communities (Black 2011). Such behaviour is problematic to identify empirically, appealing as it does to the internal motivations and sincerity of participants. Furthermore, while this behaviour may be considered anti-social and not conducive to the sort of deliberative activity that advocates may wish to foster, the extent to which it is a genuine problem may be overstated. Kelly et al (2009) conducted a study looking at interaction between different individuals online, it found that while individuals would interact with those they disagreed with more than with those they agreed with, certain individuals who expressed extreme views or those who engaged in trolling tended to be ignored entirely; the study suggested the exclusion was not due to the extremity of their views but rather that they were not considered relevant to the broader discussion. Further studies have also observed online communities self-managing issues of

trolling and the issue of limited social cues (Papacharisi 2002). It should be noted, that the impact of trolling or flaming in terms of exclusion is difficult to investigate empirically, as it is not always apparent when the behaviour of some participants may have effectively silenced other participants. Trice (2010) raises the issue of "lurkers", those who read but don't participate in forums, there is a question of who these people are, and possible reasons why they may or may not participate, but, Trice observes, this is notoriously difficult to study.

Sunstein (2002) compares the differences between studies of polarisation and the results of deliberative polling which are helpful to consider here. It has been noted that deliberative polling has not found the effects of group polarisation found in small group and polarisation research. Sunstein (2002) highlights key differences in such experiments including the fact that the groups in deliberative polling were composed of individuals brought together through random sampling, rather than naturally emerging groups, furthermore the discussions that took place through deliberative polling included moderators to ensure all voices were heard, as well as experts providing information. The different results could be used to criticise the results of deliberative polling, suggesting these experiments overlook the barriers to deliberation that more naturalistic studies have revealed; on the other hand, these differences may be used to inform the development of future online deliberative projects, raising awareness of the need to structure and organise the forum in a way that encouraged deliberation (Rosenberg 2005, Chambers 2009). Strandberg et al (2017) found that facilitation can be vital in respect to the influence of polarisation amongst like-minded groups, in an experiment comparing facilitated and non-facilitated groups, they found that while polarisation and extreme views became stronger in the non-facilitated group, they became slightly weaker in the facilitated group.

Information Representation and Management

A further key theme in the online deliberation literature concerns the challenge of information representation and management. It is often observed that popular

platforms for online communication do not provide the necessary structure and organisation of knowledge to support reasoned argumentation and decision making (Yardi and Boyd 2010, Davies and Chandler 2011). There is particular focus on the issue of "noise" and "information/cognitive overload" (Dabbish 2014, Coleman and Moss 2012). Noise can be understood as superfluous information that may or may not be relevant for debate, but nevertheless hinders effective compression of the debate. Contributions to debate may constitute noise if they repeat or reiterate an idea or argument already submitted, for example to voice support. Participants may introduce tangents of little relevance to the topic. There may be a misunderstanding between participants resulting in an exchange that may be relevant to their own understanding, but of little significance for others. Information/Cognitive overload occurs when information becomes disorganised or excessive to the point that it prevents participants drawing effective meaning from it (Coleman and Moss 2012).

Problems of noise and information overload are most commonly associated with lightly structured forums, such as message boards, unthreaded comment sections (Black 2011) and social networking sites such as Twitter (Yardi and Boyd 2010). Such forums primarily organise information by the time of contribution. It is argued that the absence of a further organising principle presents a challenge in making sense of information, particularly large amounts of information, for participants, researchers and organisations wishing to survey public opinion. Lightly structured forums typically provided limited indication of support or an emerging consensus of group sentiments. The intuitive solution of reading through messages to discern levels of support for a position can be both time consuming and misleading, as it does not capture unspoken support amongst participants for comments or the views of "lurkers". Indeed, it has been argued that the lack of structure or clear indication of support on such platforms creates an incentive for behaviour that contributes to the problem of noise. The most visible and ostensibly popular opinions are the ones most recently or most frequently contributed. This presents an incentive to participants to repeat points in order to dominate discussion or ensure they are heard, contributing to the problem of noise and distorting any indication of levels of support.

In addition to broad recognition of the problems with lightly structured forums (Davies and Chandler 2011, Black 2011), research has also identified issues with more heavily structured bespoke platforms. Delbourne (2010) and Loukis and Wimmer (2010) observe how the design of platforms can inhibit debate, lacking the flexibility that may be taken for granted in face to face communication, presenting overly rigid or complicated structures, not allowing individuals to debate in ways that seem natural or necessary to them. Davies and Chandler note that while more structured forums have been found to be broadly associated with better experiences of deliberation, more restrictive structure can lead to less participation (for example, see Janssen and Kies 2005 in Davies and Chandler 2011). Scheuer (2010) observes that heavily structured or counter-intuitive forums can present barriers to participants, presenting interfaces that are difficult to learn and use and limiting ways of interacting with others.

In addition to concerns with noise and information overload, research has highlighted issues with the accountability of online debate, specifically transparency over participation and reliability of claims found online. There is a broad debate on the impact of ICT on the consumption of news media and levels of trust in news sources. Gelfret (2018) discusses the controversial phenomenon of fake news. It is claimed ICT has enabled the publication and distribution of news online, beyond the control of traditional news media, and therefore beyond the scope of checks, regulation and channels of accountability and verification applied to mainstream media. It is claimed that the publication of misleading and false information through social networking sites has influenced the results of elections and referendums in the US and UK (Gelfret 2018). The application of the term fake news has also been called into question, some have suggested it is frequently misapplied for rhetorical and political purposes to cast aspersions on news one simply finds disagreeable or inconvenient, while the term itself ought to preserve a healthy scepticism towards traditional media and authority. As discussed, there is concern that ICT broadly and social networking sites in particular, produce enclaves of like-minded individuals, and the notion of fake news and heavily filtered sources of information is thought to exacerbate this problem.

A lack of transparency regarding participation in debate also presents potential issues. The identity of participants has critical relevance to political debate in a number of ways, it enables researchers and participants to understand which groups and voices are included and which excluded in debate, and levels of participation amongst groups. It also enables people to determine where participants are being hypocritical or deceptive, for example disingenuous arguments motivated by self-interest. As discussed, researchers have highlighted specific concerns around the anonymity and lack of information about participants including the problem of "sock puppets" and "false flags" (Lorenzen 2006), and the issue of "astro-trufing" (Davies 2009a). In cases where ICT is being used to support decision making, there are additional challenges in ensuring information about claims and participants, and any voting mechanism is accountable, secure and transparent (See for example De Cindo et al 2008). Opaque or complex systems or voting procedures may undermine public trust in the system and may be vulnerable to manipulation by participants, organisers or other parties.

Feasibility and Scale

Advocates of online deliberation are typically motivated by the promise of large scale deliberation delivered through ICT (Connery 1997 in Price and Capella 2002). Empirical research into online deliberation has opened debate on how realistic and desirable this objective is. Research has highlighted a range of challenges and barriers to large scale deliberation. The discussion thus far has highlighted issues concerning citizen engagement, managing participant behaviour and capacity, and issues concerning the organisation and management of information. In addition to these challenges, it remains unclear how space for autonomous public deliberation should be resourced and sustained. Further research has raised concerns about the relationship between online deliberation and formal decision making processes. Papacharissi (2002) observes that advocates of an online public sphere may be seeking to create something online that has never existed offline. Researchers have emphasised the sense in which the development and use of technology has been

driven by commercial forces, with current communications technology being ill equipped for the organisation of political movements and public deliberation. Dahlberg notes that new political sites to be corporately backed, undermining the democratic potential of those sites and the efforts of non-partisan, low-budget, non-profit organisations to attract attention and support for their platforms (Dahlberg 2001: 619). Research also warns against assuming a willingness and capacity on the part of governments to respond effectively to online deliberation and relinquish decision making power to the public through these processes (See for example Coleman and Gotze 2001, Wright and Street 2007). It is generally acknowledged that government led initiatives have suffered from low participation and public awareness, unequal participation on the part of the public, lack of a clear link to policy formation and a general reluctance on the part of the government or authorities involved to grant real power to the public and the decisions reached through deliberation (Wright and Street 2007, Dahlberg 2001, Coleman and Gotze 2001).

Research has also addressed issues of feasibility and scale at the level of individual platforms. In many forums, as the scale of participation and volumes of information on a platform increase so to do the demands placed on participants and staff. For example, demands on facilitators or moderators to address problematic behaviour or manage information. Studies have looked at approaches to minimise demands, including techniques of group moderation and the use of artificial intelligence to function as a moderator (See for example Stromer- Galley et al 2010).

Experimental Online Deliberation Platforms and the Role of Design

The discussion so far in this chapter has presented an overview of the findings and key debates emerging from the online deliberation literature. Research has identified a range of issues and challenges concerning ICT's capacity to support online deliberation. Davies and Chandler (2011) observe broad agreement that current online communication on the open internet is not conducive to the ideals of deliberation. In partial response to these challenges, a range of experimental

platforms and tools offering a variety of innovative design approaches have emerged (Pingree 2009, Manosevitch 2014, Coleman and Moss 2012). Many advocates of online deliberation have turned their attention to the issue of design and the development of novel platforms (Davies and Chandler 2011, Towne and Herbslep 2012, Manosevitch 2014). Pingree (2009) states that "the true promise of the internet lies not merely in its ability to bring large numbers of people into "one room" but in its ability to structure that room in ways that no physical room could be structured" (Pingree 2009:315). Loukis and Wimmer observe that most studies of online deliberation involve unstructured communication (Loukis and Wimmer 2010), while other research has attributed poor results to bad design suggesting the need for further exploration of this issue (Delbourne 2010).

Earlier in this chapter we noted a recognised division in the field of online deliberation, between research that seeks to study common forms of online communication and efforts to design and develop specific platforms and tools to support deliberation (Shane 2004). Davies classifies the field into "Design" or the creation of platforms and "Research", studying the effects of platforms via theories, observations and experiments (Davies 2009:4-5). We further noted that research from a political science background, including deliberative and democratic theory, had tended to focus on more common forms of online communication. The development of innovative platforms has tended to emerge from separate fields, notably informal logic and computer science, specifically collective intelligence.

Rose and Saebo (2009) and Towne and Herblsep (2012) observe that despite common agreement that design influences the quality of deliberation, design considerations are little researched. Design and structure describes a broad and open category of possibilities. Research into design, as it appears in the online deliberation literature, has tended to focus on broad variables and binary choices. For example, Davies and Chandler (2011) and Black (2011) discuss research that compares communication that is synchronous or asynchronous, media rich and media lean, moderated or unmoderated, anonymous or identifiable. These variables fail to capture the variety of possibilities available in terms of design of platforms. For

example, argument mapping and visualisation techniques have been highlighted as a particularly promising area (Coleman and Moss 2012), but this area is characterised by a wide variety of ontologies and approaches to representing debate not captured by binary comparisons such as threaded or unthreaded. Similarly, comparisons between conditions of anonymity and identifiable profiles (Leshed 2009) neglect the range of possibilities available to designers concerning how identity is managed and contributions represented. Furthermore, existing research has focused on the study of individual design elements (Black 2011, Davies and Chandler 2011), yet it may be more helpful to consider the holistic impact of various design choices within a platform. It may be the case, for example, that the disadvantages associated with one design choice may be addressed by other design elements within that system.

Experimental online deliberation platforms vary in relation to the specific purposes they were designed for, how they have been used, and the groups or organisations that have used them. A number of these platforms have enjoyed high profile applications. For example, the platform Pol.is has been used by the Taiwanese government in the vTaiwan project to engage large groups of citizens in binding consultations on legislation (Berman 2017). Debategraph, a platform that utilises argument mapping and visualisation techniques, has been used by organisations such as CNN, the White House (on open government), the UK Prime Minister's Office (on media policy), The Independent, Bill and Melinda Gates Foundation (on global health), and the Foreign Office (Bullen and Price 2015). Conferences on online deliberation have included many presentations in which designers outline their own particular platform or model to support deliberation, as well as technology demonstrations (for example Conklin (2008), Tauro et al (2008) Fishkin (2008), De Liddo and Buckingham-Schum (2010a). These represent only a small proportion of the platforms and tools that continue to be developed and adapted, details of some of these have been complied on sites such as ParticipateDB and Participedia.net (Towne and Herbslep 2012).

The exploratory work of experimental online deliberation platforms has been neglected by wider research, and there are a number of complications when

considering current research and its relationship to these platforms. As discussed, the developers of experimental platforms are typically influenced by fields outside of political science, notably informal logic and collective intelligence. These fields approach online deliberation with a different set of conceptual tools and objectives. It would thus be misleading to assume that the specific debates and concerns highlighted in the online deliberation research inform the developers of these platforms. In this sense, while the work of these developers may be very relevant and insightful to understanding issues in online deliberation, it is important to recognise that the language often used to talk about online deliberation and decision making in practice differs from discussions in democratic theory and political science. Current research into experimental platforms is often performed by the developers themselves (Towne and Herbslep 2012); Coleman and Moss (2012) discuss research into 58 online consultations, of which 44% of the researchers had been practically involved in the cases they evaluated, and had unsurprisingly tended to evaluate them as more positive than independent observers. In contrast to the more naturalistic research typical of online deliberation, the participants in these cases may be aware they are being studied, they may have a greater sense of the criteria by which they are being judged (for example in Iyengar et al's 2003 deliberative poll), or alternatively, if they are electing to participate in a platform designed specifically for online deliberation (for example participants of ClimateCoLab (Introne et al 2011)), then we might expect that their goals and intentions may be more closely aligned with those of advocates of online deliberation. Furthermore, current research into experimental platforms does not necessarily explore the issue from the perspective of deliberative theory or the set of concerns in online deliberation literature. The literature warns of a "build it and they will come attitude", with a heavy focus on the technical aspects of the platform and less consideration of the wider challenges associated with fostering public deliberation discussed in the broader research for example by Sunstein (2001), Dahlberg (2001).

There is no clear consensus on how online deliberative processes should be defined, operationalised and evaluated (Coleman and Moss 2012, Friess and Eilders 2014). Frequently the method of operationalisation and evaluation assumes certain design

features that are unlikely to apply across all experimental platforms (Coleman and Moss 2012). This presents methodological challenges for the study of design and makes meaningful comparisons across platforms with different design choices problematic. Further literature draws attention to the limits of thinking about design and structure as an approach to resolving the challenges of online deliberation. This literature draws attention to the limits of design, highlighting challenges that appear beyond the scope of design, such as the digital divide, the resourcing of technology, and concerns over the willingness and capacity amongst the public and governments to engage in deliberative processes. Karlsson's (2010) study comparing discussions on 28 different forums, all with the same design, found there was a significant difference in levels of participation and quality of participation, pointing to factors other than design in influencing the quality of deliberation. Karlsson (2012) argues that online political discussion is mainly shaped, not by designers or institutions, but by the participants themselves, utilising the forums in relation to their needs and aims. With these qualifications in mind, the following section will return to the four thematic challenges identified earlier and outline how experimental online deliberation platforms may provide insights and potential solutions to these issues.

Participant Engagement

The literature of online deliberation presents a history of initiatives and tools that appear to have failed through a lack of participation and engagement on the part of the public (Coleman and Gotze 2001). The problem of participation has been acknowledged by advocates and developers themselves, Brian Sullivan notes of his involvement in the Australian Citizen's Parliament that while their team had been concerned with preventing bad behaviour on their forum, the main challenge they experienced in practice was encouraging people to participate in the first place (Sullivan 2009 in Black 2011:25). Other projects have been stopped as a result of lack of input (Cavalier et al 2009), and Coleman and Gotze (2001) observe that a number of early attempts for government led initiatives suffered as a result of a lack of public engagement and interest. The design and application of platforms can influence the extent to which a platform depends on a certain level of participation. For example, a platform that relies entirely on content produced by users would suffer more than

a platform that allows users to interact with content from other media sources. A project that involves active recruitment for a single event, or deliberately limited or targeted participation would encounter less of the issues associated with open, non-targeted forums.

In the face of broad structural challenges of citizen engagement, it might be reasonably argued that some issues are beyond the scope of individual platforms and design choices are limited in their capacity to overcome some issues. Nevertheless, it is possible to identify important considerations concerning design and public engagement. A key issue concerns ensuring the design of a platform is easy to learn and use. Research has warned against excessive structure that presents barriers to entry for participants in learning and using a system (Mulberger 2005). A further concern relates to how attractive and engaging the platform is. Black (2011) suggests that the design and feel of websites aimed at fostering political deliberation or government led projects can look amateurish and unappealing compared to more successful commercial websites and social media. Mulberger (2005) also highlights challenges concerning the aesthetically unappealing design of experimental platforms often due to limited resources. A further consideration is sustaining participation through incentives and engaging design. Rhee and Kim (2009) compared the results of participation under conditions where participants were rewarded and conditions without a reward system. The rewards took the form of points appearing next to users' ID based on the frequency of their posts, the views and favourable replies to their posts. This experiment found that the group participating with the reward system posted more replies and potentially better quality deliberation based on assessments of the group's argument repertoire.

In considering how design might improve engagement, there has been further research into serious games and incorporating some of the dynamics of games into policy making (See for example Kreziak and Michel 2009, also Black 2011). Hasan (2017) explores the application of gamification to civic engagement platforms. Gamification is preliminary defined as the use of elements from video games in system design in other contexts, such as learning and civic engagement. The author

notes that “elements” is a broad term and there is no agreement in the literature on a defined set of game elements used in gamification (Hasan 2017). Hasan (2017) notes that while there have been many governmental gamification initiatives and further practical applications of gamification in civic engagement platforms (citing Community PlanIt and my.hawaii.gov as examples), they are not easily identifiable, and are seldom empirically evaluated and reported. Considering the broader research on gamification, Hasan (2017) cautions against the superficial introduction of elements of video games to civic engagement platforms, that fail to produce the benefits of gamification; Hasan discusses a wide range of variables and motivations that can influence the success of gamification techniques and encourage participants to feel meaningfully engaged in the process (these factors and the use of gamification will be discussed in more depth in Chapter 3). Davies and Chandler (2011) observe a lack of research into the comparison of the influence of different incentives. A crucial question is whether the incentives system is encouraging simply participation or attempting to foster deliberation: it is important to consider what sort of behaviour is being rewarding and any unintended consequences of such a system; for example, a point system may encourage conformity. Furthermore, drawing on the literature discussing negative emotions and lean media (Davies and Chandler 2011, Baek 2011), a simple rewards system that allowed voting down may encourage hostility between participants and misunderstandings.

Participant Behaviour and Citizen Capacity

Online deliberation literature has highlighted challenges concerning citizen capacity, polarisation, failure to engage respectfully with opposing views and trolling. Research has explored the use of ICT to develop argumentation skills and improve critical thinking (Easterday et al 2009, Towne and Herbslep 2012). Such research tends to draw on informal logic and argumentation theory rather than deliberative theory (Easterday et al 2009). In addition, within the online deliberation literature, a number of platforms have been developed and discussed which are primarily concerned with helping participants learn about different arguments and ideas in relation to a given topic (van Gelder 2003, Easterday et al 2009). Work in this area highlights the need to develop flexible structures that correctly represent argument

as it takes place in natural language discourse, and notes the restrictiveness and problems of many existing platforms (Easterday et al 2009).

Research has explored how the vast amounts of information made available online can be filtered to ensure individuals are exposed to information that challenges their beliefs (Lev-On and Manin 2009, Wojcieszak 2009). Argument mapping has been advocated for its capacity to overcome problems of polarisation ensuring participants are exposed to alternative views. Design may also influence and guide participant behaviour, with argument visualisation techniques used to encourage greater focus on the specific claims in arguments, drawing discussion away from disrespectful behaviour, and trolling.

Information Representation and Management

A key motivation for developers of online deliberation platforms is the thought that techniques such as argument visualisation, computer simulations and decision making tools may allow large groups of people to deliberate, contribute and organise their knowledge to address complex policy problems (Coleman and Moss 2012, Malone and Klein 2007). Approaches to argument visualisation and information representation and management varies greatly across experimental platforms. Hilbert (2009) describes the traditional trade-off between large scale participation and in depth will expression and describes how developers are seeking to use developments in information structuring systems and argument visualisation as a means to address some of these issues. The design challenges involved in facilitating large scale deliberation, allowing participants to contribute ideas, organising this knowledge, allowing arguments to be scrutinised and points of consensus to surface, has emerged as an important and promising are of online deliberation research (Wright and Street 2009).

Communication mediated through ICT is heavily dependent on the design choices of developers, and what information and element of communication they allow to be recognised and represented on the system, whether through intentional or unintentional design. On the one hand this is a source of great optimism for

advocates of online deliberation (Coleman and Moss 2012, Manosevitch 2014). Pingree (2009) captures this thought in arguing that the potential of online communication is in its capacity to structure a debate in ways that no physical face to face discussion could be structured. There are a great variety of attempts to map and visualise argumentation in order to draw out logical relationship between ideas, to overcome particular normative and epistemological challenges and to better support critical scrutiny of arguments (Davies and Chandler 2011, Towne and Herbslep 2012, Coleman and Moss 2012, Manosevitch 2014). On the other hand, design may inhibit debate, presenting overly rigid or complicated structures, it may produce negative experiences of debate, or exclude information of critical relevance to debate (Delbourne 2010, Loukis and Wimmer 2010, Scheuer 2010, Janssen and Kies 2005 in Davies and Chandler 2011).

Exploring this issue raises the question of how we should understand deliberation and decision making, what sort of normative and epistemological tasks are involved and how could they be supported through ICT and related techniques. There is a lack of consensus and ambiguities in the deliberative theory literature concerning these issues. Furthermore, as we have noted, many of the developers of experimental platforms have grounded their accounts of argumentation and decision making in alternative disciplines. There is debate in deliberative theory concerning the objective of deliberation, for example whether debate should aim for consensus, meta-consensus, mutual understanding or intersubjective rationality (Gutman and Thompson 1996, Dryzek 2010, Neblo 2007). Further discussion considers the role of different types of information such as technical expertise (Dryzek 2010), and the place of story-telling and emotion relative to abstract forms of argumentation (see for example, Sanders 1997, Young 1996, Coleman and Moss 2012). In addition to these debates, motivated primarily by normative concerns with exclusion, we can identify ambiguities concerning the epistemological tasks involved in deliberation. For example, we need to consider the intellectual tasks involved in bringing together relevant information, facilitating critical reflection on this information across different data types (for example, reconciling story-telling and abstract argument), and using this knowledge effectively and efficiently in relation to a given decision or

problem. Deliberative theory provides little guidance on these epistemological issues, or on the implementation of deliberative processes in practice either through ICT or otherwise. Theory discusses deliberation in ideal terms and as an on-going process, in doing so it intentionally avoids prescribing specific institutional designs, rules and procedures for implementing deliberative decision making in practice (Blaug 1999, Dryzek 2010). The fields of informal logic and collective intelligence, and the practical developments that have emerged from these fields, will provide insights into how these normative and epistemological issues may be managed.

Feasibility and Scale

Papacharissi (2002:21) warns against viewing ICT as a "light switch" for democracy. An immediate challenge for developers of experimental online deliberation platforms is the resourcing and sustaining of their platforms. Dahlberg (2001) discusses the problem of funding, suggesting that websites intended to foster public deliberation generally have less resources than corporately backed websites. Many of the experimental platforms listed on sites such as ParticipateDB and Participedia.net (Towne and Herbslep 2012) and discussed by Hilbert (2009) have limited resources and have limited opportunities for attracting participation. Typical routes towards monetising websites and similar services, such as the use of advertisements, would be problematic to adopt as they may compromise the autonomy and democratic legitimacy of the space. Therefore, there is a question of how a platform should be run and resourced, who should be responsible for running it, and the nature of its relationship to real world democratic processes and decision making.

There are further challenges concerning the demands placed on staff and participants as the scale of participation and volume of contributions increases. Experimental platforms such as Pol.is, Deliberatorim and the research of Stromer-Galley et al (2010) have illustrated how argument visualisation techniques and machine learning can be used to minimise the demands placed on both staff and participants (Klein et al 2012, Berman 2012), for example, by reducing the amount of

information they are required to process, or ensuring a moderating function within debate (Stromer-Galley et al 2010).

Conclusion

This chapter has presented an overview of the field of online deliberation. The discussion of online deliberation research findings identified a range of issues and key debates regarding communication online. The discussion organised these issues around the thematic challenges of participant engagement, participant behaviour and citizen capacity, information management and representation, and feasibility and scale. The chapter noted that in light of these challenges, many advocates of online deliberation have highlighted the promise of design as a way of delivering large scale deliberation. The discussion then introduced emerging experimental online deliberation platforms. These platforms utilise innovative designs and techniques that provide practical illustrations of the possibilities of design. Despite increased interest in the role of design, the techniques and experiences of these experimental platforms have been little researched in the wider literature. The designs and techniques applied by these platforms tend to be informed by theories and perspectives outside of political science, notably informal logic and collective intelligence. The chapter offered an initial consideration of the role of design and potential opportunities and challenges facing experimental platforms in relation to the four thematic challenges. A summary of the challenges for design and issues facing developers of experimental platforms is provided below:

Participant engagement: how well the platform attracts and retains participants.

- How do we ensure a system is easy to learn/easy to use?
- What incentives can be used to encourage people to participate and remain engaged?

Participant behaviour and citizen capacity: the extent to which the platform can encourage positive deliberative exchange of ideas and arguments amongst

participants, and avoid creating echo chambers or disrespectful and hostile environments.

- How do we support citizen capacity?
- How do we understand, identify and encourage high quality deliberation?
- How does the platform address polarisation and encourage civil interaction with opposing views and beliefs?
- How do we understand, identify and manage negative behaviour and trolling?

The representation and management of information: decision making presents a range of epistemological and normative challenges concerning how information is represented and filtered. There is an issue of how well the platform supports the representation and management of different types of data, different forms of reasoning, and potential problems such as information overload or "noise".

- How should we understand the epistemological and normative demands of decision making?
- What kinds of information and communication does the system include and exclude?
- How does a system address information overload/noise?
- How does a system ensure decision making processes are transparent and accountable?

The feasibility of the platform: the extent to which the demands placed on staff, participants or design can be realistically met and sustained, particularly in relation to large scale participation.

- How is the platform resourced and sustained?
- What demands are placed on the running of the platform, for staff and participants, as the volume of information and participation increases on the platform?
- What is the relationship between the forum and real world decision making?

This thesis will explore these issues through a theoretical and empirical study of innovative online deliberation platforms and the theories and perspectives that inform them. Chapters 2 and 3 will address the theoretical perspectives of informal logic and collective intelligence respectively. This will allow for greater insight into the various ways the objectives and challenges of online deliberation can be understood, and the potential of these approaches to address problems in the theory and practice of online deliberation. The empirical component of the thesis will appear in chapters 4 and 5, in which the potential of exemplary cases of experimental online deliberation platforms will be analysed in greater depth.

Chapter 2: Informal Logic

Introduction

The previous chapter explored the online deliberation literature. It highlighted challenges emerging from current research and noted the increased interest in the role of design and the development of innovative platforms to address these challenges. Many of these innovative platforms have emerged from academic fields outside of deliberative democratic theory, notably informal logic and collective intelligence. This chapter will explore the role and influence of informal logic.

Informal Logic is the study of reasoning in natural language arguments (NLAs). Johnson and Blair (1987:148) define informal logic as "the area of logic which seeks to develop non-formal standards, criteria, and procedures for the interpretation, evaluation and construction of arguments and argumentation used in natural language." The development of informal logic can be understood as a response to perceived limitations of formal logic and deductive validity in analysing and evaluating NLAs and reasoning in decision making situations (Walton et al 2008, Walton and Godden 2007). The field has also been influenced by the educational objective of improving critical thinking skills amongst students (Johnson 2006).

> Theories of informal logic share a broad commitment to the idea that despite the limitations of formal logic, there is nevertheless something to be preserved in the notion of good reasoning and the normative force of reason; this is sometimes expressed as the obligation to reason well (Pinto 2009, Blair 2012). How one should understand the nature of good reasoning, or the illative force of inference, remains the subject of debate and is a central concern throughout the literature (Gilbert 2004). In order to retain normative force a theory of argumentation must navigate the perceived dangers of relativism (relying on what a given audience finds persuasive) on the one hand and an unhelpful absolutism (relying on what the argumentation theorist finds persuasive regardless of the judgement of others) on the other (See Hu 2017). As the field has developed there has been

greater diversification in theories and methods. Tindale 1999 (in Pinto (2009) observes three broad perspectives on argumentation, logical, rhetorical and dialectical, and notes the further variety in how these perspectives unfold into accounts of argument. There have also been important debates around the possibility of non-verbal arguments (Blair 2012) and the role of emotion in reasoning (Gilbert 2004).

Informal logic shares some common areas of concern with deliberative theory, and has been influential on the development of platforms and tools supporting large scale deliberation. Despite this, there has been very little communication between the fields (Curato 2012), and there is therefore a need to better understand the relationship between these approaches at a theoretical level and the implications this has for understanding practical developments in online deliberation.

In the first section, this chapter will review informal logic literature and outline key themes and concepts. The second section of the chapter will compare how informal logic and deliberative democratic theory approach the issue of decision making and deliberation, and explore the implications this has for our understanding of the challenges of online deliberation. At a theoretical level this chapter will argue that informal logic, and specifically the contributions of argumentation schemes and dialogue types provide a framework within which to explore questions on the nature of argument, how we should evaluate arguments and moves in deliberation, and what kind of practical tools could support real world decision making. Furthermore, the discussion identifies ways in which informal logic may benefit from incorporating considerations of power offered by deliberative theory and critical theory into its analysis of natural language arguments.

Concepts and Themes in Informal Logic

The Limitations of Formal Logic

Formal logic is the study of deductive arguments in a formal context. The inference from premise to conclusion is evaluated in relation to the concept of deductive validity or proof. An argument is deductively valid if it is impossible that the premises could be true and the conclusion false. An argument is sound if it is both valid and the premises are true. The distinction between validity and soundness highlights two aspects of argument, the acceptability of the premises (premissary concerns) and the logical relationship between premises and conclusion (illative concerns) (Hansen and Cohen 2011). Formal logic is concerned with the illative quality of an argument. In contrast the acceptability of the premises, whether they happen to be true or false, is taken to be the domain of other areas of philosophy such as epistemology, metaphysics, and ethics. Formal logic distinguishes three broad categories of proposition, true propositions (logical truths), false propositions (logical falsehoods) and contingent propositions. Formal logic does not propose a method for establishing the acceptability of contingent propositions, consequently the analysis of arguments takes place within the context of a formal language which assumes perfect knowledge of the truth of the premises involved and the range of premises involved.

Advocates of informal logic highlight a number of limitations in applying the methods of deductive reasoning to NLAs (Hansen and Cohen 2011, Walton et al 2008). Hansen and Cohen (2011) observe that most NLAs involve contingent claims made under conditions of uncertainty and incomplete knowledge. Under the conditions of real world decision situations, illative and premissary concerns becomes problematic to disentangle and deductive validity becomes an inappropriate standard with which to evaluate good reasoning. Consider the following argument

> P1) I need to arrive at Manchester for 12:00
> P2) If I take the 11:05 train then I should arrive in Manchester for 12:00
> Conclusion) I should take the 11:05 train

The reasoning in this argument is intuitively plausible based on the available information. Yet the argument presented could not be described as deductively valid. Numerous other goals and alternative courses of action potentially influence the acceptability of the conclusion. For example, other means of travel may be preferable due to considerations of convenience and cost. We may attempt to make our argument more robust by clarifying such assumptions (or enthymemes). Our efforts to do so would be ultimately limited. Many real-world decision situations are characterised by incomplete or uncertain knowledge of the range of alternative courses of action, the consequences of a given action, and the relationship they have to multiple potential goals of the various individuals involved in the decision. In the absence of complete and certain knowledge regarding the premises of the argument, we rely on notions of plausibility, probability and reasonable doubt, rather than proof or deductive validity (Walton et al 2008). In this sense, non-deductive forms of reasoning such as defeasible reasoning, inductive reasoning, and probabilistic reasoning play an important role in NLAs, where deductive validity is often not an appropriate standard of evaluation.

Collective decision making situations present specific challenges to our capacity to interpret and evaluate NLAs. NLAs may consist of judgements of fact, ethics or aesthetics, and there is not universal agreement over how such judgements should be treated in terms of their truth conditions or status in the context of argument (Walton 2008). When we analyse arguments as observers or participants we cannot be certain of the implicit commitments of the speaker. The terminology or framing of an argument may reflect values or assumptions which are either contested, or should be subject to scrutiny. Value pluralism may lead individuals to rationally reach different conclusions while in agreement of the facts of a situation, and it is important to distinguish this from bad reasoning (Atkinson 2006). Consequently, there is a need to explain how different aspects of an argument can be identified and prepared for evaluation (Blair 2012, Cohen and Hansen 2011). There is a question of methods of illative evaluation; what does it mean to talk about good or bad reasoning in the context of NLAs, how does one arrive at reasonable, well justified or satisfactory conclusions and decisions, or refute bad reasoning?

The Development of informal logic and Scope of the Research

Informal logic emerges in response to these perceived limitations in formal logic as a means for understanding NLAs. The field of Informal logic is often thought to begin with the publication of Johnson and Blair's (1977) *Logical Self Defence*, which motivated the First Symposium on Informal Logic in 1978 and the development of the Informal logic newsletter (Hitchcock 1996). Prior to this publication, a number of works had argued that formal deductive logic was not the logic of argumentation (Johnson and Blair 1987). Influential earlier works include Perelman and Olbrechts-Tyteca's (1969) *The New Rhetoric*, which emphasises acceptability amongst an audience and the notion of justice, and Toulmin's (1958) *The Uses of Argument,* which provides an influential model of argument grounded on the notion of warrants and justified belief, represented diagrammatically. There is a strong pedagogical aspect to the development of informal logic; Johnson and Blair's (1977) *Logical Self Defence* began as an attempt by the authors to amend the limitations of existing text books on logic, and develop a learning manual or textbook to support students understanding of real world arguments (Blair 2012). Other writers observe the development of informal logic alongside the critical thinking movement which attempts to improve the teaching of critical thinking skills (Johnson 2006, Maynes 2015). The departure from formal logic has led to a re-examining of the definition of argument and reflection on the nature and scope of informal logic as a field. This has given rise to a number of key questions and research tasks, which are summarised below.

1) A Theory of Argument

How should an argument be conceived, for example should it be understood as a process or a product, as an abstract object or a speech act (Simard Smith and Moldovan 2011)? How should argument be understood in relation to related concepts or terms such as argumentation, rationality, inference and the "illative core" (Blair 2012)? Johnson and Blair (1987:149) identify other questions that arise from the development of a theory of argument, "how should argument be conceived, as a proof? as persuasion? as a conversation? as a competition?... as an address to

an audience? As all of these? Is there one central notion of argument or a family of concepts?" Do arguments consist of different modes, for example emotional modes (Gilbert 1997, 2004) or non-verbal modes (Groarke 2015)? How should argument be understood, interpreted and prepared for analysis (Blair 2012, Hansen and Cohen 2011)?

2) A Theory of Argument Cogency

When can an argument be considered cogent? Should we adopt the view of an external critic or a fellow participant? Should the judgement be timeless or constrained by historical and other circumstances? Does our evaluation of argument depend on local (field specific) or global techniques of evaluation (Blair 2012)? Should our evaluation depend on dialogue type or the intentions of the participants (Van Laar 2011)? If we assume different modes of argument exist do these require different forms of evaluation (Groarke 2015)?

3) A Theory of Fallacy

Informal logic has been closely associated with the study of informal fallacies, particularly in the early stages of the development of the field (Walton 2008, Blair 2012). The literature includes different approaches to understanding informal fallacies (Johnson and Blair 1987), attempts to catalogue informal fallacies (Hansen and Fioret 2016) and research that seeks to understand why they are persuasive (Walton 2010).

4) Informal Logic and related fields

A key concern in the literature is the relationship between informal logic and other fields, in particular, rhetoric, dialectics, and critical thinking. In her discussion of this aspect of the literature Jorgenssen (2014) identifies how Blair for example suggests rhetoric studies argument in speeches, dialectics in conversations, and logic studies good reasoning in both, but she wishes to argue that attempts to impose rigid boundaries between these fields inhibits the potential for fruitful reflection on the different insights these fields offer. Johnson and Blair (1987) observe how a fear of psychologism has been overcome within the field of informal logic, as it has begun

to embrace research in cognitive psychology and explore the insights this offers for understanding human reasoning, fallacies and critical thinking (See for example Maynes 2015).

In Hitchcock's (1996:274) discussion of the development of informal logic and the focus of research he makes the following observation

> In 1978, Blair and Johnson produced an amazingly prescient list of 13 key problem areas: theory of logical criticism, theory of argument, fallacy theory, fallacy vs. critical thinking approach, inductive/deductive distinction, ethics of argumentation and logical criticism, assumptions and missing premises, context, methods of extracting argumentation, methods of displaying arguments, pedagogy, nature and scope of informal logic, relationship of informal logic to other inquiries... Every one of these problem areas has been the subject of discussion in the subsequent informal logic literature, and hardly anything else has been.

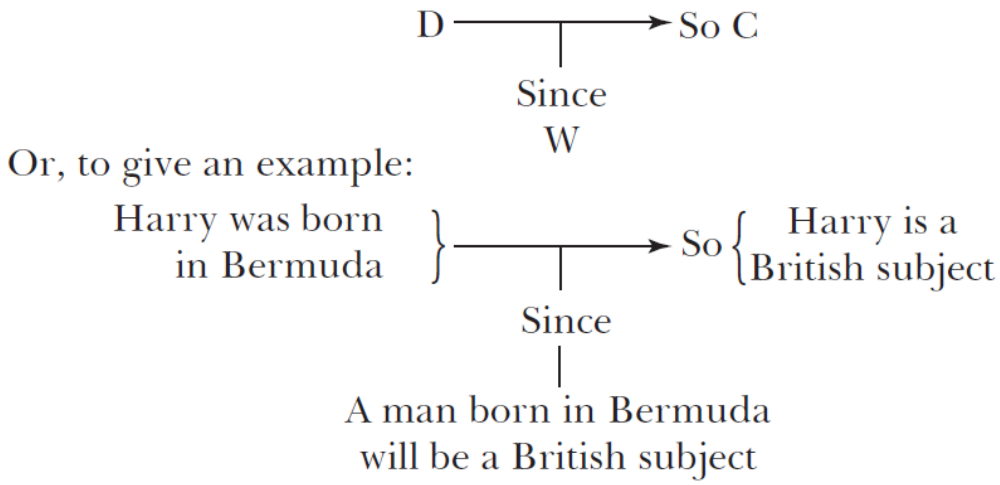
Blair (2012) discusses informal logic in relation to the task of argument identification and argument analysis and evaluation. The motivation for incorporating broader interpretations of arguments reflects the desire to consider the nature of real world decision making and the process by which we form beliefs and make judgements; this would undoubtedly include a broader range of phenomena than ideas expressed in a clear premise and conclusion form. The broader interpretations of argument present a range of challenges and demands for the project of informal logic. As the notion of argument broadens to include non-verbal arguments and other phenomena there is an increasing burden on the tasks associated with argument identification and management. Furthermore as the notion of logic or acceptable reasoning broadens (for example following Gilbert 1997) the task of identifying the persuasiveness of good reasons distinct from the persuasiveness of cognitive bias or bad reasoning becomes more complex. The following section will highlight key contributions to the field.

Toulmin

Toulmin's 1958 *The Uses of Argument* provides a significant early approach to accounting for natural language argumentation that remains influential on scholars in the field of informal logic. Toulmin presents a model for practical argumentation that relies on 6 components. These are outlined below

Claim (C): a conclusion that is being asserted
Datum or Fact (D): information that is presented as providing support for the claim
Warrant (W): a statement that authorises the move from datum to claim
Backing (B): a statement that provides support for the warrant
Rebuttal (R): Statements which present restrictions to the move from datum to claim
Qualifier (Q): The degree of force that the warrant allows one to make from datum to claim, for example whether we can say that the truth of the datum makes the claim "certain" or simply "likely"

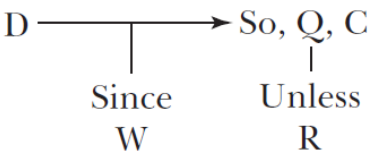
Toulmin (1958) illustrates the relationship between these components of argument through visual representation and example.

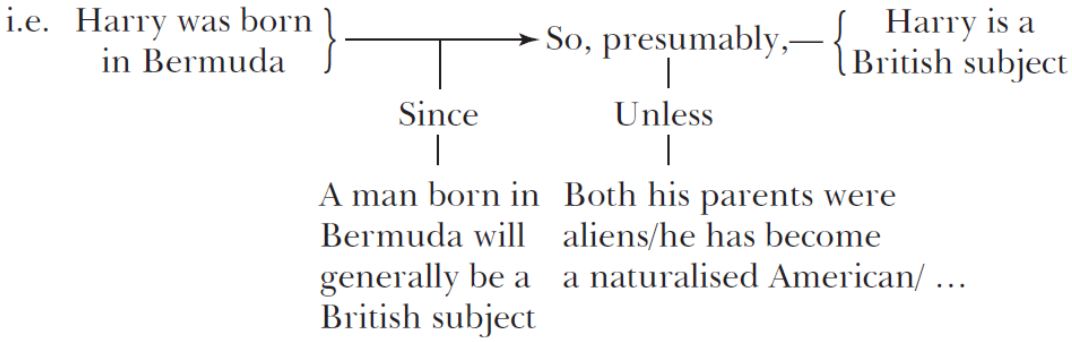


Toulmin 1958:92

The illustration above shows the relationship between the fact "Harry was born in Bermuda" with the claim that is being asserted "Harry is a British subject". The

warrant provides the grounding for the move between data and claim. If we think of NLAs involving inferences from fact to conclusion as presenting warrants, then it is possible to observe different types of warrants, for example some warrants would appear to assert a link of certainty between fact and a conclusion, while other warrants assert likelihood or a particular probability for the link between fact and conclusion. To account for this, Toulmin introduces further components to argument; the qualifier indicates the degree of force that the warrant allows in the move from datum to claim, while the rebuttal identifies conditions or facts that represent exceptions or reasons for rejecting the move from datum to claim. These components of argument are represented below.





Toulmin 1958:94

Toulmin's work represents an early identification of the limitation of informal logic (Blair and Johnson 1987). His model of argumentation can be understood as a tool for arguers rather than a theory of argumentation, and this could well be understood as a more legitimate way of understanding the project of informal logic. The components that Toulmin identified have provided an influential framework for thinking about NLAs, for example Blair (2012) draws on the idea of warrants when thinking about conditions of relevance and sufficiency, and Walton's (2007) development of argumentation schemes and critical questions shares parallels

Toulmin's model. In the second section, it will be argued that this approach could usefully inform research into deliberative processes, as well as support those engaged in argumentation.

Johnson and Blair's Logical Self Defence and the RSA Criteria

Johnson and Blair's (1977) *Logical Self Defence* is a key influence on the development of the field of informal logic. Johnson and Blair's work identifies informal fallacies as taking three general forms: Problematic premise, irrelevant reason and hasty conclusion. From these categories of fallacies Johnson and Blair develop criteria for good argumentation, which are understood to be implicit in our understanding of the flaws: Acceptable premises, relevant reasons and sufficient grounds (Johnson and Blair 1977). These have been referred to as the RSA criteria (relevance, sufficiency and acceptability) and these criteria have framed the way many scholars in the field of informal logic have discussed issues around argumentation (see for example Gilbert (2004) and Govier's (2006) ARG conditions for argumentation).

How these criteria should be understood and the extent to which they should be taken as the basis for good argumentation has been subject to much debate in the literature (Hitchcock 1996, Blair 2012, Botting 2013). For example, relevance has been defined as "lending support to" and compared to Toulmin's concept of a warrant (Blair 2012); in order to distinguish "relevance" from "sufficiency" on this understanding, Blair (2012) suggests that the concept of relevance implies a minimal authority, while the concept of sufficiency involves the degree of authority. Some have challenged the necessity of relevance to an understanding of the criteria of argument (Botting 2013), for example if an argument includes premises that are irrelevant, it may be inelegant but it does not make it a bad argument (Hitchcock 1996), and it could be supposed that "sufficiency" and "acceptability" assume relevance in a way that does not require a separate category. Blair (2012) concludes that while the RSA critieria are intuitively plausible, the challenge lies in operationalising these criteria and specifying these concepts to allow for judgement over when they have been satisfied in particular cases. Blair (2012:126) observes that

while there have been a number of attempts at this, no results have found widespread endorsement.

In *Manifest Rationality,* Johnson (2000) develops his original account of argument by introducing a further dialectical tier. This development reflects increased interest in dialectical approaches and argumentation theory. Johnson argues that the purpose of argumentation is rational persuasion, and for the need to reflect on the significance of the social context in which argument takes place. This allows him to talk about the obligation on participants to not only put forward arguments that reflect the RSA criteria, but to also rebut the arguments of others, and in this sense to participate in argumentation in a way that exhibits the qualities of rationality.

Errors of Reasoning: Fallacies and Bias

Informal logic has been closely associated with the study of informal fallacies and the desire to support students in identifying faulty reasoning (Johnson 2006, Aberdein 2017). Johnson and Blair (1977:55) define a fallacy as "a pattern of argumentation that violates one of the criteria a good argument must satisfy and that occurs with some marked degree of frequency". As theorists diverge in their understanding of what an argument is and what criteria contribute to an understanding of good argumentation, the way they understand fallacies also changes. As such the term fallacy becomes a general phrase to denote faulty reasoning within a given theory of argumentation; in some cases, fallacies can be discussed as a shift from one dialogue type to another (Walton et al 2008), misapplication of a mode of argument (Gilbert 2004), or a particular pattern of inference (Johnson 2006). Walton (2010) argues that two of the most developed theories of fallacy are the pragmatic theory and the pragma-dialectical theory. The pragmatic theory of fallacy is associated with the work of Walton (Walton 1995 in Walton 2010) where a fallacy is a failure lapse or error that occurs in the instance of a wrongly applied argumentation scheme or departure from acceptable procedures in a dialogue. The pragma-dialectical theory, associated with van Eemeren and Grootendorst (1992 in Walton 2010), has characterised fallacy differently at different stages of development of the theory; earlier versions characterise fallacy as a violation of a rule of a critical discussion where the goal is to

resolve difference of opinion. More recently, fallacy is characterised in relation to the concept of strategic manoeuvring and as a speech act that "prejudices or frustrates efforts to resolve differences of opinion" (van Eemeren, Garssen and Meuffels 2009:27 in Walton 2010:179).

There is not an agreed comprehensive taxonomy of fallacies (Walton et al 2008), but typical fallacies include ad hominem arguments, slippery slope arguments, circular reasoning, and appeals to authority. These fallacies are typically judged against the standards of deductive reasoning and formal logic, thus the informal logic literature has explored the sense in which arguments that appear to commit some form of fallacy, such as appeal to expert opinion, may be acceptable in certain NLA contexts (Walton et al 2008, Godden and Walton 2004). For example it has been claimed that appeal to expert opinion in NLAs may be acceptable in establishing that a given conclusion is more likely, if not certain (Seidel 2014). Alternatively we may talk of appeals to authority in the context of a dialogue, in which arguments may shift the burden of proof; in this context an appeal to authority may provide reasonable grounds for shifting burden of proof, if not proving, the acceptability of the conclusion. For example suppose a person justifies their belief in a claim by appealing to the testimony of an expert who supports the claim, intuitively the burden of proof would then be passed on to their interlocutor to challenge the reliability of the expert opinion. In this sense a move in argumentation that fails to meet the standards of deductive logic, or follows a pattern typically associated with fallacious reasoning, may nevertheless be an acceptable move in NLA. Approaches such as Walton's (2008) argumentation schemes and critical questions have been used to explore how traditional fallacies may be acceptable in some contexts, although this remains subject to debate in the literature (Mizrahi 2013).

A question that arises is the relationship between fallacies and other ways of talking about errors in argumentation, such as the influence of bias, cognitive bias and cues on decision making. While fallacies receive much attention in the literature, discussion of bias and other issues is more limited and conditional. The relationship between fallacies, biases and other problems in reasoning is complicated by

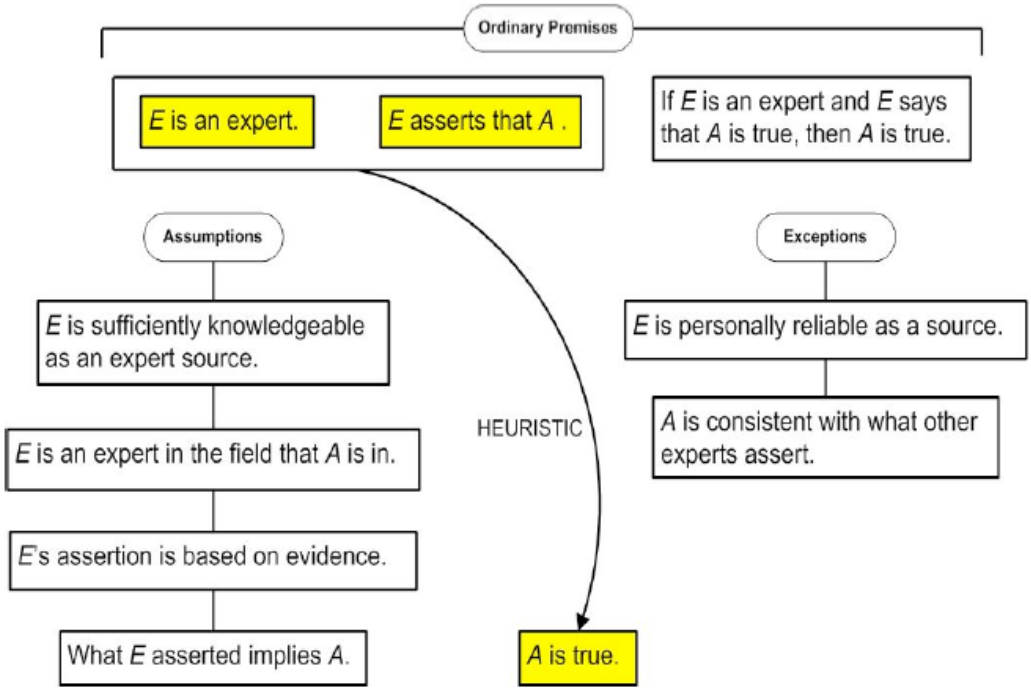
ambiguities pertaining to conceptions of argument, and the motivation by some theorists to place boundaries between different sources of error and other theorists to test those boundaries. For example, Johnson and Blair's (1977) definition of fallacies contrasts fallacies with other "mistaken beliefs". The example they provide is that of the "gambler's fallacy", the mistaken belief that if something happens more/less frequently in a given period it will become less/more likely in the future. If we understand argument as including modes relating to factors such as dress, tone of voice and the emotional force of language use as Groarke (2015), Gilbert (2004) and Macagno and Walton (2014) advocate, then talk of other forms of bias begins to be subsumed within an understanding of argument and fallacy, for example we could begin to talk about the influence of cues relating to perceptions of status, gender, class and so on in terms of fallacies.

Blair (2012) discusses bias but places the discussion within the topic of critical thinking rather than informal logic. His discussion relates to a different, intuitive sense of the non-technical word bias, rather than cognitive bias. Blair (2012) identifies three senses of the word bias: 1) bad and avoidable, bias as violating the norms of impartiality; 2) unavoidable and potentially dangerous, such as the unavoidable bias involved in reporting news; 3) unavoidable and good or neutral. Hitchcock (2014) suggest that Blair's (2012) conception of bias neglects cognitive bias and issues pertaining to confirmation bias that arise from worldviews or unconscious commitments.

Maynes' (2015) discusses the influence of cognitive bias on critical thinking and techniques for debiasing and developing skills to overcome bias. Maynes' (2015) discussion highlights three forms of cognitive bias: Hindsight bias, blind spot bias, and false consensus bias. Hindsight bias is the tendency to see events as inevitable or highly likely after they have occurred. Blind spot bias is the tendency to identify biases in others rather than in our own reasoning. False consensus bias is the tendency to believe that one's own beliefs are more widely shared than they are. Maynes' discussion draws on Dual-Systems theory of Gigerenzer (Kahneman 2011 in Maynes 2015) as a way of understanding what cognitive bias is and how it impacts our capacity to think critically about arguments. Dual-Systems theory draws a

distinction between quick heuristic driven thinking (system 1) and slow, deliberative reasoning (system 2). His discussion also highlight a number of techniques used to support debiasing, such as structuring discussion around considering alternative view points, or requiring individuals to explain the details of a policy before asking them their opinion on it. The examples of bias that Maynes' (2015) focuses on relate to general problems with an individual's capacity to process arguments and make judgements about probability, this may be contrasted with concerns relating to the socially situated nature of argumentation, of which cognitive psychology suggests there are issues around cues such as status, class, gender, race and so on. In the discussion, a contrast is made between system 1 and 2 thinking, with cognitive bias aligned with system 1, heuristic driven thinking, rather than system 2. Yet intuitively, in practice, slower, more effortful thinking and deliberation remains vulnerable to cognitive bias and systematic distortion.

Walton (2010) appeals to the idea of heuristics and cognitive bias in exploring why fallacies appear convincing; this suggests that one can think of fallacies not only in terms of errors of reasoning but in relation to cognitive errors. Walton interprets heuristics as a mediating concept between fallacies and a defensible argumentation scheme. Thus in the example below of an appeal to expert opinion, Walton suggests that heuristic reasoning results in the individual failing to scrutinise the argument and explore critical questions relating to the claim.



Walton 2010:170

Like Maynes (2015), Walton draws on Dual-Systems theory of reasoning, and appeals to an idea of slow deliberative thinking as a means of overcoming cognitive bias and fallacies, he argues "if there's time, the new (controlled, conscious and slow) system can come in and ask critical questions, looking at logical considerations pro and contra. The old argument might stand up to this kind of scrutiny, or it might not" (Walton 2010:181).

Non Verbal Arguments

The role of visual arguments is closely associated with the work of Blair (2012), with the suggestion that art, film, advertisements, political cartoons, graphs and so on may constitute an argument under certain conditions. Blair (1996, 2012) claims the study of argument from Aristotle onwards has assumed it to be paradigmatically verbal and asks whether visual phenomena can be classed as arguments, how these relate to verbal arguments and how they should be evaluated. In his discussion Blair attempts to discriminate between visual images that simply express a statement or sentiment or evoke a certain emotional response, from images that can be said to be

making an argument. Blair's argument is that visual phenomena can be treated as arguments, and that they should not be treated in a way that is fundamentally different from verbal arguments. Arguably the reason Blair comes to this conclusion is because he defines visual arguments so narrowly, to things that can be unambiguously expressed and evaluated as verbal arguments.

Blair (2012:212) presents examples of art to help support his distinction. He claims that Picasso's "Guernica" expresses horror but is too ambiguous to be classed as an argument, while Jacques-Louis David's "Death of Marat" can be reasonably interpreted as an argument with premises and a conclusion; the premises that "Marat gave his last penny to the poor", that "he was a benefactor of the unfortunate", and that "he was a poor man of dignity and composure" support the conclusion that "Marat was a great Martyr" (Blair 2012:212). Blair also turns his attention to film, suggesting that *Batman* may be considered simply entertainment, other films such as *JFK* may be making a statement, but only in some cases may they be interpreted as making an argument.

One could argue that the debate Blair is having is not unique to visual forms of communication, but is rather part of a broader debate about the extent to which we can or should interpret things that are not expressed as traditional verbal arguments as if they were arguments. It is not clear why Blair's (2012) comments about visual media could not be applied to novels (see Plumer 2015) or spoken word poetry. Despite opening up the debate on the potential for visual arguments (and art or metaphor in general), Blair (2012) is cautious about what should be classed as argument, warning against conflating argument with rhetoric and treating anything that is persuasive as if it were an argument. Blair (2012:216) suggests that only art, advertisement and cartoons that provide enough information to permit an "unambiguous reconstruction" of premise(s) and conclusion should be classed as an argument. Nevertheless this caution does not overcome the sense in which all visual or metaphorical communication involves a degree of ambiguity and a requirement for interpretation in order to translate it into a traditional argument. Other debates in informal logic have highlighted the problem of identifying enthymemes and

assuming implicit commitments on the part of the person expressing the argument (Walton 2008), and these problems would clearly be present in any process by which a piece of art or literature was interpreted and re-expressed in the form of premise(s) and conclusion. The claim that in rare cases a visual image can be sufficiently unambiguous in communicating a message that includes a conclusion based on reasons or premises, such that we can plausibly interpret it as making an argument, is not a particularly controversial conclusion. Nevertheless Blair's (2012) discussion highlights a potentially broader concern within the literature.

It is possible to develop these ideas and suggest that the central concern is really about the relationship between verbal argument and the range of phenomena that influence our beliefs, attitudes and reasoning. It would be uncontroversial to claim that a range of verbal and non-verbal phenomena exist which do not take the form of propositions or arguments, but nevertheless influence our beliefs, attitudes and behaviour in a way that can be relevant to NLAs. This might include rhetoric and art discussed by Blair (2012), but we can also talk of non-verbal communication, emotion, personal or shared experiences, events and general cognitive cues that individuals respond to (discussed in other literature for example, Mendelberg 2002). For example, a recent disaster involving a power plant or a mine may influence the position that people take on issues relating to energy policy, including how the issue is framed and how persuasive arguments are to participants in debate. This will be relevant to an enquiry into the quality of reasoning in the debate. In so far as these phenomena influence attitudes, arguments and behaviour, they will be of interest to those studying informal logic and NLAs. This invites the question of the extent to which our concept of argument, and the study of argumentation, can or should engage with persuasive phenomena not expressed as a verbal argument. We might anticipate a few issues in this regard: the epistemological challenge of identifying these factors and the sense in which certain factors may elude conscious identification and articulation. As we consider the broader range of influences on our beliefs, there is a question of how we identify rational behaviour in each case, who should be identifying these other influences, how might they do this, and how should these judgements be validated. Blair's (2012) discussion of visual argument moves

towards these issues but then returns to a more conservative view of what can count as argument which relies on a dubious distinction between ambiguous and unambiguous messages in art.

Emotion and Modes of Argument

Gilbert (1997) has been influential in advocating a broader interpretation of argument and rationality. This includes accepting the role of emotion in reasoning and decision making. Gilbert (2004) observes a cautious shift in attitudes towards emotion and "emotional reasoning" in informal logic, from a general prejudice against emotion to a broader recognition of the need to accept or at least examine alternative forms of argument and better understand their place in everyday argument and decision making. Gilbert (2004) draws on Willards' (1989) understanding of argument, broadly described as a form of interaction in which two or more people maintain what they construe to be incompatible positions. Gilbert also discusses the mode of argument, identifying four categories: Logical, emotional, visceral and kisceral. Gilbert argues that these modes of argument can be treated in a similar way analytically to logical argument. In his analysis of emotional modes of argument Gilbert (2004) uses Johnson and Blair's (1977) criteria of acceptability, relevance and sufficiency as a framework for evaluating argumentation. Gilbert (1997) also suggests there can be fallacious and non-fallacious instances of different modes of argument. The mode of argument is not related to the method of communication, it is argued that logical arguments can be verbal and non-verbal; for example emotional arguments can be expressed through the tone of the voice, or through the content of what is being said. The mode would appear to have more to do with the nature of the force of persuasiveness of the argument. To use Gilbert's (1997:79) terminology, the different modes of argument, logical, emotional, visceral and kisceral, have a different "mythic source", "the head, the heart, the gut and the senses".

To support his case, Gilbert provides examples of each mode of argument. For example suppose Jane asks Jack why she should marry him, and Jack replies "because I love you as life itself" (Gilbert 2004:247). It is argued that this is not a logical

argument, since its force is derived from its emotional aspect, and the grounds for accepting it do not depend on logical reasoning but reflection on emotions. In response Gilbert develops the idea of an emotional mode of logic. In a similar way visceral is described as a mode of argument that occurs at the physical or gut level, an example Gilbert (1997) provides is one of responding to someone else's stress or pain with physical support. Kisceral, which appears to be a neologism developed by Gilbert (2004), is described as intuitive and sensory, for example choosing not to buy a house because it feels creepy, or persuading a person not to accept an offer because they have a feeling they will get a better one (Gilbert 1997). According to Gilbert the kisceral mode of logic can include hunches and spiritual experiences.

As Gilbert observes, emotion has traditionally been seen as anathema to good reasoning and logic, and this would certainly be true also of the other modes of reasoning he identifies. Intuitively, the very notion of hunches would appear to be an invitation to bad reasoning and unjustified prejudices, something that would need to be exorcised from any decision making process rather than given serious consideration. Gilbert's (2004) position consists of first recognising the descriptive fact that these non-logical factors are persuasive in real world decision situations. Furthermore, he would claim that most arguments in natural language are not purely logical but consist of other types of considerations that relate to other modes of reasoning. Gilbert would also claim that under certain circumstances logic is not an appropriate mode with which to analyse the persuasiveness of an argument, and that under certain circumstances there are good reasons for accepting emotional, visceral or kisceral modes of argument. Gilbert argues that like logical modes of argument, other modes can be fallacious or non-fallacious. Many of the examples that informal logicians may have considered when dismissing emotion and other modes of logic, may just be misapplication of emotional modes of argument to logical modes; in this sense the issue may be with fallacious reasoning rather than a fundamental problem with emotion as a basis for decisions. For example it would clearly be fallacious and unacceptable to take a detective's hunch that a suspect is guilty as good reason for doing anything other than thoroughly investigating the possibility and seeking evidence acceptable under logical modes of argument.

Gilbert's arguments represent a paradigmatic challenge to informal logic, yet in some ways his claims are much more modest than they may first appear, and there has been engagement with these ideas in the general literature (Blair 2012). An initial methodological concern relates to the distinction between categories; for example it is not clear that visceral and kisceral could not be subsumed within the category of the emotional mode of argument. The examples that Gilbert (2004) provides of visceral argument could be plausibly interpreted as non-verbal emotional argument and it is not clear what we lose if we choose to talk of "a creepy feeling in a house" as being an emotional response rather than a kisceral response. In other words it is not clear how these modes of argument would operate differently in terms of whether they were acceptable or not. Indeed Gilbert often treats different modes of argument as if they have very similar qualities analytically. As with all discussion of theories in informal logic there are two broad concerns; how one identifies argument to prepare it for analysis, and the standards one uses to evaluate the argument. Gilbert's (2004) arguments encounter a number of challenges specific to the broader notion of argument he is proposing.

Gilbert (2004) provides a number of examples that he suggests could be interpreted as forms of argument; crocodile tears, people dressing to look professional or to look richer than they are, confidence in tone being used to persuade, emotion in voice being used to express intensity of feeling. Such a discussion engages with the broader issues of rhetoric and non-logical factors influencing NLAs and decision making, as mentioned in the discussion of non-verbal arguments. There are a number of challenges in preparing such a broad understanding of argument for analysis; firstly the people involved may not be aware that they are presenting such arguments, a person is not necessarily aware or in control of the confidence or emotion in their voice or how this influences the way their arguments appear to others. In this sense we may be attributing arguments to people that they have no intention of expressing in a traditional sense. There is a further epistemological challenge of interpreting and identifying all the relevant factors that contribute to the argument and its persuasiveness in debate. Gilbert (2004) makes the argument for acknowledging that

these factors exist, that they cannot be treated or reduced to logical arguments, but the method of identifying them remains unclear.

Gilbert (2004) frames discussion of the evaluation of emotional modes of argument around the criteria of acceptability, relevance and sufficiency. The suggestion is that in a broad sense emotional modes of argument can be evaluated in a similar way to logical modes of argument, and that there can be fallacious and non-fallacious arguments in this context. In his discussion of acceptability, Gilbert notes that debates within informal logic over acceptability have focused on what participants accept or know to be true or false. Emotions cannot be true or false, but rather assertions of emotions can be evaluated as either being sincere or insincere, and Gilbert (2004) argues that verifying emotional arguments may be difficult in some cases but no more difficult than verifying logical arguments. The issue of relevance is particularly central to Gilbert's project, which can be understood as an argument for the relevance and role of emotion in NLAs. On the subject of relevance, Gilbert discusses the following example;

> M: So we're agreed, Catherine should receive the promotion
> E: Yes but then we ought to give Harold a merit increase
> M: Well there are more deserving than him,
> E: Perhaps but he's going to feel bad about not getting the promotion, so this will at least be some recognition
> M: I see your point, but I'm not sure it is relevant, I mean...
>
> (Gilbert 2004: 255)

Establishing the role of emotions and their relevance to the decision is complex. E is putting forward Harold's emotions as a reason for giving him a raise. In addition one could also factor in E's emotions of feeling bad about not giving Harold a raise which is arguably implicit in the argument. M may be persuaded by this, concluding that Harold might have reasonably expected a promotion and the raise may be good for morale, alternatively M might be persuaded by other considerations, such as whether this would be consistent or fair to other employees. Gilbert's (2004) aim is

to establish that emotion may or may not be relevant in this given case, but it cannot be dismissed entirely. In other cases, the relevance of emotion may be clearer. Emotional considerations, such as potential upset to parties involved, are intuitively relevant to a couple deciding whether to forgo celebrating their anniversary to attend a work conference. A couple deciding whether to forgo celebrating their anniversary to attend a work conference, might be reasonably expected to consider emotional factors, such as upset caused. In contrast, an examiner deciding whether to pass or fail a student, might be reasonably expected to remain impartial to emotional considerations. Gilbert is not proposing how one determines relevance, either in logical or emotional modes of argument, but is suggesting that it is not obviously more difficult to determine in cases of emotional modes of argument as logic. The subject of sufficiency is one that Gilbert (2004) suggests is the most challenging and problematic. He acknowledges that the issue of sufficiency remains subject to debate in informal logic and is central to the project of informal logic. Much discussion rests on grounding validity in some notion of the acceptability of the inference to the audience. This challenge consists of avoiding the problems of relativism and absolutism (Perelman and Olbrechts-Tyteca's 1969). In this respect he suggests that emotional arguments should be treated no differently; thus the question of whether Harold's feelings and other factors are sufficient to warrant the raise depend on the judgement of M and E as to whether they are (or should be) persuasive.

Gilbert's argument is that emotional modes of argument can be treated in a similar way to logical modes of argument. He argues that similar rules apply to both logical and emotional modes, including "veracity, non-exageration, avoidance of bias, consideration of alternatives, and so on" (Gilbert 2004:261). Gilbert further argues that dismissing the role of emotions can be as fallacious as their overuse or misapplication. In so far as we accept that emotional modes of argument have a place in rational debate, and they hold a similar status to logical modes of argument, we could anticipate that they present similar problems. Indeed, Gilbert's argument that emotional modes of argument can be treated like logical modes of argument is achieved by demonstrating how deeply problematic logical modes of argument are.

As literature on informal logic has highlighted, questions of argument identification and argument evaluation have given rise to much debate and disagreement, particularly there is an issue of what it means to produce a theory of argumentation that is useful and meaningful in real world situations and NLAs. Gilbert is not only proposing a separate mode of argument, but implicit within his work is a much broader understanding of the forms that argument can take, including verbal, non-verbal, and the variety within these categories, such as tone and content, issues of whether the aspects of argument are intended or not, and potential varieties in interpretation. In this sense, Gilbert's arguments place a great number of demands on any argumentation theory, expecting a theory to address identification, evaluation, different modes of logic, and a very broad understanding of the form of argument.

Gilbert's (2004) discussion challenges the boundaries of informal logic and confronts us with the dangers of concept stretching and disorder. The next section will discuss the pragma-dialectic approach and dialogue types. This approach refocuses discussion on NLAs and speech. Furthermore, it offers an approach to managing some of the issues discussed above by breaking down communication, not by categories of verbal/non-verbal, emotional or logical, but according to the goals and aims of a given case of communication.

Pragma-Dialectics

Pragma-Dialectics is an approach to the study of argumentation developed by Frans van Eemeren and Rob Grotendorst (1984) and identified with the Department of Speech, Communication and Argumentation Theory at the University of Amsterdam. The term "Pragma-Dialectics" reflects the role of pragmatics and dialectics on the theory. The theory construes argument as a speech act with a social purpose, in this respect it draws on Searle's speech act theory, which belongs to the field of pragmatics. The theory also understands the speech act of argumentation as occurring in the context of a dialogue between two people. Blair (2012) argues that we can think of "pragma-dialectics" as an approach to argumentation that should be

distinguished from the particular expression and formulation of that approach by van Eemeren and Grotendorst (1984). In this sense "pragma-dialectics" as a general approach can be said to be the dominant current approach to argumentation and informal logic (Secades 2015); Krabbe and van Laar (2007) identify a "dialectical turn" in argumentation, such that various influential theorists such as Walton (1990), Johnson (2000), and Blair (2012) have developed an understanding of argumentation that construes arguments as speech acts with a dialectical tier or in the context of a dialogue (Blair 2012).

The pragma-dialectics approach, as developed by van Eemeren and Grootendorst, defines argumentation as "a verbal activity, a social activity and a rational activity" (van Eemeren and Grootendorst 2004:2). They identify argumentation as a particular type of interaction which they identify, in ideal terms, as a "critical discussion". Argumentation ideally consists of four stages: 1) "confrontation", the two speakers express a difference of opinion; 2) "opening", the speakers agree on procedural and substantive starting points for resolving the disagreement; 3) "argumentation", in which argumentation is advanced and responded to; 4) "conclusion", where the speakers jointly decide whether and how the difference has been resolved (van Eemeren and Grootendorst 2004:59-62). In addition to these stages, van Eemeren and Grotendorst (2004) offer 10 rules of conduct for a critical discussion. A fallacy is understood as a violation of one of these ten rules, or as a move which disrupts or derails the process of rationally resolving a difference of opinion. These rules are summarised below.

> 1) Freedom Rule: Discussants may not prevent each other from advancing standpoints or from calling standpoints into question
>
> 2) Obligation to defend rule: Discussants who advance a standpoint may not refuse to defend this standpoint when requested to do so
>
> 3) Standpoint rule: Attacks on standpoints may not bear on a standpoint that has not actually been put forward by the other party

4) Relevance rule: Standpoints may not be defended by non-argumentation or argumentation that is not relevant to the standpoint

5) Unexpressed-premise rule: Discussants may not falsely attribute unexpressed premises to the other party, nor disown responsibility for their own unexpressed premises

6) Starting-point rule: Discussants may not falsely present something as an accepted starting point or falsely deny that something is an accepted starting point

7) Validity rule: Reasoning that in an argumentation is presented as formally conclusive may not be invalid in a logical sense

8) Argument Scheme Rule: Standpoints may not be regarded as conclusively defended by argumentation that is not presented as based on formally conclusive reasoning if the defence does not take place by means of appropriate argument schemes that are applied correctly

9) Concluding Rule: Inconclusive defences of standpoints may not lead to maintaining these standpoints, and conclusive defences of standpoints may not lead to maintaining expressions of doubt concerning these standpoints

10) Language use rule: Discussants may not use any formulations that are insufficiently clear or confusingly ambiguous, and they may not deliberately misinterpret the other party's formulations

(van Eemeren and Grotendorst 2004:190-195)

It is helpful to highlight a number of further characteristics of the pragma-dialectical approach advanced by van Eemeren and Grotendorst (2004). Although argumentation is defined in terms of a critical discussion consisting of speech acts, involving two people with a social purpose, it is claimed that a range of other practices can be understood and interpreted according to this framework; this includes written arguments, visual arguments, monological arguments such as speeches and essays. In this sense "critical discussion" operates as an ideal model, with actual argumentation reconstructed and evaluated as if it were supposed to conform to this model (van Eemeren and Grotendorst (2004:95). The focus of analysis is on expressions or speech acts, rather than beliefs or other psychological factors, although arguably some of the rules of conduct allow psychological considerations to feature, for example rules (5), (6) and (10) above appear to entail judgement about the sincerity and beliefs of the speakers. Blair (2012) observes that the theory assumes a Popperian critical rationalist epistemology, that the closest that it is possible to arrive at scientific truth is the survival of attempts at refutation.

Blair (2012) outlines some of the ways in which the pragma-dialectical model, as conceived by the Amsterdam theory, might be rejected. To summarise he suggests: 1) critical rationalism is rejected, in favour of different epistemological assumptions; 2) Searlean speech act theory, or its application to argumentation may be rejected; 3) argument reconstruction theory is rejected; 4) the theory of fallacy is rejected; 5) the four stages of critical discussion may be rejected or understood to apply to one type of argumentation; 6) the rules of conducted may be challenged, they may be seen as not exhaustive or in need of revision, some of the rules may be regarded as derivative (entailed by others) while others may be basic, as argued by Vilhelm Hansen (2003 in Blair 2012:287); 7) either not all argumentation can be modelled as an attempt to resolve a difference of opinion, or else it is not fruitful to try to assimilate all argumentation to that model; 8) ideal model theorising is rejected; Goodwin (2001) challenges the thought that consensus or agreement should be understood as the goal of argumentation (Goodwin 2001 in Blair 2012), and Blair (2012) discusses epistemic investigation as an alternative to critical discussion; 9) the

primacy of the dialectical is rejected, for example in favour of a rhetorical perspective (Tindale 2004 in Blair 2012:288) (Blair 2012:285-288).

To illustrate the limitations of the scope of the pragma-dialectical approach, Blair (2012) asks whether an epistemic investigation is a critical discussion or could be helpfully understood as a critical discussion. He argues that arguments can be used to conduct an epistemic investigation. Blair (2012:294-295) characterises an epistemic investigation as one in which there is a question that has two or more possible, plausible but incompatible answers. The stages or elements (to avoid the assumption that they take place sequentially) of epistemic investigations are described as 1) evidence gathering; 2) evidence assessment; 3) evidence revision based on assessment; 4) hypothesis revision. Blair argues that this investigation can be modelled as a dialogue, involving a questioner and someone who responds to these questions, however he is sceptical that their roles and the actions taking place are best understood as a critical discussion. For example, he argues that the role of antagonist and protagonist of pragma-dialectical theory do not fit this situation. He argues;

> An epistemic investigation has a different starting point and a different objective from a persuasion dialogue. There are not two parties who disagree, neither is trying to convince the other of anything, all parties take a pro and a contra perspective, seeking to find arguments that support a hypothesis and also refute the arguments they have found. The discussion rules (of epistemic investigations and critical discussions) differ in many ways. An investigation is not motivated by incompatible agreements but an absence of commitment on which all parties want to decide what commitment is justified. In critical discussions the burden of proof is asymmetrical: who asserts must defend, who questions has no obligation to defend. In an investigation, the burden of proof is complicated; the investigators have an obligation to seek both pro and contra arguments, but once the arguments have been formulated the burden of proof lies with the

> "critic" not the "proponent", the argument stands until some further argument weakens it. (Blair 2012:296)

In this sense it could be argued that the "critical discussion" framework of pragma-dialectics imposes too many assumptions on the nature of the role of those engaged in argumentation and the norms that should govern their interaction, such that it is unhelpful or obscures the issues in some contexts. One possible response to this, that retains the pragmatic approach of pragma-dialectics, can be found in the work of Walton.

Walton, Dialogue Types and Argumentation Schemes and Critical Questions

Walton is widely acknowledged as an influential and prolific writer in the field of informal logic (Blair 2012). This section will focus on his work on dialogue types, argumentation schemes and critical questions. As will be discussed further in the second section, the concept of dialogue types and argumentation schemes may provide us with a framework in which to talk about how communication breaks down in deliberation, as well as supporting people engaged in argumentation in identifying sources of error and distinguishing between fair and unfair criticism, or legitimate and illegitimate moves in dialogue.

Dialogue Types

The pragma-dialectical approach has been influential in encouraging theorists to recognise dialectical aspects of argumentation, the sense in which argumentation is a purposeful, social activity and the need for argument assessment and evaluation to take into account the social context and dialectical tier of argumentation (Blair 2012). There are concerns over the extent to which it is appropriate to talk about the goals of argumentation or NLAs as fitting the critical discussion model, or having the goal of reaching agreement (Blair 2012). A potential response to this issue can be found in Walton's work, which suggests that there are various dialogue types, of which persuasion dialogue (or critical discussion), is just one example (Walton and Krabbe 1995). Walton et al (2008) identify seven basic dialogue types that differ in

relation to the initiating situation, the goal of the dialogue and the goals of the participants. These dialogue types are summarised in the table below

Dialogue Type	Initial Situation	Participant's Goal	Goal of Dialogue
Persuasion	Conflict of Opinion	Persuade Other Party	Resolve Issue
Inquiry	Need to Have Proof	Verify Evidence	Prove Hypothesis
Discovery	Need for Explanation	Find a Hypothesis	Support Hypothesis
Negotiation	Conflict of Interests	Secure Interests	Settle Issue
Information	Need Information	Acquire Information	Exchange Information
Deliberation	Practical Choice	Fit Goals and Actions	Decide What to Do
Eristic	Personal Conflict	Attack an Opponent	Reveal Deep Conflict

Walton (1992) makes two important points in relation to his approach. The first is the notion of dialogue shifts which can take place during communication; for example, deliberation may reveal gaps in knowledge which motivate participants to enter into an information dialogue. Secondly Walton emphasises that each dialogue type can be understood as appropriate in certain situations; for example, he argues that eristic dialogue, or quarrels, should not be understood as purely negative forms of communication but could be beneficial in avoiding violence, and allowing people's feelings to be expressed. Walton's dialogue theory invites the question of how these negotiations should be evaluated, and whether different evaluative standards should be applied in different cases. For example, the criteria by which we judge whether deliberation involves good communication might be different from the criteria we judge eristic dialogue to be good or bad. Walton (1992) describes how some dialogue shifts can be inappropriate (he discusses the relationship between fallacies and dialogue shifts), others can be helpful. The example Walton provides is one of a divorced couple discussing custody of their children; it is suggested that the discussion might take the form of negotiation initially, in which the couple try to secure their own interests against the other, in these cases a mediator may try to move the dialogue type to a critical discussion in which the issue is looked at more

objectively in terms of who is best able to look after the children (Walton 1992). The implication of such comments would appear to be a further meta-standard by which a conversation is judged in relation to the type of dialogue it is and the type of dialogue it should be.

Krabbe and van Laar (2007) question the method by which dialogue types are identified. For example, they question whether the "examination dialogue" discussed by Walton should constitute its own dialogue type or be subsumed in some other form of dialogue type. They also challenge the notion that argument takes place within all of these dialogue types as is claimed by Walton, suggesting that this may involve stretching the concept of argument too much. A central concern within the informal logic literature relates to the identification of argument and the standards of evaluation. The dialogue type approach incorporates within this task the issue of how we identify what type of dialogue is taking place, whether it is appropriate or not, and how we should evaluate the quality of that dialogue and any dialogue shifts. Walton (2007) notes that this is an emerging area of study, and, while there has been some research into dialogue types such as negotiation and deliberation, other areas have received less attention such as information seeking dialogue.

Argumentation Schemes and Critical Questions

Argumentation schemes and associated critical questions can be understood as tools for identifying the structure and assessing the cogency of natural language arguments (NLAs). Braet (2004) provides a historical discussion of argument schemes, identifying their presence in ancient texts. Hastings (1963) is credited with developing the idea of critical questions associated with argument schemes, these are questions that test the cogency of a given example of an argument scheme (Walton and Reed 2003). The pragma-dialectical approach to argumentation utilises argumentation schemes (van Eemeren and Grotendorst 1984), and in so far as argumentation schemes and critical questions treat argumentation as a dialectical process they can be understood as an alternative to Blair and Johnson's (1977) RSA model for assessing defeasible arguments (Blair 2012). Blair (2012) observes that the

fullest expression of the dialogue modelling approach to argument scheme theory can be found in the work of Douglas Walton, for example *Argumentation Schemes for Presumptive Reasoning* (1996) and *Argumentation Schemes* (Walton et al 2008).

Walton's (1996) account of argumentation schemes involves the concept of presumptive reasoning and burden of proof. A presumption is a plausible or provisionally acceptable argument, the acceptance of a presumption shifts the burden of proof to the participant in dialogue who aims to rebut the argument. This person may raise challenges that then shift the burden of proof to the person defending the claim. Walton (1996) presents an account of 25 argumentation schemes for presumptive reasoning, and an associated set of critical questions. Walton et al (2008) develop an account of 96 argumentation schemes in the later work *Argumenation Schemes*. The example below illustrates the form of an argumentation scheme note

Premise: There are bear tracks in the snow

Conclusion: A bear has passed this way

It is argued that this argument takes the form of "the argument from sign"

A is true in this situation

B is generally true in this situation when A, its sign, is true in this situation

Therefore B is true in this situation

It is further argued that the following critical questions are relevant to an assessment of the acceptability of this argument

1. What is the strength of correlation between the sign and the event signified?

2. Are there other events that could better account for the sign?

Walton (2007) acknowledges that work on argumentation schemes is in its infancy, and there remain a range of theoretical issues to tackle. Blair (2012) suggests that Walton's account raises a number of questions that remain unanswered, such as

where the argument schemes come from and the basis for the development of an argument scheme and the method of its application. Blair (2012) goes on to suggest that Walton does not clarify the relationship between the scheme and the critical questions, and fails to indicate how a list of critical questions could be considered complete. In his discussion Blair suggests that some examples of natural language arguments could be interpreted as fitting different schemes, and that some schemes such as the argument from signs above could group together arguments with otherwise very different reasoning implications; for example causal relations in the context of matters of fact, normative judgements, physical states (such as the presence of a bear discussed in the above example) and psychological states (such as nail biting being a sign of anxiety in an example discussed by Blair (2012:149). Concerning such debate the literature, Shecaira (2016:500) warns that theorists are in danger of "engaging in fruitless pseudo-disagreement because they fail to perceive that competing schemes are means for achieving different (but compatible) practical or theoretical goals". Blair (2012) feels that Walton's approach is promising but that further developments are needed to answer the questions he identifies and present a more robust or convincing account of argument schemes and their application.

Informal Logic and the Challenges of Online Deliberation

The above section outlined the field of informal logic and argumentation theory, highlighting key ideas, concepts and debates in the field. The informal logic literature is relevant to the online deliberation literature in two key respects. The theoretical literature develops an approach to decision making that may be contrasted with deliberative theory which has formed the theoretical background to discussions of online deliberation. Furthermore the field of informal logic has inspired the development of a wide variety of tools, platforms and techniques intended to support argumentation and other activities relevant to online deliberation; this includes the development of computational models of argumentation and defeasible artificial intelligence logics based on argumentation schemes (Gordon et al 2007, Atkinson and Bench-Capon 2007, Walton and Godden 2007), argument visualisation

techniques have also been developed in the context of software aimed at supporting argumentation for purposes such as learning and collaborative decision making (Atkinson 2006, De Liddo and Buckingham-Shum 2010b). In this sense informal logic offers insights into the nature of the challenges facing online deliberation, as well as practical solutions and techniques to support online deliberation.

The following section will consider the relationship between the respective approaches to decision making of informal logic and deliberative theory. The discussion will then address how these considerations relate to our understanding of the challenges of online deliberation. The discussion in this chapter will focus on the themes of participant behaviour and citizen capacity and information management and representation. The theoretical debates in the informal logic literature are particularly relevant to these challenges and the normative and epistemological issues they raise. In contrast, at a theoretical level, informal logic has less to say about the issues raised by the challenges of participant engagement and feasibility and scale. Discussion of these challenges will be reserved for later chapters, where we explore empirical applications of informal logic and the experiences of platforms in practice.

Informal Logic and Deliberative Theory

Informal logic and deliberative democratic theory share many common areas of interest; broadly speaking both are concerned with better understanding and fostering the force of the better argument in decision making situations. There are also parallel debates over a range of issues including the role of rationality and consensus in argumentation, how social context relates to the process of argumentation and decision making, the norms that govern argumentation and how to identify good reasons. There are also significant differences between the fields, with each field approaching the subject of argumentation and decision making with a different set of conceptual tools, as well as a different set of priorities and concerns with regards the issues to explore. Comparison between the fields is complicated further by the sense that many of the concepts and approaches to decision making are subject to contest and debate within their respective literatures.

Despite the shared areas of concern and the opportunities presented by different approaches to related issues, there is very limited engagement between the two fields. In reference to Habermas and deliberative democratic theory, Kock (2007:240) writes "It is a curious fact that outside of argumentation theory proper, there is another school of thought which has central notions in common with Pragma-dialectics, and which has had an even wider resonance, yet the two schools seem to have almost no cognizance of each other." Reflecting on pragma-dialectics and deliberative theory, Curato (2012) observes that while deliberative democratic theory has linguistic foundations- Habermas grounds his account of deliberation in universal pragmatics- much research into deliberative democracy does not return to this issue. Furthermore Curato (2012:8) argues the work initiated by Habermas can be considered unfinished and key questions remain unanswered such as "What is an argument?", "What are the standards for reasonableness?", "What moves in deliberation distort communication?" This section will address how informal logic and argumentation theory may provide insight into these issues in deliberative theory and online deliberation.

Understanding of the Decision-Making Process: The Context and Content of Deliberation

Deliberative democracy and informal logic present different understandings of the decision-making process. Indeed, the term "decision making process" is problematic, given the varied nature of the activities that deliberative democracy and informal logic are interested in.

The deliberative literature focuses on decision making as a dialogue between two or more people; arguably the most common way of talking about decision making in deliberative literature is as a forum in which people with conflicting opinions engage in debate (Chambers 2003). In addition to discussion of debate in forums, the deliberative literature is also concerned with the concept of a public sphere; this is understood as a broader social phenomenon, a space in which individuals can engage one another as a public to resolve social problems (Habermas 1962). This idea has been discussed in various ways but tends to take a broader focus on the relationship

between public, media and conditions of communication (Baek 2009). The public sphere can be understood in contrast to debates around specific forums, mini-publics, and the way forums are structured or organised (Thompson 2008). Researchers vary in their conceptualisations of deliberation, notably over what conditions must be met for communication to be classed as deliberation, whether the process must result in a decision, and appropriate evaluative criteria. Tensions between broad and narrow conceptualisations of deliberation have led to concerns about concept stretching (see Steiner 2008). The implicit focus of online deliberation literature, evidenced in the analysis in Chapter 1, has been debate over public policy, current affairs, social problems and ethical issues.

Informal logic is often defined as the study of natural language arguments (Johnson and Blair 1987). It is therefore rooted in an understanding of debate and decision making as it takes place in the real world under conditions of uncertainty (Walton and Godden 2007). Despite the motivation to base informal logic on arguments and decisions as they take place in the real world (Walton and Godden 2007, Atkinson 2006), there is a sense in which the approach of informal logic can involve separating the argument from the context of real world dialogue. A significant debate in the informal logic literature is whether argument is an abstract object or a speech act, and the relationship between argument and argumentation. The idea of argument as a speech act, associated with a particular social context and purpose, is a relatively recent development in informal logic. It is associated with writers such as Pinto (2009), the later work of Johnson (Johnson 2000), Walton (Walton et al 2008) and the pragma-dialectic approach to informal logic (van Eemeran and Grootendorst 2004). This development in informal logic can be understood as a response to the perceived neglect of the dialectical elements of argumentation and recognition of the need to consider further the social context of arguers and argumentation. In the absence of such considerations, it could be argued that the informal logic approach would assume argumentation under the conditions of an ideal speech situation, and thus exclude various concerns that influence real world decision making.

The pragma-dialectic approach of van Eemeran and Grootendorst (1984) and the pragmatic approach to argumentation developed by Walton (Walton et al 2008) have some similarities and interesting points of contrast with deliberative theory (Curato 2012). Van Eemeran and Grootendorst's (1984) concept of the critical discussion is similar to what is typically evoked when deliberative theorists talk of deliberation. The ten rules of conduct arguably reach for similar principles as those expressed in discourse ethics (Habermas 1991); for example, rule (1), the freedom rule, would appear to be demanding inclusiveness and the opportunity for all participants to introduce arguments and challenge arguments of others, as required in discourse ethics. Rule (10) requires participants not to deliberately misinterpret others or express themselves in ambiguous ways reflecting a similar principle involved in discourse ethics for sincere and respectful engagement with others. The thought that argumentation should be understood as an attempt to resolve disagreement through rational persuasion, and the challenges that this understanding has faced from Govier (1998) and others (Blair 2012) would seem to mirror anxiety in the deliberative theory literature over the place of consensus, inter-subjective rationality and mutual understanding as goals of deliberation (Thompson 2008).

It is helpful to reflect on Walton's pragmatic theory of argumentation (Walton et al 2008) in our consideration of what is meant by "deliberation" in deliberative theory and how this relates to argumentation and the field of informal logic. "Critical discussion" as described by van Eemeran and Grotendorst (2004) initially appears to capture what is typically meant by deliberation in deliberative theory. Blair (2012) has argued that the pragma-dialectical model of argumentation as critical discussion, involving protagonists and antagonists, is limited and that argumentation has broader applications, for example in epistemic investigations. Walton's pragmatic theory, involving different dialogue types reflecting different goals and norms, would appear to be one way of thinking about other contexts of argumentation.

A number of dialogue types identified by Walton et al (2008) appear relevant to the way deliberative theorists talk about deliberation. "Deliberation" and 'persuasion" dialogue types have uncontroversial relevance to deliberation. The deliberative

literature emphasises education as a goal and feature of the deliberative process (Gutmann and Thompson 1996), suggesting "information" and "inquiry" dialogue types may also be appropriate ways of thinking about deliberation. More controversially, some theorists involve bargaining and conflict in the concept of deliberation (see Mansbridge 2009, Young 1996), which are more accurately captured by "negotiation" and "eristic" dialogue types. These dialogue types provide a framework that clarifies the tensions in talk of deliberation, identifying competing (sometimes incompatible) conceptions of agent roles, goals and evaluative standards in deliberative processes. Walton discusses the notion of dialogue shifts in discourse, where moves from one dialogue type to another may be appropriate or inappropriate (Walton et al 2008). For example, it is claimed eristic dialogues may be negative or positive in preventing violence and allowing feelings to be expressed. In practice, judging where dialogue shifts are appropriate or inappropriate may be problematic, relying on counterfactual claims and a meta-evaluative framework. It is conceivable that a deliberative process that shifted into an eristic dialogue type could be at once responsible for preventing future violence, acting as a catalyst for future violence, allowing people to express themselves, while colluding in the suppression of the voice of the others. Nevertheless, Walton's framework of dialogue types and discussion of acceptable and unacceptable shifts in dialogue may form a way of mapping communication breakdown and understanding how deliberation becomes distorted. This could form the basis of a response to Curato's (2012) question for deliberative democracy "what moves in deliberation distort communication?"

There are important qualifications to consider when comparing the pragmatic approaches to argumentation in informal logic and deliberative democracy. The pragmatic approaches often assume that argumentation takes place between two people, rather than amongst many people (Blair 2012). Although Johnson and Kahane have observed that the desire to develop an account of reasoning relevant to political subject matter, specifically the war in Vietnam, was a central motivation for their interest in the project (Johnson 2014, Kahane 1971), the issue of politics and deliberation tends to be treated as a special case and is rarely engaged with in informal logic literature. In some cases, research has explored argumentation in

political settings (see Androne 2016 and Rowland 2016) but not engaged with the normative concerns of political science.

Johnson's (2014) essay on politics and informal logic and Kock's (2007) paper on the obligations of rhetors in political deliberation tackle the relationship between deliberation and politics directly. Both discussions are influenced by Johnson's (2000) discussion of "manifest rationality" and the notion of the dialectical tier in addition to the RSA criteria. Kock (2007) characterises political discussion as having the following features:

1. There will always be several good but contradictory arguments.
2. Contradictory arguments do not cancel out each other.
3. A good argument never entails a policy by necessity or inference.
4. Contradictory arguments often rely on plural values which are not objectively commensurable.
5. Contradictory arguments must nevertheless be compared for choices to be made.
6. Choices rely on individuals' value commitments and are subjective.
7. Debates between exponents of opposite policies cannot be expected to lead towards agreement, but may help other individuals consider and compare arguments the pro and con arguments relating to a policy

(Kock 2007:238)

Both Johnson (2014) and Kock (2007) develop similar ideas about the nature of political deliberation and the norms guiding participants. For example, both emphasise the significance of value pluralism, and the sense of political debate as dealing with a comparison or cost/benefit judgement involving incompatible and incommensurable propositions. Their discussion emphasises the need for argumentation to address alternative view points, this is described as an obligation of the rhetor and a requirement of argument. The writers also reflect on the purpose or benefit of political deliberation, given ambiguity around the judgements between different courses of action, their discussion appeals to an objective of better understanding and more informed decision making (Kock 2007). This engagement

with political discussion is not organised around the same set of concerns found in deliberative theory, specifically the issue of power. Deliberative theory emerges and is informed by critical theory and broader discussions in political theory, notably dialogues with postmodern theorists and feminist critiques (Dryzek 2010). Such discussions focus on nuanced understandings of the relationship between knowledge and power inequalities, exclusion, injustice and emancipation. Developments in informal logic allow space for talking about the role of power, particularly dialectical approaches and discussions of cognitive bias and non-verbal phenomena that influence argumentation. Nevertheless engagement with power and social dynamics has been limited. Discussion of power is a fringe issue in the literature and focuses on feminist analysis (see Gilbert 2004, Rooney and Hundley 2010, Lang 2010, Hundleby 2013, Carrillo et al 2004). Van Laar's (2008 discussion of ridicule) has parallels with the debates on politeness, civility and deliberation in the deliberative theory literature. Arguably informal logic would benefit greatly from further incorporation of the role of power. For example, the dialectical approaches emphasise argumentation as purposeful communication between agents, and while they outline ideal norms of behaviour, an analysis that considered the influence of power between agents may benefit the explanatory power of these approaches. Similarly, an analysis that considers how power inequalities produce systematic cognitive bias, or distort arguments and non-verbal phenomena influencing argumentation would strengthen accounts of sources of fallacies and bias.

Bondy (2010) discusses the concept of argumentative injustice; he places the discussion within Johnson's concept of manifest rationality. Manifest rationality implies that an argument must appear to be rational to both the participants in the exchange and to those interested in the issue. From this perpsective, Bondy (2010) discusses the idea of perceptions of credibility and "metadistrust". It is argued that social stereotypes prejudice an arguer's perception of others, and consequently compromise the rationality of the process by bestowing too little or excessive credibility to participants. For example, too little credibility may cause a participant's arguments to be unfairly dismissed by others, and this experience may diminish the participant's perception of their own capacity to the point that they do not offer

arguments. Excessive credibility may cause a participant to disregard challenges to their arguments, recognise the limits of their own situated knowledge and thus derail the rationality of the process. Bondy (2010) characterises social stereotypes as a type of emotional reaction in contrast to reasons; he argues that emotional reactions can persist in the face of reasons not to trust them. He illustrates this thought with his fear of flying that persists despite his understanding that it is statistically safer than traveling by car. This returns us to the discussion of Gilbert's modes of argument, and the role of emotion and non-verbal factors in argument; for example, factors such as the attire of candidates for a job interview, a prospective home buyer's feelings about a house. Incorporating these kinds of elements into our understanding of argument, heuristics and errors in reasoning, would allow us to talk about how power inequalities distort deliberation. Were informal logic researchers to develop this analysis we might anticipate that this would share many parallels with the arguments presented by critical theorists in political science. We should not that not all informal logic theorists recognise these elements to argumentation. Furthermore, for those that do, there remains the challenge of engaging with the following issues: How, as theorists, one analyses and identifies these elements of an argument, including their significance on the experience and outcomes of argumentation; how, as theorists or participants, one recognises and distinguishes between good and bad reasons for elements such as emotion influencing argument, especially when participants may have limited awareness of their influence. A potential approach to these challenges, which concern the fundamental method and goals of informal logic, will be discussed in greater detail in the following section.

Normative Commitment to Good Decision Making and the Goals of the Fields

The informal logic and deliberative literatures are both motivated by a commitment to the idea of good or better decision making, or some identifiably positive aim of discussion or argumentation. This aim is articulated in different ways, in the different fields and within each field. For example, deliberative democracy describes the goals of the force of the better argument (Habermas 1991), intersubjective consensus (Dryzek 2010), mutual understanding (Dryzek 2010) and the common good (Chamber

2003). Informal logic has been described in relation to the obligation to reason well (Blair 2012), rational resolution of disagreement (van Eemeran and Grootendorst 2004), with argument described as an invitation to inference (Blair 2012) and plausible reasoning (Walton et al 2008).

These terms reflect an effort to define the "good" which the field aims to understand and seek to support. In many cases the attempt to give a fuller account of this normative justification, for example the development of models of evaluation, has led to controversy and uncertainty. A contributing factor may stem from the fact that both informal logic and deliberative democracy tend to be interested in reasoning or decision making in the context of inequality, bias, incomplete knowledge and imperfect outcomes. In this sense each field is attempting to preserve some sense of progress or improvement while acknowledging the temporary and imperfect nature of any given instance of decision making or argumentation. This thought is implicit in the project of informal logic as a response to formal logic (Blair 2012, Atkinson 2006), it is also apparent in discussions of the unfinished project of modernity in deliberative democratic theory (Habermas 1981b).

In both literatures one can observe an existential anxiety and reflection on the purpose and nature of the project itself, a questioning of the legitimacy and effectiveness of the models and methods used, uncertainty over the standards used for judging decision making in practice, and concern that approaches may be counter-productive to the aims of the project. In relation to deliberative democracy, Landemore and Page (2015) describe the lack of normative standards by which to judge the wisdom of a decision, there is concern that the procedural norms described in deliberative theory contribute to exclusion and are overly disciplining (Baek 2007, Neblo 2007). Neblo (2007) highlights particular caution over the position of the researcher or theorist in deliberative democratic theory, the concern is to ensure that the judgement and prejudices of the researcher, or the results of a monologically developed system of evaluation, do not come to substitute the judgement of participants in the evaluation of deliberative process and their own interests and preferences.

In the case of informal logic it is possible to observe a tension between the desire to be receptive to the variety and ambiguity of NLAs and the desire to produce rigorous methods to support the interpretation and evaluation of NLAs. Informal logic develops from a concern with the restrictions and limitations of formal logic and deductive validity; this produces a movement towards elaborating the variations and elusiveness apparent in NLAs and ambiguity in real world reasoning. Yet advocates of informal logic are also interested in the obligation to reason well and the binding nature of argument (Blair 2012). Informal logic is therefore also motivated by the desire to better understand arguments to enable the study of arguments, and the enforcement of the obligations of good reasoning in arguments. This creates a different move towards identifying commonalities in the form of NLAs, and creating a well founded systematic method of identifying and evaluating arguments.

The danger of concept stretching or elaborating ever broader understandings of argumentation can entail that the task of interpretation and analysis becomes unmanageable, and a theory of argumentation loses explanatory value or force. There are a number of dangers associated with the desire to produce systematic theories of argumentation and argument cogency. A model may be ineffective (for example it is not convincing or helpful to any person engaged in real world argumentation) or it may be flawed (for example it might exclude legitimate considerations or aspects of argument or decision making). These ideas have been discussed in the informal logic literature (Hansen and Cohen 2011). In addition to these issues, the conception and application of the model may be fundamentally misplaced if it is demanding an illegitimate obligatory force. For example, if it is derived from the monological assertions of the model, theorist or observer. A concern that deliberative democratic theory is particularly sensitive to is the danger of monological reasoning illegitimately replacing the judgements of an intersubjective process; for example the risk of observers and researchers positioning themselves as enlightened judges in relation to a deliberative process studied (Neblo 2007). This concern must also apply to theories of argumentation and argument cogency. While bemoaning those who declare themselves sympathetic to

informal logic but retain “soundness” as a paradigm for argument cogency, Johnson and Blair (1987:148) give expression to this tension when they say “In calling for *no more* precision than the subject matter allows, we do not abandon the demand for *as much* precision as the subject matter allows”. Yet there is little agreement on how much precision informal logic allows, and in this sense there is uncertainty over what a theory of argumentation should do.

Reflecting on criticisms of Walton’s theory of argumentation and the concept of argumentation schemes. Blair (2012) asks of argumentation schemes, “where do they come from?”, “how can we be sure we’ve interpreted an argument correctly?” or “how can we determine when we’ve exhausted all critical questions?”. It is important to reflect on what a satisfactory answer to these questions might look like, and whether this is compatible with the level of precision that informal logic allows. It is possible that these questions demand too much of a tool for argument analysis, and pursuing such standards is counterproductive and harms these theories. It may be more helpful to ask “how useful is an argument scheme for people engaged in argument?”, “Do people who are in (fundamental) disagreement with one another find the argument scheme persuasive and helpful in reaching better understanding or agreement together?”, and if not, “what other aspects of the argumentation process should the theory be sensitive too that would allow better support for real world decisions?”. In this sense it might be helpful to shift the focus of our questions from the abstract issues of foundations to questions of practicality, including consideration of the experience and use of the tools developed in this field. Arguably the efforts to develop convincing theoretical foundations for evaluating argument are ultimately attempts to produce something that has force and is compelling to interlocutors in real world disagreements.

Hansen’s framework for evaluating the methods of informal logic highlights additional considerations when reflecting on the utility of argumentation theory (Hansen and Cohen 2011). Hansen discusses methods in informal logic in terms of the content of their standards, the reliability of the method, and the efficiency of the method. For example, whether people using the same method of argument

evaluation produce the same results and ensuring those results are not counter-intuitive. He also suggests we should ask of a method of argument evaluation, how easy it is to learn and apply; for example, a "thinking it through" approach may be easy to learn, but difficult to apply in a consistent or coherent way, while the "argumentation scheme" approach might be more difficult to apply but somewhat easier to apply. Cohen's response to Hansen observes that his framework neglects the task of argument identification and representation. He further suggests that argumentation involves many different tasks and that different methods might be more appropriate to different tasks or dialogue types (Hansen and Cohen 2011). While Hansen's framework may be incomplete, it nevertheless suggests a number of ways in which a theory of argumentation could be meaningfully evaluated while avoiding foundationalism and pseudo-disagreements (Shecaira 2016). Research has found positive results regarding how reliable and accurately argumentation schemes track lay people's evaluations of arguments (see Schellens et al 2017).

Participant Behaviour and Citizen Capacity

The previous chapter identified participant behaviour and citizen capacity as a key concern in the online deliberation literature. The research highlighted a general concern with the capacity of citizens to participate in deliberation in a way that reflected the ideals identified with open, inclusive and effective deliberative debate. This included concern that participants were respectful to one another, and that they were capable and willing to subject their own beliefs and arguments, and those of others, to the scrutiny of critical discussion and argumentation. In the context of ICT and online communication there was particular concern that the way people access information and participate online may exacerbate problems of polarisation and group think (Sunstein 2002). There was further discussion regarding the influence of different modes of communication and the role of identity and anonymity online and how this may influence participant behaviour and the inclusion or exclusion of a greater variety of ideas, arguments and voices (Black 2011). These concerns were summarised as the following questions and challenges for the development of online platforms:

- How do we support citizen capacity?
- How do we understand, identify and encourage high quality deliberation?
- How does the platform address polarisation and encourage civil interaction with opposing views and beliefs?
- How do we understand, identify and manage negative behaviour and trolling?

How we understand the challenge of participant behaviour and citizen capacity in online deliberation will depend on how we conceptualise decision making, and specifically the normative criteria by which we analyse participant behaviour, and the sources of error that we attribute to the capacity or behaviour of participants. This can be contrasted with challenges pertaining to the organisation of knowledge and epistemological factors that will be considered in the next section. It is important to note that in both deliberative theory and informal logic the issue of how this area of concern is conceptualised is contested. As discussed earlier an influential account of regulative norms of deliberative theory can be found in Habermas' (1991) discourse ethics; this and other accounts have emphasised the role of equality and freedom in participation, respectfulness, reciprocity, sincerity and orientation towards the common good (Naurin 2007). These criteria have been challenged, for example, the necessity of sincerity (Thompson 2008), the role of respectfulness or civility (Papacharissi 2004, Baek 2009) and orientation to the common good (Mansbridge 2009). Furthermore, how we empirically identify these criteria and support them in practice presents further challenges (Thompson 2008).

Informal logic approaches issues of participant behaviour and citizen capacity from a different perspective with a different set of concerns. Informal logic is primarily concerned with theories of argumentation and argument cogency, identifying good and bad reasons for supporting arguments and avoiding fallacies. The extent to which these issues are explored with attention to the social aspect of argumentation varies across the field (Johnson 2000). There is further variety in how sources of error such as fallacies and bias are understood and discussed in the literature (Walton et al 2008). In addition the project of informal logic is connected to the pedagogical

project of supporting and developing critical thinking capacity. In this sense, as a broad comparison with the field of deliberative theory, we can observe that informal logic takes an approach that talks about challenges of participant behaviour and citizen capacity in terms of fallacies or violations of norms connected with particular dialogue types, and furthermore, research has responded to issues of citizen capacity by focusing on educative tools and the development of argumentation schemes.

As discussed, the extent to which theories of argumentation and fallacy acknowledge the role of social factors varies across the field. Some studies may discuss the structure of arguments and potential for errors with little reference to the sense in which argumentation is a social practice, thus there will be little engagement with questions such as how or why participants in argumentation might commit errors or how they might ensure good reasoning. The pragma-dialectic theory of argumentation developed by van Eemeran and Grootendorst (2004) understands argumentation as a critical discourse and presents rules of conduct by which participants of argumentation could be judged. A fallacy on this understanding is a violation of these rules or behaviour that derails the attempt to reach an agreement (van Eemeran and Grootendorst 2007). The assumptions of the pragma-dialectical model, that participations should be conceived as protagonists and antagonists aimed at reaching agreement, might be too limiting for some advocates of online deliberation. Walton et al (2008) provide an alternative approach to argumentation which acknowledges a range of different dialogue types. Johnson's (2000, 2014) concept of manifest rationality and the dialectical tier of argumentation provides a further account of the relationship between argument and the social context in which it occurs.

The pragma-dialectical theory, Walton's theory of argumentation, and Johnson's notion of manifest rationality provide more insight into the obligations of participants and how participants in argumentation might commit errors or fallacies. On this understanding participant behaviour can be analysed in relation to the regulative norms associated with a particular dialogue type. Johnson (2014) draws on the RSA criteria and the notion of the dialectical tier of argumentation to develop

an account of the obligations of participants in political deliberation and an understanding of errors based on fallacies. For example, Johnson (2014) posits an arguer who fails to engage satisfactorily with alternative positions is guilty of the fallacy of straw man (if she distorts), the fallacy of *ad hominem* (if she personalizes inappropriately) and the fallacy of red herring (if she digresses). Kock (2007) draws on this same theory to develop a similar account of the obligations of rhetors in political deliberation. Walton (2010) and Maynes (2015) also explore the issue of why participants might commit errors of reasoning or fallacies. As discussed both accounts draw on the idea of heuristics and the Dual-Systems theory of Gigerenzer (Kahneman 2011 in Maynes 2015) that posits the idea of two systems of thought, one fast, that uses heuristics and one slow, that involves effortful deliberation and scrutiny. Walton (2010) suggests that heuristics help explain fallacies, characterising heuristics in terms of shortcuts in argumentation schemes that neglect critical questions or full consideration of the conditions of the argument. Such an account would be strengthened by further conisderations of power inequalities, for example slow deliberation may not be sufficient to identify faulty reasoning if power inequalities suppress arguments or voices.

A natural development of this questioning is to consider how theory might help us understand what we should do to support better decision making and argumentation and avoid fallacies. Tools such as argumentation schemes and other models of argumentation have been used as the basis for the development of argument visualisation and computer supported collaborative learning aimed at supporting deliberation and the development of critical thinking skills (see Secades 2015). Based on his discussion of the role of heuristics, Maynes (2015) also discusses the need to develop meta-cognitive skills to help individuals overcome bias and avoid fallacies. In his discussion he observes that while there is extensive research in cognitive bias, research into techniques for overcoming cognitive bias is much more limited, particularly in naturalistic settings (Maynes 2015). This is therefore a promising area for the development of research.

Contrasting the discussion of participant behaviour and citizen capacity in the informal logic literature with discussions in deliberative democracy we can make a number of observations. The informal logic literature seeks to provide a more detailed account of the process of argumentation, how the obligations of participants relate to contributions to debate, and how arguments may be interpreted and analysed to identify fallacies and errors. In the context of online deliberation, the informal logic literature develops tools and techniques, such as argumentation schemes, that may be used to develop platforms that manage participant behaviour and encourage better forms of engagement with others; they may also support critical thinking and engagement with different arguments. On the other hand, the informal logic literature can be understood to neglect certain issues discussed in deliberative theory. Although theories of argumentation acknowledge social elements to discussion, they do not directly engage with issues such as power and inequality as is typical of discussions in political science and deliberative theory. For example in addition to thinking about problems in argumentation in relation to problems of reasoning, we might also think of broader forms of exclusion and the influence of cultural assumptions and cognitive cues on perceptions of argument cogency. Bondy (2010) addresses this broader sense of exclusion and cognitive bias in his development of the idea of argumentative injustice, but it is neglected in the general literature.

Deliberation and Decision Making: Knowledge Representation and Management

There was a broad acknowledgement in the online deliberation literature that current forms of online communication were not conducive to deliberation (Davies and Chandler 2011). A significant aspect of this concern relates to how well knowledge is managed towards the goals of critical scrutiny and decision making. Forums and social network sites have been criticised for not providing the organisation and structure necessary to support debate, particular challenges include the need to filter out “noise” and repetition, and the need to manage and represent arguments in a way that captures and clearly communicates their levels of support and relationship to other ideas in the debate (Black 2011). It should be acknowledged that research often studies communication over platforms that were

not developed with the intention of supporting deliberation as understood by deliberative theorists, and participants do not necessarily participate with an orientation towards deliberative decision making (for example Yardi and Boyd's (2010) study of disputes on Twitter). The opportunity for online platforms to represent and manage knowledge in novel ways that improve on face to face communication is seen as a promising area for further research and development (Pingree 2009). Research highlights the dangers associated with clumsy or poor design that inhibits communication and critical scrutiny (Scheuer et al 2009). The design of online deliberation platforms involve important choices concerning what elements of communication are included and emphasised in the representation of argument. The challenge of knowledge representation, management and filtering were summarised as follows:

- How should we understand the epistemological and normative demands of decision making?
- What kinds of information and communication does the system include and exclude?
- How does a system address information overload/noise?
- How does a system ensure decision making processes are transparent and accountable?

The challenges of knowledge representation, management and filtering may be helpfully broken down in a way that corresponds with some of the key debates in informal logic. There is debate over what an argument is, this includes debate over the role of non-verbal arguments, emotional and other modes of argument, the sort of knowledge and tasks that involve argumentation. These debates could be considered to fall under discussion of theories of argumentation, and they help inform our understanding of what decision making is, and what kinds of information need to be represented in an online deliberation platform. Informal logic also provides accounts of particular models of argumentation, including accounts of dialogue types, and tools such as argumentation schemes and other models; these provide ways of thinking about how knowledge and information should be

represented and the ways in which participants might need to interact with the information. Finally, theories of argument cogency, and accounts of how arguments might be assessed and competing claims judged, allow us to think about how an online deliberation platform might address critical work and the process of managing or filtering information.

In the deliberative literature, Habermas provides an influential account of universal pragmatics which is used as the basis for his discussion of discourse ethics. Arguably this serves as one of the more detailed attempts to break down the process of reasoning and communication in the literature, appealing to the idea that deliberation involves speech acts that raise validity claims. These validity claims present information about the objective world, the shared normative world of the speakers, as well as claims about the sincerity of the beliefs of the speaker and assumptions around linguistic and logical norms (Chambers 2003). As mentioned earlier, Curato (2012:8) observes that these linguistic foundations tend to be neglected in subsequent literature and questions such as "What is an argument?" and "What are the standards of reasonableness?" remain unanswered. In this sense deliberative theory presents some ambiguity or uncertainty in relation to what kind of tasks are involved in deliberation, how argument should be understood, and therefore what type of tasks need to be supported and represented through online deliberation. The informal logic literature provides some potentially helpful discussions in this area.

A key question in the field of informal logic is "what is an argument?" Theories of argument and argumentation provide accounts of how argument should be conceived, what information is relevant to arguments and how this should be interpreted and prepared for analysis (Blair and Johnson 1987). For the purposes of thinking about online deliberation, there is a need to consider the extent to which these accounts capture what we might mean by deliberation, what these accounts might omit, and the extent to which these aspects of argumentation place demands on the development of online deliberation platforms.

Argumentation is often described in terms of verbal communication or speech acts (for example van Eemeren and Grootendorst 2004). A number of theorists have challenged this assumption by considering the possibility of visual or non-verbal forms of argument. For example, Blair (2012) discusses the potential for visual arguments; in addition to visual images Groarke (2015) considers further modes of argument including sounds, taste, smell, and tactile sensations. Gilbert (2004) uses a different sense of modes of argumentation. While he also suggests that non-verbal forms of communication may be considered important elements to an argument, he claims that there are different modes of argument; logical, emotional, kisceral and visceral. These debates represent efforts to expand on traditional understandings of what an argument is, and what sort of information is relevant to argument interpretation and analysis. There remains a question of how acceptable these concepts of argument are, and the place these concepts have in common theories of argumentation such as pragma-dialectics and Walton's theory of argumentation.

The discussions of Gilbert (2004), Goarke (2015) and Blair (2012) have focused on questions such as whether we can interpret these phenomena as argument, and whether they are relevant to processes of argumentation. While it may be possible to interpret visual images or art and literature as an argument (Blair 2012), and various phenomena such as visual images, tone of voice and dress may influence participants responses in argumentation, the question most pertinent to our discussion is whether these discussions identify forms of argument that should be supported in online deliberation, or what we lose when we fail to support particular modes of argumentation. The online deliberation literature described how online discussion typically involves media lean communication, for example asynchronous text based forums. In this sense there is limited opportunity for tone of voice or participants' attire to influence the process of argumentation. The literature has identified how media lean forms of communication can be associated with misunderstandings and greater hostility or negative emotions (Davies and Chandler 2011). Furthermore graphs and visual representations of data can undoubtedly serve to communicate knowledge and clarify a point in ways that may be more effective and efficient than verbal or text based communication (Blair 2012). These

observations establish the advantages of richer modes of communication, however richer modes of communication place further demands on platforms and platform design (Davies and Chandler 2011) and in this sense there is not a clear case for establishing what forms of information should be supported in online deliberation.

Gilbert (2004) suggests that arguments can be communicated using a variety of verbal and non-verbal methods, and that the nature of those arguments can take the form of logical, emotional and potentially other modes of reasoning. One may ask if those arguments can be refuted or even evaluated using similar, non-verbal, non-logical modes of communication, or whether at some point we return to the paradigm of privileging verbal propositional arguments and verbal analysis. There is a danger of concept stretching, such that notions of argument become so broad as to evade any meaningful hope of interpretation or analysis. Gilbert's discussion is also relevant to the debates within deliberative democracy over the relationship between emotion and deliberation. Gilbert's (2004) discussion suggests that it is possible to preserve a notion of rationality and evaluative standards that can also accommodate and respect the role of emotion and intensity of feeling. It remains unclear what Gilbert's (2004) distinctions amount to, either at the conceptual level or in practice, if the same evaluative criteria are employed to deal with them. Gilbert (1997) makes a strong case for the role of emotion in argument, and identifies a problematic prejudice against emotion which has arguably become embedded in the way we commonly think about good argumentation. What is less clear is whether this simply requires a change in attitude and greater reflection on the part of participants engaged in argumentation, or whether this requires further conceptual development and tools for analysis.

In addition to reflections on the modes of argument and information relevant to argument, it is also helpful to consider accounts of what an argument is, how it should be conceived and how we should understand the purpose of argumentation. Johnson and Blair (1987:149) describe approaches that conceive of arguments as proofs, persuasion, conversations, competitions and so on. Walton et al (2008) highlight the various uses of argumentation in the context of different dialogue types.

In the discussion earlier we reflected on the extent to which these descriptions capture what deliberative theorists mean by deliberation, and the kind of tasks they would like to achieve through online deliberation platforms. It was suggested that deliberation is often talked about in ways that suggest what is meant is some combination of "persuasion", "deliberation", "information" and "inquiry". Furthermore in light of some of attempts to broaden the concept of deliberation (Mansbridge 2009, Young 1996), it may also be helpful to reflect on the role of "negotiation" dialogues in supporting deliberation. These dialogue types suggest different goals and different roles for the participants engaged in deliberation. This suggests that platforms for online deliberation may need to support different types of decision making, how it does this is complicated by the sense in which shifts in dialogue may be necessary for the process of deliberation. For example a deliberation dialogue may reveal gaps in knowledge that necessitate discovering the truth of some hypothesis, requiring an inquiry dialogue. A further consideration is that shifts in dialogue may be problematic, for example Walton et al (2008) discuss fallacious shifts in dialogue, which would imply the need for some account of how dialogue types are judged as appropriate in addition to supporting different dialogue types.

In addition to thinking about the different roles of participants and goals of deliberation, informal logic also offers accounts of different elements of deliberation and different forms of reasoning. The pragma-dialectical theory provides one framework, suggesting critical discussion takes the form of four stages. As discussed earlier these are "confrontation", "opening", "argumentation" and "conclusion" (van Eemeren and Grootendorst 2004). Walton et al (2008) present argumentation schemes and critical questions as ways of thinking about the structure of NLAs. Kock (2015) identifies the sense in which deliberation involves different types of reasoning, for example reasoning about the ultimate acceptability of claims, and reasoning about the costs and benefits of different courses of action in the context of acceptable claims connected to accepting and rejecting a policy. These theories of argumentation provide approaches to breaking down the process of deliberation and understanding what kind of tasks are involved in deliberation. These accounts of

argumentation have encountered criticism and are not universally accepted (Blair 2012); in this sense, the value of these accounts lies in their capacity to provide a framework for supporting certain elements or functions of deliberation, rather than providing a definitive account of what must be included on a platform.

The discussion thus far has considered how theories of argumentation inform our understanding of what demands might be placed on online deliberation platforms with respect to types of information and forms of activity. Theories of argumentation have been used to generate models and visual representations of arguments that help us to address the question of how arguments should be represented. Reed et al claim that argument diagramming is one of the most important tools currently in use to assist with the tasks of analyzing and evaluating arguments (Reed et al 2007:107). How theories of argumentation might be applied to the generation of online platforms can vary in a number of ways. In this sense developers may use argumentation schemes as the basis for an online platform without necessarily confronting participants with diagrams as presented in the literature. Scheuer et al (2010) provide a helpful framework for thinking about the sources of variety in the ways different platforms and tools have attempted to support argumentation. They distinguish between the following: Argument representation, interaction design, ontologies and automated analysis. “Argument representation” identifies the variety of ways argument is represented; many systems inspired by informal logic have used visual representation of arguments, while some platforms can use a combination of visual and text based conversation. “Interaction design” identifies the various ways in which users are able to manipulate or create arguments, for example whether they are free to create their own arguments or analyse arguments from transcripts, also whether the system is single or multi user. “Ontologies” identifies how different systems define “conceptual primitives” used to construct arguments, for example certain platforms might be developed for certain fields such as medicine, law or science, and the terms and concepts used might reflect this; for example, the choice to use “hypothesis” or “data” as elements (used in a platform called Convince Me) rather than “idea” or “question” elements (used in issue based information systems (IBIS), discussed later). Finally, “automated analysis” identified techniques used by

platforms, often drawing on models in informal logic and techniques in AI to perform specific functions, for example to identify patterns of reasoning and alert users to potential problems in their argument, or alert moderators of potential problems with messages (Scheuer et al 2010).

Informal logic has led to a number of applications in ICT, many of these platforms and tools are discussed under the label of computer supported collaborative argumentation (CSCA). Though there are a number of platforms intended to support the general practice of argumentation, many of the tools and platforms in the field of CSCA are intended for educational purposes or profession specific contexts. The thought is that argument is a way in which students can learn about a subject as well as learning the skills of argumentation, and the platforms and tools are often developed with this practice in mind (Scheuer et al 2010). The majority of these tools and platforms are designed for a single user, or small scale users, though there are some large-scale tools such as Debategraph and Collaboratorium (now Deliberatorium) (Klein and Iandoli 2008). The field is often described as being in its infancy (Walton 2007); Scheuer et al (2010) describe how the current tools are not well described or documented from a technical point of view, this results in many duplicated efforts and developers having to "reinvent the wheel" each time they produce new software. Empirical research on these tools is also limited (Easterday et al 2007); a significant problem is that there is no agreed upon method for evaluating how successful platforms and tools are; different empirical studies may be testing different things, such as argument repertoire, change in opinion or frequency of use (Scheuer et al 2010). This makes comparison between different platforms and questions such as whether one method of argument representation is more successful than another very difficult to determine (Scheuer et al 2010).

Despite the limitations and qualifications outlined above, the developments in CSCA and the computational models developed from informal logic are nevertheless very relevant and potentially helpful in exploring the potential for online deliberation. They suggest ways online platforms may be designed and structured in order to support argumentation, encourage the development of critical thinking skills, and

overcome problems connected with large scale communication. This includes filtering techniques and the use of automated analysis to support moderation or identify patterns of reasoning. The developments in the field of CSCA also provide evidence for further issues not fully explored in the online deliberation literature; for example, findings that different design choices may be more appropriate for different types of decision making (Scheuer et al 2010). This is an issue that may have been anticipated in the online deliberation literature, but the developments in CSCA provide more helpful insight into how this issue manifests itself.

While the informal logic literature has led to the development of computational models, platforms and tools to support argumentation, it is important to also reflect on aspects of decision making it may neglect. As discussed in the earlier section, some of the normative issues connected with decision making that are identified in deliberative theory literature do not receive the same attention in informal logic. The informal logic literature tends to think of the process of decision making in terms of argumentation, and consequently evaluation processes are understood in terms of claims in an argument. Arguably this characterisation is too insensitive to variations in the types of claim that can be made; probabilistic judgements, statistical evidence, anecdotal evidence, fact based and value judgements. These variables influence the way claims in argument should be evaluated and considered in relation to one another. Attempts to incorporate story telling (Greco 2017) and broader conceptions of argument (Gilbert 1997) have largely been neglected by researchers developing visual representations and computational models for argument. There is therefore engagement with debates in deliberative theory literature over the role of emotion and story-telling in argumentation. It may be that specialist decision making tasks, such as budgeting, require context specific visualisations and support, and are not best supported by a general argumentation model. In this sense the models developed in informal logic may support one aspect of an online platform, or may be appropriate for a more limited range of decision making tasks.

Conclusion

This chapter has discussed the theoretical literature on informal logic a field that has contributed to the development of innovative online deliberation platforms. The chapter outlined key contributions and debates within the field, and considered how informal logic can inform our understanding of the challenges of online deliberation. The discussion compared differences between informal logic and deliberative theory concerning the conceptualisation of decision making and issues that motivate researchers. Informal logic presents a series of models and frameworks of argumentation, notably dialogue types and argumentation schemes and critical questions. These conceptual tools offer potential ways of understanding deliberative processes and how they may breakdown. Such tools are particularly relevant to the challenges of participant behaviour and citizen capacity, and information management and representation. The literature offers approaches to structuring debate and visually representing the relationship between ideas in an argument. This may foster deliberative capacity by focusing attention on arguments and claims, and clarifying elements of abstract argumentation and the reasoning process. This may also facilitate greater organisation of ideas in debate, enabling clearer comprehension of ideas and levels of support. The informal logic literature suffered from a lack of engagement with issues of power in argumentation.

The theoretical literature has less to contribute to the other challenges of participant engagement and feasibility and scale. Although informal logic reflects on the social context of argument, this does not tend to involve considerations around power relations and forms of exclusion from the argumentation process. Often there is an implicit assumption that individuals are motivated to participate in natural language arguments, and little attention is paid to the problem of engagement in political participation, or the problems of inequality or exclusion in respect to particular groups participating in certain forms of decision making. The issue of feasibility and scale is addressed in part through the application of computational models and argument visualisations which are intended to facilitate large scale argumentation. These issues are better understood within the context of particular practical developments that have emerged from this field and will be addressed later.

Before turning our attention to the analysis of practical developments in the design of platforms influenced by informal logic, the next chapter will explore research in the field of collective intelligence and related literatures.

Chapter 3: Collective Intelligence

Introduction

The first chapter discussed the field of online deliberation. It observed how researchers from political science and deliberative theory backgrounds had explored the potential for ICT and online communication to deepen democratic processes and support large scale deliberation. Within the field of computer science, it is possible to observe related discussions taking place regarding how ICT and online communication may support decision making and collective action, or how technology can be used to utilise shared knowledge for the common good. These discussions may be associated with a number of related terms, "collective intelligence", "computer supported cooperative work" (CSCW), "group decision support systems" and "human computer interaction" have all been used to identify work in computer science relevant to online deliberation.

Collective Intelligence has been broadly defined as multiple agents acting in a way that seems intelligent or achieves goals (Salminen 2012, Malone 2012). In its broadest conceptualisation the agents need not be humans, and the agents involved need not be aware of the goals that are being achieved during the process (Malone 2012, Couzin et al 2005). Discussions of collective intelligence often refer to the notion of the "wisdom of crowds", and the famous observation of Francis Galton; during a livestock fair, villagers and experts are invited to guess the weight of an ox, it is found that the average of the villagers' guesses is more accurate than the estimates of individual experts (Malone and Bernstein 2015). The phenomena of the wisdom of crowds can be contrasted with the observation of the "madness of mobs", circumstances where groups perform badly, reaching incorrect or unjust decisions, failing to utilise individual expertise due to a variety of potential factors including systematic bias and "group think" (Lo 2015). Malone (2012) describes the study of collective intelligence as trying to understand how to foster collective intelligence (as opposed to collective stupidity), and the conditions under which collective intelligence can be improved, and the tasks it can help support. Collective intelligence

has included the development of a measure of "collective IQ" and methods for studying and testing group performance in different contexts and considering different variables. Of particular importance in discussions of collective IQ is the role of emotional intelligence, including the ability to understand non-verbal cues and facial expressions (Cherniss 2010, Malone and Bernstein 2015, Malone 2012).

A significant area of focus for the study of collective intelligence has been within the context of computer science and human computer interaction. Douglas Englbert has been credited as an early advocate of collective intelligence in the context of the use of ICT to "augment the human intellect" (Englebert 1995). Collective intelligence is often discussed specifically in terms of ICT supported human collaboration (Malone and Bernstein 2015, Smith 1994, Heylighen 1999, Levy 1995). In this respect, collective intelligence overlaps with other areas of study in computer science, notably human computer interaction (HCI), computer supported cooperative work (CSCW) and group decision support systems (GDSS). Further writers have highlighted the relevance of discussions of collective intelligence to democracy and political science, for example Pierre Levy (1994, 2005) and Heylighen (1999). Heylighen defines collective intelligence as "the ability of a group to find more or better solutions than would be found by its members individually" and transforming the web into a "global brain" or "collective mental map" (Heylighen 1999:253). Pierre Levy (2005) discusses the project of cyber-democracy and using ICT to support ambitious and novel forms of governance.

Collective Intelligence has been influential in the development of various online deliberation platforms (for example Climate CoLab, Debategraph, Deliberatiorium and Cohere, all discussed later in the thesis). The field has introduced a variety of approaches to understanding, evaluating and supporting deliberation and decision making, drawing on various disciplines, including research into organisational theory, social psychology and cognitive research. Collective intelligence literature does not exclusively deal with ICT or humans in contrast with CSCW, HCI and GDSS. HCI does not exclusively deal with collaborative work and includes ICT use by individuals in contrast with CSCW and GDSS. Where these fields do deal with groups of humans

collaborating through ICT there is much overlap, they share similar theoretical influences (for example the work of McGrath (1984) informs CSCW (Liebe et al 1995), GDSS (Antunes and Ho 2001) and collective intelligence (DeSanctis and Gallupe 1987, Grudin and Poltrock 2012) research, and there is cross over with researchers in the field (for example Malone writes of collective intelligence in CSCW (Kim et al 2017). Given the focus of online deliberation presumes human groups collaborating using ICT, the broad differences between collective intelligence and the other fields are not particularly pertinent to the discussion. Nevertheless, our capacity to bring together these developments and consider how they relate to deliberative democratic theory is complicated by a number of factors.

In comparing collective intelligence and related literature to deliberative theory it is helpful to observe the following points of contrast. The field of collective intelligence approaches the issue of decision making with a different set of conceptual tools and concerns, and there is much disagreement within the field on approaches to decision making. Indeed Salminen (2012) describes the field of collective intelligence as being in danger of fragmentation. The context in which decision making takes place may differ from the focus typical of online deliberation, for example collective intelligence and related literatures often focus on decision making in organisations and the private sector (Malone and Bernstein 2015). This raises the question of how relevant these discussions are to the context of deliberation in the public sphere or in the context of public participation in debates on policy making. Secondly, the method of coordination may not rely on deliberation; for example, even in cases where collective intelligence is focused on issues of politics and policy making, certain examples of crowd sourcing do not involve deliberation as a coordination method per se (for example Sadilek et al 2012). This raises the issue of how deliberation as a form of decision making may relate to other forms of knowledge coordination.

This chapter provides a theoretical exploration of the field of collective intelligence and its relationship to deliberative theory and online deliberation. The first section outlines key themes and concepts in the collective intelligence literature. The second section explores how these approaches relate to deliberative democratic theory and

the challenges of online deliberation. The chapter observes that the field of collective intelligence shares many common areas of interest with deliberative democracy and provides potential insights into deliberative decision making. The chapter argues that collective intelligence literature provides a range of categories and taxonomies for thinking about the epistemological tasks and processes involved in decision making, and that this reveal ways in which deliberative theory is under-defined and highlights challenges that may benefit from further attention. It is argued that collective intelligence is particularly useful in identifying conditions for successful collective decision making and sources of inefficiencies or distortions such as cognitive bias or information flow problems in deliberation. Furthermore, this area of research provides techniques and tools for addressing these issues, and engages with practical concerns regarding how ICT and design can be used to foster collective intelligence.

Concepts and Themes in Collective Intelligence

Collective Intelligence in Groups and Organisations

An important area of influence on collective intelligence and related literatures is organisational theory and approaching issues of collective intelligence by seeking to better understand the features and dynamics of groups collaborating to achieve particular goals. Researchers have talked about groups and group decision making in different ways, appealing to different frameworks and understandings (McGrath 1984). This section will highlight two influential approaches, McGrath's development of a conceptual framework for the study of groups and classification found in *Groups: Interaction and Performance (1984)* and Galbraith's five point "STAR" model. Applied to deliberative processes, these models suggest ways in which we might helpfully identify different elements or stages of a given process to better understand sources of inefficiency or issues of epistemological or democratic concern.

McGrath's Groups: Interaction and Performance

McGrath's (1984) discussion of groups and classification of group tasks has been influential in collective intelligence and related literature (DeSanctis and Gallupe 1987, Grudin and Poltrock 2012). In the CSCW literature it has provided a framework

for thinking about how ICT can support different types of tasks (Grudin and Poltrock 2012).

McGrath (1984:12-13) begins his discussion by identifying a series of variables relating to groups. He identifies the following four general variables

Individuals: variables relating to the traits and characteristics of the individuals that form the group, for example age or gender

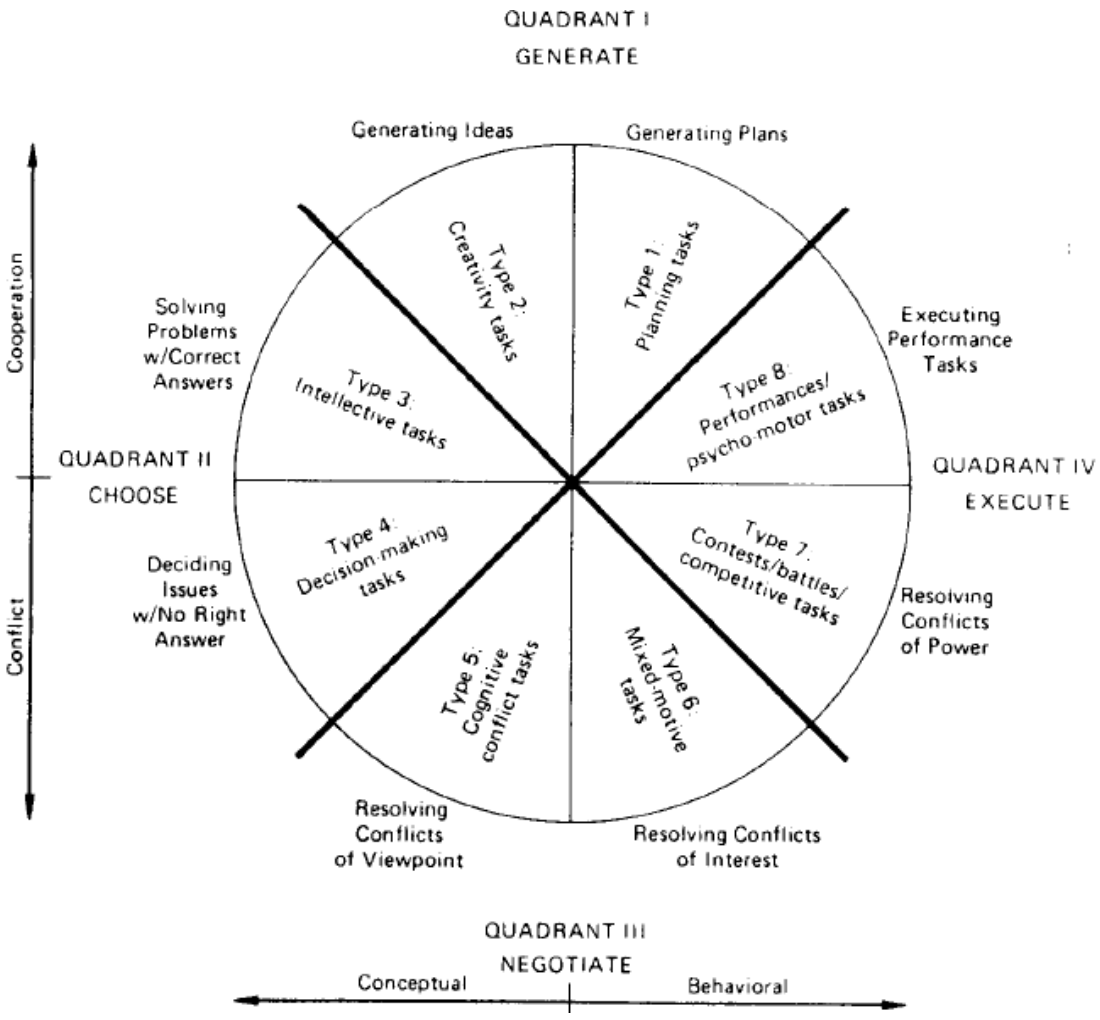
Group Structure: variables at the level of the group, for example the size of the group, whether the members like each other, how long they have known each other, relations between members (for example whether some exhibit dominance over others)

Environment: variables concerning where the group activity is performed, examples provided include the workplace, a conference, a family dinner table.

Tasks: variables relating to the assumed goals of the group and the roles and jobs ascribed to the participants

McGrath (1984) then elaborates an account of the interaction process to identify further elements of communication. He identifies three aspects of communication; communication (behaviour of an individual, verbal or otherwise), communication process (the series of behaviours exhibited by the group), communication pattern (the form and structure of that behaviour). McGrath also breaks down the communication in relation to its task orientated component and its interpersonal component. The thought is that the content of communication has some component that relates to achieving the task, and some component that relates to interpersonal relations within the group. Since he is attempting to provide a framework for the study of groups, he also identifies factors for consideration when exploring studies into groups; generalisatibility (from agents to the general population), precision (internal validity), and realism (external validity). The most influential aspect of McGrath's work on collective intelligence and related literatures is his discussion of the typology of tasks.

McGrath (1984) provides a review of prior approaches to categorising tasks, identifying that tasks may be classified on any of several different bases; the physical environment, behaviours required by the task, behaviours usually elicited by the task (e.g creativity or discussion), relations among the behaviours of individual group members (e.g competition, cooperation, individual effort), classification in terms of goals or criterion (e.g minimising errors, increasing speed) (McGrath and Altman 1966 in McGrath 1984:55). McGrath (1984) attempts to combine these previous efforts into one general scheme, represented below:



(McGrath 1984:61)

McGrath also provides the following table further explaining this system of classification:

Table 5-1: Quadrants, Task Types and Key Concepts of the Task Circumplex

Quadrant 1:	GENERATE
Type 1	*Planning Tasks*: Generating plans. E.G: Hackman's "problem solving". Key Notion: Action-oriented Plan
Type 2	*Creativity Tasks*: Generating ideas E.g Hackman's "production" tasks, "brainstroming" tasks. Key notion: Creativity
Quadrant 2:	CHOOSE
Type 3	*Intellective Tasks*: Solving problems with a correct answer. E.g Laughlin's intellective tasks , with correct and compelling answers; logic problems and other problem solving tasks with correct but not compelling answers; tasks for which expert consensus defines answers. Key notion: Correct answer
Type 4	*Decision-Making Tasks*: dealing with tasks for which the preferred or agreed upon answer is the correct one. E.g tasks used in rishy shift, choice shift, and polarization studies; juries. Key notion: preferred answer
Quadrant 3	NEGOTIATE
Type 5	*Cognitive Conflict Tasks*: Resolving conflicts of viewpoint (not of interests) E.g Cognitive conflict tasks used in social judgement theory work; some jury tasks. Key notion: Resolving policy conflicts
Type 6	*Mixed-motive Tasks*: Resolving conflicts of motive interest E.g negotiations and bargaining tasks, mixed motive dilemma tasks, coalition formation/reward allocation tasks. Key notion: Resolving pay off conflicts
Quadrant 4	EXECUTE
Type 7	*Contests/Battles*: Resolving conflicts of power; competing for victory E.g wars, all winner-take-all conflicts, and competitive sports. Key notion: Winning
Type 8	*Performances*: Pyschomotor tasks performed against objective or absolute standards of excellence, e.g many physical tasks, some sports events. Key notion: Excelling

McGrath

(1984:62)

McGrath's framework for groups and group tasks has provided an influential way for researchers to talk about groups and how ICT might support the performance of groups in relation to different task types. For example DeSanctis and Gallup (1987)

apply this framework to different forms of ICT support in GDSS, summarised in the table below.

Task Purpose	Task Type	Possible Support Features
GENERATE	Planning	Large Screen Display, graphical aids
		Planning tools (e.g PERT) Risk assessment, subjective probability estimation for alternative plans
	Creativity	Anonymous input of ideas; pooling and display of ideas; search facilities to identify common ideas, eliminate duplicates
		Nominal Group Technique, Brainstorming
CHOOSE	Intellective	Data access and display; synthesis and display of rationales for choices
		Aids to finding the correct answer (e.g forecasting models, multiattribute utility models)
		Rule Based Discussion emphasising thorough explanation of logic
	Preference	Preference weighting and ranking with various schemes for determining the most favoured alternative; voting schemes
		Social judgement models; automated Delphi
		Rule Based discussion emphasising equal time to present opinion
NEGOTIATE	Cognitive conflict	Summary and display of members' opinions
		Using Social Judgement Analysis, each member's judgements are analyzed by the system and the used as feedback to the individual member or the group
		Automatic mediation; automate Robert's Rules
	Mixed Motive	Voting Solicitation and Summary
		Stakeholder Analysis

		Rule base for controlling opinion expression: automatic mediation

DeSanctis and Gallupe (1987:601)

This discussion has provided a brief outline of McGrath's work on group dynamics, and an example that illustrates how the framework has been used to talk about ICT systems and their support for decision making. The next section will consider Galbraith's STAR system, as an alternative approach to talking about organisations and collective intelligence.

Galbraith's STAR system

An influential framework for understanding the coordination of teams and organisations has been Galbraith's five point "STAR" model, developed in the 1960s (Galbraith 2002). Although Galbraith applies his framework to businesses and formal organisations, the framework has been used in the literature to talk about collective intelligence more broadly (for example Woolley et al 2015). Galbraith's (2002:72) star system emphasises the following:

Strategy: what the team is trying to accomplish

Structure: how agents coordinate and decision making power

Processes: flow of information in the group

Rewards: motives and incentives for desired behaviour

Right people: how to ensure people are best allocated to the work, and potential and expertise are being used.

Strategy

Strategy incorporates the nature of the task and the goals that the group are trying to accomplish. Woolley et al (2015) suggest there are two broad sources of failure at this point, if the task is not suited to collective work, or the goals and objectives are unclear. How we conceptualise group tasks depends on our framework and the kind of area of collective intelligence we are interested in. McGrath's (1984) framework

of group tasks discussed above has been frequently drawn on in the literature (Woolley et al 2015), other examples include Steiner (1966, 1972) who categorises task types in relation to group performance;

Conjunctive: the group performs to the lowest of individual ability (e.g running in a group)

Disjunctive: the group performs to the best of individual ability (e.g solving a maths problem)

Additive: all contributions add to a group performance (e.g collecting a resource)

Compensatory: performance of others compensates for failings in individual performance (e.g the wisdom of crowds and collective estimates).

Structure

Structure describes the placement of power and authority in organisations (Galbraith 2002) and the way in which agents coordinate to make decisions (Woolley et al 2015). Faraj and Xiao describe coordination in organisations as "the integration of organisational work under conditions of task interdependence and uncertainty" (Faraj and Xiao, 2006:187). They observe how research has emphasised the distinction between formal and informal modes of communication, and the need for informal coordination in conditions of uncertainty. Woolley et al (2015) illustrate this with the use of tacit coordination and on the spot information sharing in the context of laboratory teams and medical emergency units.

At the macro level, hierarchies and markets are two common ways in which groups coordinate. Collective intelligence literature has explored collective intelligence in markets (Lo 2015), while Woolley et al (2015) observe the majority of literature has focused on collective intelligence in the context of the structure of hierarchies. Under a hierarchical structure coordination is organised vertically, with decision making power residing at the top of the structure and filtered down through various layers of management. The literature also divides the issues of structure into differentiation and integration; differentiation involves dividing labour, for example dividing an organisation into different departments. There is then an issue of organising coordination between different departments, for example setting up casual

meetings, formal meetings, or matrix managers to oversee coordination between groups. Integration is described as the management of dependencies (Woolley et al 2015). Thompson (1967) describes three types of interdependencies: pooled (shared resource, such as money or a machine), sequential (where work relies on the completion of other tasks), reciprocal (where resources flow back and forth). In addition to discussions of hierarchy and market coordination, there is increasing interest in the concept of "networks", for example in *Neither Market Nor Hierachy* Powell (1990) argues that networks, understood as informal and shifting connections within organisations and between different organisations, are more important for understanding coordination in social systems than hierarchies.

Process

Processes describes the flow of information within an organisation or group engaged in a task; this includes considerations such as how well a group can learn and how well groups can rely on the knowledge of other members. Woolley et al (2015) suggests that the elements of process most germane to the study of collective intelligence are those which characterise intelligence systems more generally, identifying these as memory, attention and problem solving. Factors related to problem solving encompass many of the issues discussed under group tasks, and factors relating to cognitive processes and cognitive bias discussed in the following section.

A key theme in collective intelligence literature is memory in groups; Salminen (2012) suggests that the concept of the internet as a shared memory of humankind has been mentioned repeatedly (e.g. Levy 2010, Luo et al. 2009, Heylighen 1999 in Salminen 2012). Wegner (1987) discusses the notion of group memory, and describes a transactive memory system (TMS) as the capacity to store and retrieve information in different domains. He identifies three behavioural indicators of TMS; specialisation, credibility and coordination. Specialisation is reflected in how the group members divide cognitive labour tasks, credibility is reflected in members' reliance on one another to be responsible for specific expertise, such that they

possess all information needed for their tasks, and coordination reflects how smoothly and efficiently such knowledge is exchanged and called on.

Alternatively, the issue of process has also been discussed in the context of attention in groups (Ocasio 2011). Ocasio (2011) presents an attention based view of the firm. In light of increasing availability of information, he observes that there remains a scarcity of attention, and in this sense our focus should be on theorising around attention in groups. Although he places his discussion within the context of business, he believes his arguments apply equally to other group behaviours such as the response of governments to threats such as terrorism. He proposes three principles: "Focus of attention", what are the issues that firms pay attention to. "The principle of situated attention", the thought that attention is situated within time and space, and the organisation of an individual's attention on different things at different times, and problems that arise from inconsistencies or shifts in attention. "The structural distribution of attention" the firm's formal and informal structure shapes how attention is focused. Ocasio (2011) identifies four determinants of attention in relation to formal and informal structure; the rules of the game, the agenda of the individuals, the position of individuals in the network and the material resources and technology of an organisation.

Rewards

Galbraith (2002) discusses rewards in terms of motivation and incentives for agents, and the way in which the design of organisations and the decision making process can align these with the goals of the organisation or strategic direction. The collective intelligence literature has distinguished between extrinsic motivation, such as financial incentives, and intrinsic motivation, such as internal satisfaction with the work itself (Woolley et al 2015). Research exploring monetary incentives has found an increase in quantity but not quality of work (Bigham et al 2015), and further research has explored the problem of free riding with monetary incentives in groups (Alchian and Demsetz 1972, Lazear and Shaw 2007). Findings have identified motivations such as gaining affiliation with the larger team as a community, accruing status or signalling one's expertise (Butler et al 2007, Lakhani and Wolf 2005, Lerner

and Tirole 2005 in Woolley et al 2015, Bigham et al 2015). A significant development in this area, which will be discussed in greater detail later, concerns "gamification". This involves applying game mechanics to engage, motivate and direct agents involved in a process. For example, Kahtbi et al's (2011) discussion of Foldit, a game designed to support scientific research.

Right People

In Galbraith's (2002) discussion "right people" is understood in terms of the recruitment, development and training of people and allocating them to the right jobs. In Woolley et al's (2012) application of the framework to collective intelligence literature they speak more generally about the differences in individuals that are relevant to supporting collective intelligence. This includes the debate in collective intelligence literature over the role of diversity in groups, characteristics and capacities that enhance the ability of groups to achieve goals and make decisions and factors such as emotional intelligence. These factors can be understood as part of a distinct area of debate within the collective intelligence literature that draws on research into social psychology and cognition, rather than the kind of frameworks of organisations and groups considered in this discussion. The next section will explore these debates in greater depth.

Collective Intelligence, Social Psychology and Cognitive Bias

Research into social psychology and cognition has provided a significant influence on collective intelligence literature (Steyvers and Miller 2015). There is much research identifying the various ways and contexts under which individual judgement can be biased and erroneous. Of particular interest to the field of collective intelligence is the notion of systematic bias, bias that distorts the judgements of the group as a whole such that individual errors are not compensated, and the way in which factors relating to the group can distort judgement and inhibit effective decision making, often discussed in relation to concepts of group think and group polarization. Collective intelligence literature seeks to draw on the insights of research into social psychology, cognitive bias and heuristics to develop an understanding of factors that

influence group performance as well as techniques to overcome challenges and foster more effective reasoning within a system. Steyvers and Miller (2015) outline the following issues: how does one know what the potential biases are? How does one correct for them? Suppose some individuals are better than others, some don't understand the task, or are not paying attention, how does one identify which judgements are more accurate? How does one identify experts? What impact does the context of the decision have on the judgements of individuals? This section will outline some key ideas and debates that have influenced the literature.

Errors in individual judgement and cognitive bias

Research into cognitive bias has identified a vast and expanding range of ways in which individual judgement can be distorted through cognitive illusions and deviate from what might be typically accepted as accurate, rational or good judgments (Pohl 2004). Cognitive biases can be categorised according to different criteria, such as in relation to the kind of cognitive process they influence, for example probabilistic judgements, memory, or your perception or behaviour towards others. Alternatively, cognitive biases may be discussed in relation to the nature of the source of the bias, for example whether the bias could be said to be motivated by wishful thinking or self-preservation (sometimes described as a "hot bias") or whether it is related to more general limits in cognitive capacity (sometimes described as "cold bias") (Pohl 2004, Janis and Mann 1977). Tversky and Kahneman (1974) connect cognitive biases to heuristics and emphasise how these heuristics can be useful, economical and usually effective but that they can lead to systematic biases and distortions.

A vast range of biases have been identified in the literature (Pohl 2004), commonly discussed examples include "confirmation bias", the tendency to search for or identify information in a way that confirms existing assumptions; illusions of control, the tendency to overestimate ones degree of control over a situation; illusions of correlation, inaccurately perceiving a relationship between unrelated events (Pohl 2004). Tversky and Kahneman (1974) discuss probabilistic judgements in connection to three broad categories of biases and identify a range of errors associated with

them; they describe errors associated with “representativeness”, “availability” and “adjustment from an anchor”. To illustrate problems associated with representativeness, they describe an experiment in which participants were given a description of an individual and asked about their likely occupation. Participants were given a description of an individual as quiet and asked whether he was more likely to be a farmer or a librarian. Participants tended to base their judgement on matching the description to a stereotype, rather than considering the numbers of farmers relative to librarians in the area. These examples provide an illustration of the kind of errors in judgement identified within the literature.

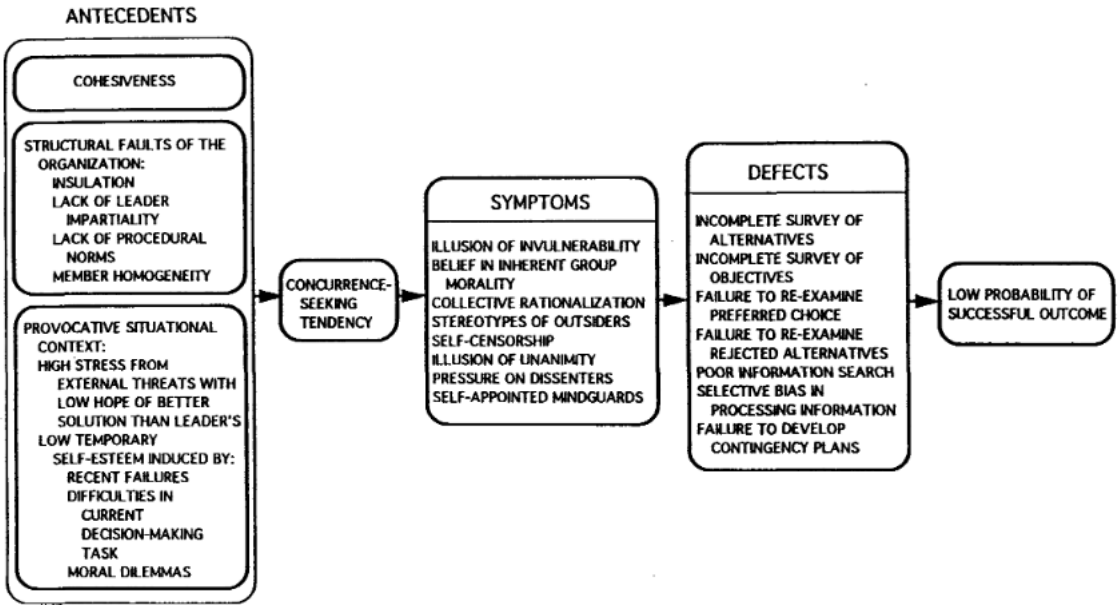
Research has emphasised the role of individual differences, the environment and context of decision making in relation to behaviour and judgement (Kelemen et al 2000). There is a broad acknowledgement in the literature of differences in individual susceptibility to different types of bias (Steyvers and Miller 2015). Thinking more broadly of cognitive factors and citizen capacity, Franco et al (2015) describe the concept of “need for closure”, observing that the desire for definite knowledge and eschewal of ambiguity varies across individuals and influences how those individuals organise themselves in groups and the formal and informal techniques they employ for decision making. Steyvers and Miller (2015) discuss how the environment and context of decision making can influence judgement, for example in certain competitive conditions it may be beneficial for participants not to give honest estimations or to give estimations that do not reflect their true judgements but place them in a better position to win the competition over other participants. This observation could be seen as part of a broader concern with strategic behaviour and negotiation in decision making situations.

Systematic Bias, Group Think and Group Polarization

In some cases, errors at the individual level may be compensated for within the group. In other cases, systematic bias and bias at the group level can exacerbate errors (Steyvers and Miller 2015). Lorenz et al (2011) discuss the problem of information cascades and how individuals can wrongly assume that others have

better information than they do, leading them to choose not to challenge or introduce contradictory information. Lorenz et al (2011) also describe how the "wisdom of crowds" effect can be undermined when individuals' beliefs are confirmed by others, giving them confidence without increased accuracy. Groups can also be influenced by systematic biases that result from cognitive cues, notably assumptions around race, gender and class, as well as in regard to probabilistic judgements, such as under-estimating the probability of an event because it is unfamiliar to the people involved (Steyvers and Miller 2015). In addition, there can be social pressures towards conformity and confirmation bias that reduces the diversity of opinions being offered and considered (Lorenz et al 2011).

The group think model developed by Irving Janis emerged as a way of talking about group decision making, and specifically decision making fiascos in which otherwise intelligent or capable groups of people are perceived as making poor decisions, such as the Bay of Pigs invasion (Janis 1972 in Aldag and Riggs-Fuller 1993). In contrast to more general issues of cognitive and systematic bias, Janis describes group think as "a mode of thinking that people engage in when they are deeply involved in a cohesive in-group, when the member's strivings for unanimity override their motivation to realistically appraise alternative courses of action" (Janis 1982:9). Group think has been presented as a model, outlined below



(Janis and Mann 1977 in Aldag and Riggs Fuller 1993:535)

Janis identifies eight symptoms associated with group think, categorised as follows: “Illusions of invulnerability”; “unquestioned belief in the morality of the group”; “rationalising” warnings that might challenge the group’s assumptions; “stereotyping” those who are opposed to the group; “self-censorship”; ”illusions of unanimity”; ”pressure to conform” and dissent characterised as disloyalty; self-appointed “mindguards” within the group who shield the group from dissenting information (Aldag and Riggs Fuller 1993:534). Although Janis’ model has been influential in social psychology and collective intelligence research, it has received criticism. As a general way of thinking about groups and group behaviour Aldag and Riggs-Fuller (1993) argue the model is too negative in its conceptualisation of group behaviour and offer an alternative General Group Problem Solving Model as an attempt to offer a more neutral account of factors relevant to group decision making. They also discuss limitations in research into the model and its usefulness as a way of explaining problems in group decision making, they suggest the model neglects factors such as organisational power and politics, directive leadership, and social control. They further suggest that problems in group decision making may be more better described in relation to other concepts such as “group polarisation” (Aldag and Riggs Fuller 1993).

Group polarisation can be understood as the tendency for groups to move towards more extreme positions than the initial positions of the majority of the individual members (Heylighen 2013). The phenomenon of group polarisation has been observed in a variety of contexts (Meyers and Lamm 1976) and has been used to explain different phenomena such as political violence and risk taking (Meyers and Lamm 1976, Sunstein 2002). The phenomenon is particularly associated with groups that are organised on the basis of self-selection, where membership is based on an existing inclination towards a particular view and thus limits diversity in the group (Sunstein 2002, Heylighen 2013). Group polarization has been explained by appeal to a number of social factors: “Social comparison” suggests the desire to be liked and accepted within a group that is defined primarily by an inclination towards a particular viewpoint leads to group polarisation, motivating conformity and

expressions of views that support an initial inclination of the group. “Persuasive arguments” or “risky shift” describes the sense in which the group is more likely to be exposed to views and arguments in favour of a particular viewpoint, this is thought to be a likely consequence of the diminished diversity and selection bias organising the group’s membership, arguments in favour of a view point that a person is already inclined to accept are also likely to be more persuasive to individuals than arguments that contradict their position (Heylighen 2013, Sunstein 2002). Factors such as confirmation bias may be one way of explaining this phenomenon.

Discussion of group think and group polarization illustrates the significance of “diversity” and “independence” as factors that contribute to group performance and collective intelligence. Many studies have emphasised the importance of diversity in collective intelligence. For example, Hong and Page (2004) observe how research has found that groups of diverse problem solvers can outperform groups of high ability problem solvers. Diversity and the availability of a range of different viewpoints are seen as one way of overcoming some of the problems and biases associated with group decision making (Steyvers and Miller 2015). Surowiecki (2004) describes diversity and independence as necessary conditions for the wisdom of crowds. There is a need to think about the context of decision making and the nature of the task, as well as what sort of diversity is helpful for collective intelligence (Lorenz et al 2011). In the classic example of the “wisdom of crowds” effect, in which villagers estimate the weight of an ox, the decision-making situation allows a level of separation between the knowledge contributed by the agents and the process of aggregation. In this sense independence can be advocated on the grounds that it avoids problems such as systematic bias that would arise from villagers influencing one another.

The collective intelligence literature has also looked at the role of emotional intelligence amongst individuals within a group (Malone and Bernstein 2015, Malone 2012, Cherniss 2010). Emotional intelligence is described as the capacity for individuals to recognise their own emotions, and the emotions of others through facial expressions and non-verbal cues, and is understood to be an important factor in understanding the success of groups (Malone 2012). Malone (2012) observes that

increasing the number of women in a group correlates with an increase in the collective IQ of that group, he suggests that this is not an argument for diversity, since this correlation continues to the point that the group consists entirely of women. Instead he attributes this to the role of emotional intelligence, and findings that suggest emotional intelligence is generally higher amongst women as a way of explaining this trend.

Studies have examined group behaviour and bias in a range of different environmental settings and contexts. When thinking about these findings, the picture they form of individual and group level bias, and the approaches to addressing such biases, it is important to keep in mind that often the evidence is based on experiments in artificial settings or questions where there is an objective right answer. The motivations for this are clear; in respect to creating an experiment with internal validity and producing a set of results that can be meaningfully compared. We might expect some problems in interpreting these results in regards to typical real world decision making; for example, a person is not typically asked to guess a person's occupation based on very limited information, and the fact that they are in that situation may lead them to over-interpret the significance of that information and what the experimenter is expecting of them. This is not to say that such biases do not apply in the context of more ambiguous knowledge claims, indeed the absence of an obvious right answer may make it more difficult for people to examine and reflect on their bias, but simply to say that the comparisons between different contexts are problematic.

This section has discussed ideas in social psychology and research into cognition that have been influential in collective intelligence literature and the way developers think about the challenges facing group decision making. The next section will discuss concepts, tools and techniques used in collective intelligence research to elicit knowledge from collective behaviour, support decision making and address some of the issues identified in the literature such as cognitive bias.

Collective Intelligence: Methods, Techniques and Tools

The discussion thus far has outlined some key theoretical influences on research into collective intelligence. This discussion has considered conceptual frameworks that have been used to talk about collective behaviour and decision making, as well as highlighting particular issues and challenges that arise from this research. The following section will explore some of the methods, techniques and tools that have been used in collective intelligence and related literature in order to elicit or support collective intelligence and address challenges in decision making. They illustrate the range of additional considerations and associated approaches to practice involved in the development of online deliberation platforms.

Crowd Sourcing

Research into collective intelligence often focuses on the notion of crowd sourcing; crowd sourcing can be broadly understood as the process by which multiple agents work towards the achievement of a goal. The literature identifies three broad types of crowd sourcing; directed, self-directed and passive crowd sourcing. In directed crowd sourcing, the agents are working towards a goal determined by an external party such as their employer. Self-directed crowd involves agents working towards a shared goal, an example of this behaviour which has received much attention in the literature is Wikipedia (See for example Kittur and Kraut 2008, Keegan and Gergle 2010, Royal and Kapila 2009). Passive crowd sourcing describes the situation whereby information is gleaned from the work of multiple agents to serve a goal which the agents may or may not be aware of, for example studies have looked at the use of social networks and search engines to gather information for the purposes of public health (Bigham et al 2015). Each example of crowd sourcing raises particular challenges and issues.

Directed Crowd Sourcing

A number of issues relevant to directed crowd sourcing have been discussed in the literature. A key issue concerns the motivation of participants, the use of incentives and how this impacts the quality and effectiveness of work. The goals are determined

by an external party, and the goals of agents may not align with those of the external party. In this case a system of rewards and incentives can motivate agents. As discussed earlier rewards can include extrinsic rewards such as financial incentives or intrinsic rewards, as well as approaches such as gamification.

In addition to issues of motivation, there may be further challenges with the organisation and design of the work involved. An important idea in such discussions is the notion of micro-tasking and workflows. This involves breaking down the work into micro-tasks for individuals to complete, however if the tasks are ill-defined or not coordinated correctly this can create inefficiencies. There have also been further concerns raised about the ethics and efficiency of these processes. For example, breaking down work in this manner can reduce the work involved to simple, tedious tasks which can threaten the role of expertise, divorce workers from the work they are creating, have indirect negative social/economic consequences, in some circumstances this can make the organisation less adaptable to change and have unintended consequences on the motivations of workers (for example these issues have been raised in relation to the Amazon mechanical turk (Bigham et al 2015).

Self-Directed Crowd Sourcing

Self-directed crowd sourcing involves multiple agents intrinsically motivated towards achieving a shared goal; discussion of self-directed crowd sourcing in the collective intelligence literature may be broadly grouped around three main areas; leadership, coordination and conflict (Bigham et al 2015). Much research has looked into the quality of leadership and nature of leadership in groups, notably there has been much focus on Wikipedia as an example of self-directed crowd sourcing involving individuals taking on the role of leaders (Kittur and Kraut 2008, Panciera et al 2009). This literature also discusses issues arising from the use of different forms of communication, such as the issue of motivation and use of incentives, and the relationship between the individuals involved. For example, research has explored the different conditions under which competition may be productive or counter-productive in supporting the coordination of information and the achievement of goals (Bigham et al 2015, Rafaelli and Ariel 2008). There has been interesting work

on the role of conflict in collective intelligence and ways of supporting more productive discussions between individuals who disagree. Kriplean et al (2011a and 2011b) look at platforms aimed at addressing issues of conflict, ConsiderIt is a platform aimed at supporting structured deliberation (Kriplean et al 2011a, Kriplean et al 2014, Freelon et al 2012, Freelon et al 2011) Reflect requires posters to summarise the original poster's points before commenting, supporting active listening (Kriplean et al 2011b). Other platforms such as OpinionSpace (Faridani et al 2010) and Widescope (Burbank et al 2011) have used design to try to reveal how individuals who disagree may be closer in opinion than they expect in some ways (Bigham et al 2015).

Passive Crowd Sourcing

Finally, passive crowd sourcing involves using information from the work of multiple agents for a goal, but the agents may not be aware of this goal and are not working directly towards its achievement. For example, when people search for remedies for illnesses online, information such as the nature of the illness (for example the flu), the number of people searching for remedies and the location of those people can be used to direct public health services. In this way studies have looked at the use of Twitter to better understand the spread of disease (Sadilek et al 2012) and public opinion on policy (Charalabidis 2014). The process of passive crowd sourcing raises particular issues of reliability, since the information that is being used is only indirectly relevant to the purposes that it is being used for, for example searching for information about the flu, does not necessarily mean a person is suffering from it and there may be reasons that many people search for it at a given time (such as a health scare or epidemic). There are also ethical issues around privacy and the use of personal information.

The notion of passive crowd sourcing helps illustrate a broader issue in our conception of collective intelligence. Research has talked about crowd sourcing as a technique that can be used by studies to draw out particular forms of knowledge. It has distinguished different types of crowd sourcing based on the relationship of the agents to the goals of the crowd sourcing process. We may reflect on further issues such as the type of work and knowledge involved, and the relationship between

different types of knowledge in the context of crowd behaviour. For example, a social networking site such as Twitter will use information that emerges from a passive crowd-sourcing process to generate trending topics (issues that are being discussed by many users), the trending topics that users are exposed to can be manipulated by the developers (weighting the results according to the users' connections on the network) or by the users themselves (for example they can view which topics are popular in their geographical area). These trending topics can be reasonably expected to influence the kind of information users are exposed to, what they discuss and who they converse with. This example illustrates a number of issues; the relationship between different types of knowledge, the tacit knowledge involved in the passive crowd sourcing process and the conscious discussion and deliberation that takes place on the site; the sense in which the product that is generated from passive crowd sourcing influences the behaviour of the crowd; the degree of control that different agents have over how knowledge is being used and the different purposes it serves.

Collective intelligence considers a wide sense of group behaviour and forms of knowledge that transcends the focus of deliberation and decision making. This discussion on crowd sourcing highlights the sense in which the distinction between the process of deliberation and other processes and forms of knowledge can be blurred and interdependent, and the need to consider the relationship between deliberation and other forms of crowd behaviour in online deliberation. The next section will focus on techniques and tools in the context of deliberation and decision making.

Gamificiation

A technique associated with examples of collective intelligence (for example, fold.it (khatib et al 2011) and also applied to areas of civic engagement and policy making is gamification (Hasan 2017). Gamification can be understood as the use of game elements in non-game contexts (Deterding et al 2011, Nicholson 2012, Deterding (2012). Thomas Malone is credited as advocating learning from videogames to

produce enjoyable interfaces in HCI as early as the 1980s (Deterding 2012); the term was first used in 2008, and was popularised in 2010 (Asquer 2014, Deterding et al 2011). Deterding (2012) summarises the appeal of gamification, observing how videogames entice millions of people to spend countless hours and money performing menial or repetitive tasks, the intuition being that this power could be used for other purposes. The literature on gamification has primarily focused on its application in the business sector (Asquer 2014), although there is also great interest in the use of gamification for education and training (Landers 2014), and increasing interest in its application in civic engagement projects and policy making (Asquer 2014, Bista et al 2014, Escobar and Urriago 2014, Mayer 2009).

As the concept of gamification has become more popular and widespread it has received criticism, particularly in its application in the business sector. Bogost (2015) argues that gamification often represents a cynical appropriation of video games for marketing purposes, furthermore examples of gamification often misunderstand the appeal of videogames; focusing on the most superficial elements of a game, such as point scoring. Bogost's (2015) critique references the need to consider the context of the use of gamification, the actors involved and the purposes of the project; his critique also highlights potential failings in our understanding of what game elements are relevant to realising the benefits of gamification in non-game contexts. The literature on gamification has highlighted a number of potential factors relevant to the success of gamification processes.

The literature highlights the need to create a meaningful, gameful experience (Nicholson 2012). A distinction is made between extrinsic and intrinsic motivation (Broer and Poeppelbuss 2013, Nicholson 2015). Intrinsic motivation describes skills or actions valued by users that motivate their engagement, while extrinsic motivation describes external rewards, for example points or money (Nicholson 2015). It is often argued that extrinsic motivation, such as rewarding points, cannot alone motivate a person to do something they would not otherwise care to do (Asquer 2014, Hassan 2017), research findings have suggested extrinsic motivations may have no effect at all, indeed it may even diminish internal motivation (Asquer

2014), or produce negative feelings of manipulation amongst users (Nicholson 2012). Successful gamification, it is argued, should connect external rewards meaningfully to intrinsic motivations of users (Nicholson 2012); for example, a user of fitness or educational games (see Deterding et al 2011) may be assumed to have intrinsic goals motivating their engagement, a process of gamification may use extrinsic motivations such as points and levels to represent these goals and progress and encourage and direct the behaviour of the user.

In addition to the discussion of motivation, the literature has identified further factors in determining the success of gamification. Flow theory (Czikszentmihalyi 2008 in Asquer 2014) describes a state of happiness associated with games that are derived from the following conditions; clear, well defined goals and rules of play; an accelerated feedback cycle; a compelling narrative that encourages participation; challenging but achievable tasks offering thrill and enjoyment (Bista et al 2014). The challenge presented to a user should be balanced, low challenges and high skill situations cause boredom, while excessive challenges can cause anxiety or disengagement on the part of the user (Bista et al 2014). Examples of gamification are often criticised for failing to the challenge level resulting quickly in boredom, it is argued that it is important to progressively increase the challenge level in line with the users skills (Nicholson 2015).

There is increasing interest in gamification in politics, policy making and civic engagement. Mayer (2008) discusses the use of games as simulation models in planning and policy making. Research has discussed the use of gamified platforms to address public problems (for example *Waze* discussed in (Escobar and Urriago 2014). *CommunityPlanit* is an example of a fully-fledged serious game that intends to positively impact civic engagement, developed and evaluated for local planning (Gordon et al. 2014 in Hasan 2017:257). Hasan (2017) describes My.hawaii.gov as a successful governmental gamified platform. Bista (2014) provides a case study of gamification used in an online community; the project involved the Australian Department for Human Services supporting welfare recipients transitioning from different payment methods. Game elements such as points and levels were

introduced based on the user's contributions and ratings amongst other members of the community. Current research has tentatively concluded that, if done correctly, gamification can be used to increase citizen engagement and trust (Bista 2014, Escobar and Urriago 2014). The literature has highlighted issues concerning the implementation of gamification; notably a need to consider potential tensions between the norms of participation and the dynamics of the game. For example, Bista (2014) was careful to ensure the dynamics of the game did not result in inequality amongst members or penalties for members not participating. Asquer (2014) also highlights cultural and ethical limitations on the gamification of civic engagement, for example the potential inappropriateness of introducing points or reward systems to health checks. Finally, Asquer (2014) discusses the significance of gamification in the construction of the citizen and citizenship, comparing the construction of the citizen as a gamer to the construction of the citizen as a consumer under a New Public Management paradigm.

ICT and related fields

Collective Intelligence is often discussed in the context of the use of ICT to support collaboration between individuals. In this sense, collective intelligence is treated as an area of computer science, taking the ideas regarding organisations, cognition and collective intelligence, and applying these to developments in ICT. Within the literature there is much overlap between this area and the area of human computer interaction (HCI) (Bigham et al 2015) and computer supported cooperative work (CSCW) and Group Decision Support Systems (GDSS). HCI seeks to gain a better understanding of how humans interact with software, and how the design of the interface influences efficiency and user satisfaction with the software. This includes exploring the principles of design and interface development, developing methods to evaluate design, study the use of software and the impact this has at the level of the individual and broader society (Sears and Jacko 2007). The issues raised in HCI are clearly relevant to CSCW and GDSS, however these areas deal specifically with human collaboration. Software that is designed for collaborative work is often called "groupware" while CSCW tends to describe the study of the techniques and tools of

groupware, as well as the impact this has at an individual, group and social level. Bryan et al (2012) observe that there is debate whether CSCW and GDSS, or the area labelled Group Support Systems (GSS), describe the same field. One distinction that has been made is that the goal of GDSS is to support a decision, while the goal of CSCW is to support groups in working towards a problem solution (Coleman 1997 in Hosack et al 2012), while GSS goes beyond decision support to include "indirect support communications, planning activities, idea generation, discussion, negotiation, and other tasks necessary to allow a group to work together to make a decision or solve a problem" (Turban, Sharda and Delen 2011 in Hosack et al 2012:320). In practice this distinction is more difficult to sustain as research tests these distinctions and researchers use the terms interchangeably (DeSanctis and Gallupe 1987). Research in the collective intelligence literature includes discussion of argumentation systems, argument visualisation, and decision making tools. This work provides the basis for the development of practical tools and platforms to support activities typically associated with online deliberation. This section will outline these areas of research.

Human Computer Interaction

At a very basic and abstract level HCI involves mapping out the factors relevant to the use of ICT, and using theories around these factors to guide the design and evaluation of software. HCI identifies relevant properties of humans and computers, reflecting on how study of these qualities can contribute to the development of effective interface design. A helpful illustration of the thinking can be found in Card, Moran and Newell (1983) discussion of the "human model processor", which reflects on input and output channels and qualities of human memory and information processing capacity. Systems are also broken down in similar terms, identifying input and output devices, different types of interface (for example text based (e.g command line) or graphical user interfaces (e.g desktop)). HCI then draws on understandings of human perception, cognition, memory and motor system in guiding the development of a system, predicting how it will be used, and methods of evaluation (Dix et al 2004).

The methods of evaluating design in HCI are complex and varied, however general standards and broadly accepted practice have emerged (Nielson 1994, Dix et al 2004). There are a great number of general design principles, but it may be helpful to mention a few to illustrate the process. One thought is that the interface should match existing real world or cultural expectations; thus for example the visual representation of an increase in volume could match expectations by showing an increase in altitude, or critical information could be indicated by the colour red rather than a pastel blue; buttons relating to tasks should be organised according to the order they are likely to be used or the collection of commands they are likely to be used with; different types of feedback should be given depending on the time a process takes, for example a process that takes 0.1 sec requires no feedback, 1 second could include some feedback (such as a timer), 10 seconds could include a progress bar etc. When such design principles are stated they can seem intuitive and obvious, this is not to say that they are always applied effectively, and some features require study and evaluation to ensure they are applied. Beyond such general principles there is a much broader literature discussing evaluation methods and approaches to design.

The HCI literature on evaluation is broad, and discusses evaluation in a number of ways. Evaluation methods differ depending on their purpose, whether they are intended to be used at the beginning of development to predict problems with design, used after the system has been developed to identify problems or compare the system with another system. Evaluation methods can be conducted through expert analysis (for example heuristic set evaluations) or they can involve researchers working with users (for example observation, ethnography, questionnaires and interviews), they can include measuring eye movement and scan paths in different systems or the time it takes to complete a task. This illustrates the vast range of evaluative approaches in HCI, naturally different approaches will be appropriate in different contexts. HCI literature has focused initially on the issue of efficiency and usability, including how easy it is to learn and use a system (Briggs 2006, Dix et al 2004). There has been increased interest in methods for evaluating the users experience of the system, for example whether users want to use the system and

whether it is fun to use (Dix et al 2004). These different aims require different evaluation methods, and though there is no generally accepted method for measuring how "fun" a system is to use, there is increasing interest and development of methods for addressing more nuanced aspects of interface design. In the context of social computing, research has identified the importance of social presence and explored how interface design can affect "the sense of being with another" (Graf et al 2017:532). Although these observations relate to ICT use at a very general level they are nevertheless relevant for the development of online deliberation platforms and the experience participants have of online communication.

The field of HCI also considers issues of design and aesthetics. Ngo and Byrne (1998) observe that one way of improving the usability a system is to improve the appearance of the user interface. Ahmed et al (2009) makes the distinction between instrumental and non-instrumental qualities, relating to the ease of use of the system and perceptions of its aesthetic quality; Ahmed et al discuss research supporting a correlation between perceived aesthetic quality and user's overall satisfaction, the success of a product or system, and even the sense in which aesthetic problems may overcome problems created by usability problems in users' experiences and desire to use the platform. Researchers have used different aesthetic measures to evaluate design, although it is possible to identify common approaches; for example, Ngo and Byrne (1998) identify five aesthetic measures; balance, equilibrium, symmetry, sequence and order and complexity. Balance can be understood as the optical weight of a visualisation. Opitical weight refers to the perception of heaviness of objects; dark colours, unusual shapes or large objects appear heavy, while light colours, regular shapes and small objects appear lighter. Balance is achieved by distributing the weight of objects evenly across a screen (left and right, bottom and top). Equilibrium describes the centring and framing the layout of the screen. Sequence refers to the ordering of objects in relation to the eyes natural/trained movements. For many, the eye, trained by reading, will move from the upper left to the bottom right. The eye will also be attracted to move from heavier optical objects to lighter optical objects. Good design in sequencing involves being aware of people's natural eye movements, how one is directing people's vision with the weighting of

objects and whether this correlates with the content of the objects and the way you intend the information to be accessed (Ngo and Byrne 1998). Economy is a further important factor in aesthetic design; screen design benefits from simplicity, using styles, colour, and display techniques sparingly and carefully. Fishwick (2008) describes such measures as classic concepts, and contrasts this with further aesthetic definitions and categories typically associated with art. For example, he describes the sense in which structures in computing may use the style of Gaudi or the Bauhaus school, or otherwise evoke genres, cultures and movements in design (Fishwick 2008). These considerations highlight a further element relevant to considering the users experience of online deliberation platforms and their success and appeal.

Computer Supported Cooperative Work and Group Decision Support Systems

CSCW deals with many of the same issues as HCI, but the focus is on use of computers in the context of groups, thus it is interested in developing user friendly software, mapping out and addressing issues of group dynamics in social activities and supporting groups in handling difficult tasks and information management (Palmer and Fields 1994). A number of terms are used to identify specific areas of interest of CSCW, for example CSCW identifies the following "modes" of cooperative work (Johansen 1988, Palmer and Fields 1994);

Synchronous: groups work in the same room at the same time
Distributed Synchronous: groups work in different areas at the same time
Asynchronous: groups work in the same room at different times
Distributed Asynchronous: groups work from different areas at different times

The CSCW literature also draws on the following classifications to navigate the type of area that is under discussion (Tepper 2003)
Social entities: dyad, group, network, community
Social interaction: coexistence, communication, coordination, consensus, collaboration
CSCW support: the same categories as social interaction, but understood in terms of the support that can be offered

CSCW tools: notable examples include; workflow management systems, wiki's, blogs, shared workspace systems and video conferencing, message boards

Ellis and Wainer (1999) develop the above categories by talking about the kind of tasks that tools and groupware might be involved in, they suggest the following categories.

Keepers: storing and retrieving information, such as a shared database
Coordinators: coordinating tasks, such as workflow systems
Communicators: allowing for communication between participants, such as an email system or video conference
Team agents: Performing specific tasks as if part of the group, such as interpretation

Furthermore, CSCW identifies different types of groups; homogenous, heterogeneous, tightly coupled and loosely coupled. These terms identify the extent to which the group share the same values, goals and attitudes, and the extent to which they are familiar with working together and know each other respectively (Palmer and Field 1994). There is also a distinction between formal and informal groups, with increased attention to supporting spontaneous informal groups (Ellis and Wainer 1999). In this sense CSCW addresses a range of issues, considering ICT and groupwork in many different contexts based on the aims of the people involved, the nature of the group, and the technology that is being applied.

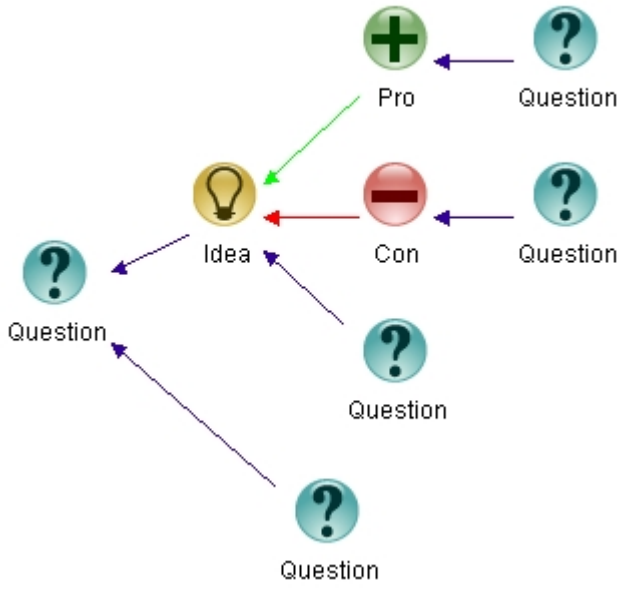
Grudin and Poltrock (2012) identify a number of models that have been influential on the field of CSCW and GDSS, these include Poltrock and Grudin's (1981) modes of collaboration, DeSanctis and Gallupe's (1987) CSCW taxonomy and McGrath's (1991) modes of group activity or tasks. They qualify this observation however by noting that the field draws on a diversity of theories, and that furthermore the link between theory and practice is limited. They suggest that the way these theoretical models are interpreted and applied can vary making comparisons problematic. Grudin and Poltrock (2012) describe how the field has concentrated on ethnographic studies addressing decision making and group behaviour in various contexts which make the

development and application of general principles an “unsolved problem” (Grudin and Poltrock 2012:42). Grudin and Poltrock (2012) also describe the limitations of evaluations of tools and techniques, they suggest that evaluations of platforms have often focused narrowly on a single aspect of decision making, or have used productivity or reaching a decision as indicators of success without factoring considerations of group health. This has led to some platforms being judged successful while participants experience of using the platforms has been entirely negative (Grudin and Poltrock 2012). Grudin and Poltrock (2012) also observe that many CSCW papers report favourably on the success and performance of tools and platforms that do not become successful in terms of broader adoption of the platforms suggesting limitations in evaluation techniques.

Argumentation Systems and Argument Visualisation

The collective intelligence literature has also explored the development of computational models of argumentation and mark up languages that are able to capture natural language arguments (NLAs) for application in the development of tools, argument visualisations and artificial intelligence (Chesnevar et al 2006). In this area, there is much crossover with the field of informal logic, with many developers drawing on models developed in the informal logic literature and the work of scholars such as Walton and Hitchcock (Chesnevar et al 2006), Dung (Snaith et al 2010), and Toulmin and Wigmore (Reed and Rowe 2007). Chesnevar et al (2006) observe that there are a wide range of approaches to the ontology of argumentation systems and a lack of consensus around how these approaches should be formalised, this has led to duplicated efforts and a lack of interoperability between different tools and platforms. As discussed in the previous chapter, design choices of argument visualisation tools may differ in a number of respects; argument representation, interaction design, ontologies, conceptual primitives and the application and scale of automated analysis (Scheuer et al 2010). An influential example from the collective intelligence literature, the Issue Based Information Support system (IBIS), provides a helpful illustration of an approach to structuring argument visualisations.

The IBIS system was developed by Rittel and Kunz (1970) as a way of addressing wicked problems. The method breaks down decision making processes into three broad categories; divergence, the stage where solutions to problems are suggested; convergence, where the group refines its decisions; decision, where the group reaches a consensus around the issues (Ellis and Wainer 1999). The IBIS method involves identifying questions, ideas and arguments for and against; this system is illustrated below



The intention of such a system is to visually organise aspects of a debate, allowing multiple users to understand how ideas connect (or fail to connect) with one another (Ellis and Wainer 1999). IBIS systems have been used as the basis for the development of argument mapping tools such as Cohere (Buckingham Shum 2008), Climate CoLab (Introne et al 2011) and Debategraph (De Liddo and Buckingham Shum 2010a) and QuestMap (Ellis and Wainer 1999). Other argument mapping tools have drawn on other systems, for example Araucaria uses argument mark-up language (AML) to visually represent arguments (Reed and Rowe 2004). It is important to note that such systems and formats only provide a basic ontology around which different platforms and tools can be developed. These platforms and tools can vary in relation to their goals and interface design. For example, the platforms may aim to support the analysis of existing texts, creating argument maps, decision making and education (Reed and Rowe 2004, De Liddo and Buckingham Shum 2010a). The specifics of the interface design and aesthetics may also vary. In this sense while

these techiniques may provide a structure and basis for the development of platforms, many issues relating to the experience of participants and how successfully a platform may support deliberation relate to other choices specific to the platform.

Decision Making Tools and Techniques

The collective intelligence literature often makes a distinction between knowledge representation and argument visualisation techniques and decision making tools (Malone and Klein 2007). The thought is that while certain techniques may be helpful in organising and representing debate the move from debate to decision making requires some sort of tool to filter the arguments and allow groups to make a decision. In this sense, online deliberation platforms require a system of representation of argumentation and a system of decision making and filtering (Malone and Klein 2007). Decision making tools encounter a range of different challenges, these include the development of meaningful aggregation methods, techniques for countering problems around group attention, group memory, individual and group bias, and problems of motivation and incentive.

There are a large number of decision making methods that attempt to provide a legitimate and meaningful account of a group's decision or filter a large range of potential ideas and preferences. The Delphi method is a common approach to group decision making in the literature, that involves heavily structured and facilitated communication; participants submit ideas as responses to questionnaires which are then moderated by the facilitator, in the next stage of the process feedback is provided and the participants then repeat the process in response to this feedback. The structure of the Delphi method is intended to reduce cognitive biases and problems associated with group dynamics by ensuring minimum communication between participants. This method has been used in the development of a Policy Delphi and Argument Delphi to facilitate online deliberation (Linstone and Turoff 2002). Engaging with the challenges of expertise and attention in group decision making, Malone and Klein (2007) discuss the notion of a redistribution of votes or proxy democracy, whereby individuals can submit their vote on an issue to someone

whose expertise they trust in an area. In other discussions Klein (2014) has advocated a “bag of lemons” approach to filtering, the approach is claimed to be superior to other approaches such as the likert scale of rating preferences. This approach is based on the understanding that groups are better at eliminating bad ideas than identifying good ones. Le et al (2014) acknowledge the challenge of aggregation, acknowledging that there are a range of approaches, none of which has found universal acceptance.

The collective intelligence literature has highlighted issues of cognitive bias and other errors of judgement, and different decision making tools and techniques have been developed to address some of these issues in individual and collective judgement. The appropriateness of these techniques depends in part on the nature of the task. Techniques include weighted aggregation methods that try to accommodate for systematic bias, or alternatively methods that try to identify more credible information or expertise within a collective group. Methods have used indicators such as subjective confidence, previous accuracy or other methods to weight results. However, in practice, subjective confidence generally correlates poorly with accuracy, and this issue is compounded in group situations where issues of group think and group polarization can distort subjective confidence, or if the topic deals with popularly held myths or misconceptions then systematic bias can influence decision making (Lorenz et al 2011). In other contexts, research has found subjective confidence can be used as a helpful predictor of the correct answer, for example in a situation where two people are asked questions the person who indicates the most confidence in their answer correlated with the correct answer (Steyvers and Miller 2015). In cases where individuals are asked to make predictions that can be verified, studies have shown how systematic bias or individuals shortcomings can be compensated by a weighted system (Steyvers and Miller 2015). Other techniques include the use of seed questions; these are questions for which the developers already know the answer, and they use the accuracy of participant’s answers to identify expertise and weight calculations for further questions (Steyvers and Miller 2015). In a similar way, some experimenters will test the coherence of probabilistic judgements of individuals and use this to weight responses to the further questions.

In other cases, paying people or otherwise rewarding people for the correct answer can also reduce social pressures and the incentives for conformity and encourage more challenging discussion (Steyvers and Miller 2015). These findings often deal with decision making in artificial situations, or in situations in which an answer is verifiable, and thus the techniques may not be appropriate or applicable in deliberative decision making.

Collective Intelligence and the Challenges of Online Deliberation

It is possible to observe some parallels between the emergence of the field of collective intelligence and online deliberation. In the case of online deliberation, the development of ICT and online communication was understood as a potential way of strengthening democracy and supporting greater public participation and deliberation. The potential of ICT and online communication was understood in terms of the imagery of a virtual coffee house or virtual town hall (Davies 2009). Collective intelligence literature reveals similar kinds of discussions taking place within the field of computer science, in which developments in ICT and online communication were understood as a potential way of coordinating knowledge with appeal to the imagery of a "global brain" (Heylighen 1999). The collective intelligence literature is broader in scope in some ways, however there are many shared points of interest. The discussion thus far has outlined some key ideas, debates and approaches in the collective intelligence and related literatures. This section will discuss how this research may contribute to our understanding of the challenges of online deliberation.

Collective Intelligence and Deliberative Theory

The collective intelligence literature defines its subject very broadly. Indeed, in some ways it is more helpful to think of the field as defined by the idea of outcomes (collaborative behaviour that produces intelligence results) rather than in relation to a particular understanding of decision making or group behaviour. Consequently, how different researchers understand and talk about decision making in the

collective intelligence research can vary greatly. This variety in understanding and conceptual tools complicates comparisons between the understanding of decision making in deliberative theory and that found in collective intelligence and related literatures. On the one hand the collective intelligence literature is much broader, considering emergent intelligence in humans and non-human animals (Gordon 2015), the study of the activity of markets (Lo 2015), the management of organisations (Bigham et al 2015), and decision making in various different contexts. In this sense, we might anticipate that only a narrow selection of the research is relevant to the kind of behaviour described in deliberative theory and online deliberation. On the other hand, the collective intelligence literature reveals ways in which the conception of decision making in deliberative theory and online deliberation is arguably under-defined and ambiguous.

The collective intelligence literature presents a range of conceptual and practical tools for understanding and supporting decision making, drawing on research into groups and organisations (Woolley et al 2015) as well as social psychology and cognition (Steyvers and Miller 2015). Applying the discussion of decision making in collective intelligence literature to online deliberation literature requires paying greater attention to the tasks and requirements of deliberation. For example, the collective intelligence literature suggests the need to consider different decision making contexts and the role of unique tools for particular topics of discussion (Malone and Klein 2007). It is important to note that the conceptual frameworks and tools found in the collective intelligence literature are often contested and do not necessarily present clear solutions to the challenges of online deliberation, but rather approaches to understanding the problem and tools that may be helpful in addressing these challenges. There is a need to think about how one applies concepts in collective intelligence research to deliberative theory, but also why and when these comparisons may be useful or insightful, and how we might judge between different approaches and evaluate the success of different tools.

It may be helpful to reflect on a number of ideas found in the collective intelligence literature and consider how these apply to the conception of deliberative decision

making. At the macro level the collective intelligence research highlights the issue of the relationship between conscious deliberative decision making and other forms of group behaviour and coordination of knowledge. In the first chapter, we noted how Pennington (2008) contrasted the coordination of tacit knowledge of the market with deliberative decision making. This discussion presented these two forms of coordination in opposition to one another, as alternatives. The collective intelligence research expands on this discussion by highlighting the range of forms of behaviour and coordination methods, and the need to consider the interrelationship between these different processes. On this understanding the market can be treated as one example of how tacit knowledge can be elicited and coordinated, as part of a broader understanding of emergent intelligence described in discussions of crowd sourcing. These forms of coordination need not stand in opposition to deliberation and public participation, but these forms of coordination may have different roles in a given platform or example of collective intelligence. When Pierre Levy (2005) discusses the project of cyber-democracy and using ICT to support ambitious and novel forms of governance, this is not necessarily imagined as taking the form of a virtual agora or town hall, but rather as self-organised intelligent behaviour of which deliberation may be a part. Projects discussed by Gegenhuber (2014), such as FixMyStreet.com or Schau.auf.linz, use citizen participation to help identify and resolve social problems, yet the extent to which the behaviour includes deliberation over the rightness of actions can vary. In this sense, there is a need to think about the role of deliberation in relation to other forms of coordination and intelligent group behaviour.

The collective intelligence literature presents a range of taxonomies for categorising group behaviour, identifying relevant variables in group performance, and contexts for judging group performance. The deliberative democracy literature tends to make different types of distinctions from the collective intelligence literature. Deliberative decision making, as discussed in the literature, tends to evade precise definition; we may think of it broadly as discussion that involves decision making and engagement with conflicting arguments, towards reaching a better understanding between participants and a better decision (Dryzek 2010). Attention is paid to the normative ideals and evaluative standards that we apply when talking about the process of

deliberation, thus the deliberative democracy literature makes distinctions between deliberation and bargaining, or the degree to which deliberation is open and respectful rather than exclusive and distorted by power relations (Thompson 2008, Macedo 1999), though there is much disagreement in this area. In contrast to the collective intelligence research, far less attention is paid to the epistemological nature of the goals and process of deliberation. Deliberative theory is also expressed as a normative theory rather than a description of group behaviour, thus there is a need to unpack the normative assumptions underlying the descriptions of knowledge coordination and group behaviour.

Reflecting on Steiner's (1966) categories, deliberation does not easily apply to a single category. Deliberative democracy tends to be advocated under the assumption of a post-positivist understanding of decision making, such that relevant knowledge is incomplete and dispersed amongst participants (Pennington 2008). On this understanding one may characterise deliberative processes as additive and compensatory, in the sense that ideally the performance of the group is improved by each contribution of the individual, and failures in individual knowledge are compensated by the group through the deliberative process. In practice whether the deliberative process reflects these characteristics depends on the power dynamics of the group and any potential cognitive bias that could distort communication. Turning to McGrath's (1984) categories it would seem that deliberation involves different tasks at different points; for example, deliberation is clearly understood as involving creativity tasks, drawing on ideas held individually and developing ideas collectively, however the process also requires choosing between alternatives and the task of negotiating conflict at different levels. Furthermore, deliberation typically involves shifting between different types of task as defined by McGrath (1984), and encounters disagreement amongst participants as to which task is appropriate at a given time.

It is helpful to consider how online deliberation platforms might be understood in the context of these discussions. The frameworks of writers such as McGrath may allow us to better understand and talk about the advantages and disadvantages of a

platform. For example, an online deliberation platform that facilitated idea generation but provided no mechanism of selection would likely struggle to provide an efficient deliberative experience. A platform that allowed for both generation and selection or negotiation would have to manage issues such as disagreement as to what task is required, and the choices over legitimate ideas. Online deliberation platforms can be understood as a particular type of groupware, though how they are defined and understood may be contested. Drawing on CSCW terminology (Palmer and Fields 1994), the focus of many online deliberation platforms is to seek to support an informal, heterogeneous, loosely coupled community, it aims to support this group in argumentation, consensus forming and decision making, and this takes place through a distributed asynchronous mode of communication, under conditions of uncertainty and incomplete knowledge. Implicit in this characterisation is the anticipation of a range of complex issues associated with the dynamics of the group and the ambitions of the goals, i.e supporting a heterogeneous, informal community in decision making would appear to present greater and more ambiguous demands than a relatively homogenous formal group wishing to communicate or coordinate work. Relating this area of concern to the CSCW literature, it is possible to identify particular developments that engage with these types of issues, in particular the development of group decision support systems, and methods such as the issue based information system (IBIS) (Ellis and Wainer 1999).

In addition to different understandings of the decision-making process and the object of study, the fields of collective intelligence and deliberative theory also have different understandings of the goals of decision making and the set of concerns or sources of error that they are sensitive to. If deliberative theory is concerned with the legitimacy of decisions, including issues around inclusiveness and rationality of the deliberative process, collective intelligence literature describes the goals of decision making in terms of intelligence (Malone 2012), wisdom (Landemore and Elster 2015), efficiency and accuracy (where decisions and judgements can be described as accurate). Though there are considerations of ethical issues in the collective intelligence literature, for example in relation to passive crowd sourcing (Bigham et al 2015), the impact of technology on individuals and broader society (Ellis

and Wainer 1999), the discussions are not characterised by the same set of concerns around equality, respectfulness, reciprocity etc, that can be found in the deliberative literature. The collective intelligence literature tends to talk about issues in terms of the epistemological and organisational challenges presented by tasks and collective decision making scenarios.

The collective intelligence literature also draws on other disciplines in informing how it understands errors in decision making. Drawing on frameworks for understanding organisations and group decision making, research has discussed sources of error such as unclear goals (Woolley et al 2015), tasks inappropriate to collaborative work (Woolley et al 2015), failure to apply the correct performance process at the appropriate stage of decision making (for example issues around generating, selecting, negotiating and executing a task, see McGrath 1984), failures in group memory for example ability to recall relevant information or produce reliable information (Wegner 1987), failure to present the right incentives, or to retain the right people for the performance of a given task (Galbraith 1977). These approaches provide potential insights into sources of error in deliberative decision making beyond those traditionally identified in studies of deliberation and online deliberation.

It is helpful to note a few areas in which collective intelligence and deliberative theory have explored very similar research areas. As discussed, collective intelligence and deliberative theory both draw on research into social psychology and cognitive errors, discussing issues such as systematic bias, group think (Malone 2012) and information cascades (Lorenz et al 2011). Furthermore, Scholars such as Landemore (2017a) and Estlund (2008) have been associated with an epistemic turn in deliberative theory (Landemore 2017a:277). This work focuses on social epistemology and explores empirical work with the aim of making the epistemic case for deliberative democracy. Landemore (2017a) discusses evidence that in certain situations cognitive diversity matters more than epistemic competence in reaching optimal decisions. This would suggest that a diverse group would outperform an expert, and highlights the sense in which collective intelligence is more than a

function of individual epistemic competence. In contrast to the approaches in collective intelligence, there is less focus on the descriptive task of unpacking the epistemological tasks involved in different collective decision making situations. Landemore (2017a, 2017b) highlights the need to reflect on the epistemological contexts of decision making. She discusses research that suggests in predictive settings cognitive diversity matters as much as individual ability, while in problem solving cognitive diversity matters more than individual ability. Different mechanisms may be appropriate for different procedures, for example Galton's country fair experiment relies on non-deliberative procedures, taking an average of independent estimates. Deliberative mechanisms may produce optimal epistemological and normative outcomes in other contexts, allowing arguments to be critically evaluated, new ideas to emerge, and a reconciliation of different preferences. Again Landemore (2017b) alerts us to variations in context, for example under circumstances of homogeneity in polarised groups, systematic cognitive bias may inhibit collective intelligence. Alternatively, this context may provide a fertile ground for novel ideas that contribute to the diversity of views in the broader public sphere. Landemore (2017a) also discusses the significance of different kinds of expertise and the division of intellectual labour, for example situations in which one is drawing on the knowledge and judgement of lay people (juries), and situations in which one is drawing on expertise (for example Greenpeace informing policy makers on environmental issues). This work raises important questions about the potential tensions between the epistemic case for deliberative democracy, and other normative issues in deliberative democracy. For example, if empirical evidence suggested that while majority rule outperformed individual experts, weighted voting outperformed majority rule, this may be in tension with deliberative norms of equality. This work illustrates the relevance of collective intelligence research to democracy, and the need for greater attention towards the context of decision making. While knowledge relevant to a decision may be distributed amongst the population, there is a need to think about the mechanisms that might best gather and organise that knowledge, and how to ensure divisions of labour and expertise are accountable and transparent.

This section has discussed the relationship between deliberative theory and the field of collective intelligence and related literatures. The following sections will explore how the collective intelligence literature may be applied to our discussion of the challenges of online deliberation identified in the first chapter. The discussion will focus on three of the challenges based on their relevance to the theoretical collective intelligence literature; participant engagement, participant behaviour and citizen capacity, and information management and representation. The final thematic challenge, feasibility and scale, concerns issues of sustainability, resourcing and demands on staff, addresses platform specific challenges for which the theoretical collective intelligence research is of limited relevance. Therefore, this final challenge will be addressed in the context of practical applications of the theory in Chapters 4 and 5.

Participant Engagement

The online deliberation literature highlighted participant engagement, including attracting and sustaining participation as a major challenge. The issues were broken down into the following questions:

- How do we ensure a system is easy to learn/easy to use?
- What incentives can be used to encourage people to participate and remain engaged?

The collective intelligence literature discusses a number of issues relevant to participant engagement and design. The literature on human computer interaction introduces criteria for exploring how easy a platform is to learn and use, and how intuitive and aesthetically engaging the interface design is. The discussion of these issues highlighted the need for interface design to match existing real world or cultural expectations, and organise task options according to the order they are likely to be performed. Ngo and Byrne (1998) identify five aesthetic measures to consider in relation to platform design; balance, equilibrium, symmetry, sequence and order and complexity. Fishwick (2008) discussed further aesthetic considerations, such as the style or genre of design. While these discussions provide a language with which to talk about design and participant engagement, there are a number of potential

limitations. Arguably these design and aesthetic considerations outline basic requirements that do not necessarily capture the different issues at play in the challenge of participant engagement particular concerning its discussion in the online deliberation literature. To illustrate this issue, Microsoft Excel might satisfy the design and aesthetic criteria outlined above. Yet it does not seem helpful to compare Excel to social network sites, or ask, in reference to these platforms, how it could be more fun or engaging to use. The online deliberation literature intuitively draws a comparison between online deliberation platforms and news media and social network sites designed for entertainment. Although these sites provide a platform for political debate (broadly defined) it is not clear they share the same principles and aims as online deliberation platforms. The design of online deliberation platforms has, whether it ought to or not, focused on functionality rather than entertainment. We may ask the extent to which we can or should treat successful examples of social network sites and news media as standards for success in online deliberation platforms. As discussed, there is no generally accepted method for measuring how "fun" a system is to use, and it is not clear what points of comparison one should use when comparing the experiences of participants on online deliberation platforms.

The collective intelligence literature provides insight into the application rewards, incentives and techniques of gamification on online deliberation. Research on extrinsic motivation, specifically financial incentives, cautioned that this may not produce an increase in quality (Bigham et al 2015), and may incentivise free riding (Alchian and Demsetz 1972, Lazear and Shaw 2007). These findings may be qualified with the claim that monetary incentives may support the recruitment of hard to reach groups and improve cognitive diversity and representativeness. Findings have also observed the significance of the social element of intrinsic motivations, such as gaining affliation, accruing status and signalling expertise (Butler et al 2007, Lakhani and Wolf 2005, Lerner and Tirole 2005 in Woolley et al 2015, Bigham et al 2015). This is relevant to the design approaches of online deliberation platforms, that may exclude social elements of communication, since this research emphasise the value of social connection and feedback, further research has also discussed the

importance of the experience of social presence (Graf et al 2017). A significant development in this area is gamification, with research suggesting that when done correctly can be used to increase citizen engagement and trust (Bista 2014, Escobar and Urriago 2014). In applying gamification there are a number of issues to consider. There is a need to connect extrinsic or in-game rewards meaningfully to intrinsic motivations of participants, and avoid introducing game elements like points superficially (Bogost 2015). There is a question of how one ensures game dynamics complement the dynamics of the deliberative process. For example, how one introduces clear goals, rewards and a level of challenge in a way that is consistent with the norms and desired outcomes of deliberation. Bista et al (2014) discuss challenges of ensuring games do not violate norms of equality, while Asquer (2014) highlights areas where reward systems might be inappropriate (such as in the context of health checks) and questions the desirability and potential implications of constructing the citizen as a gamer.

Finally, the collective intelligence literature draws attention to the use of ICT in knowledge coordination that avoids deliberation, for example the use of mechanisms such as passive crowd sourcing (Charalabidis 2014). These initiatives encounter ethical and democratic issues, they also present a challenge for advocates of online deliberation, highlighting the potential of alternative approaches to drawing on the knowledge of citizens that avoids challenges of citizen engagement.

Participant Behaviour and Citizen Capacity

The review of online deliberation literature identified citizen capacity and participant behaviour as a key theme in the research. The discussion reflected on the influence of anonymity and limitations of online communication on deliberative quality, as well as research concerning group polarization, trolling and the capacity and willingness to engage respectfully with the arguments of others. These challenges of online deliberation were summarised in the following questions.

- How do we support citizen capacity?
- How do we understand, identify and encourage high quality deliberation?

- How does the platform address polarisation and encourage civil interaction with opposing views and beliefs?
- How do we understand, identify and manage negative behaviour and trolling?

The deliberative literature tends to talk about problems in decision making as arising from power inequalities or having the result of reinforcing existing inequalities between participants. Furthermore, the concern with participant behaviour is often connected to a set of normative rules, for example discourse ethics. In contrast, the collective intelligence and related literatures tend to focus on problems in group decision making in terms of problems of coordination and the cognitive judgements of participants. Debates in deliberative theory are sensitive to the possibility that participants are engaging in deliberation in bad faith, being disrespectful or acting in such a way to exclude particular groups whether consciously or otherwise (Baek et al 2011), the concern that relevant knowledge is excluded is connected to the thought that particular groups are excluded from a given decision (Baek et al 2011). The collective intelligence literature tends not to talk about these issues in the same way. The problems of coordination and cognition are seen as arising in many cases from the complexity of the task (Lo et al 2012), and are not typically connected to power inequalities or issues of legitimacy in the political context of decision making. For example, Lorenz et al (2011) discuss how group interactions can undermine the wisdom-of-crowds effect by giving participants undue confidence in the initial or mainstream view and inhibiting the contribution of alternative views. In this sense, while both fields draw on similar ideas such as cognitive bias, polarisation and group think (Sunstein 2001, 2002, Heylighen 1999), these sources of influence are developed in different directions, arguably reflecting the priorities of each field.

A key issue in deliberative literature is the issue of citizen capacity, including concern over citizens' capacity to engage in abstract level argumentation, reflect on their assumptions and their willingness to participate in open and respectful dialogue (Rosenberg 2005, Mendleberg 2002). The literature on collective intelligence develops these concerns by highlighting the many other areas in which we should be alert to problems in judgement at the individual and collective level; since

deliberation involves not only the capacity to deliberate according to the criteria identified in the deliberative literature, but also involves a series of further context specific intellectual tasks, such as probabilistic judgements, that are subject to bias and error. The collective intelligence literature also highlights the importance of individual differences in understanding how cognitive bias influences group behaviour and the tools and techniques that groups find helpful in decision making (Franco et al 2015). In addition to expanding the understanding of the range of issues influencing decision making and deliberative capacity, the collective intelligence literature is also helpful in exploring ways in which citizen capacity may be supported and how techniques and tools may serve to support "debiasing", specifically through ICT based communication. The collective intelligence literature explores factors in decision making situations that may increase or reduce the influence of group think, polarization or other problems in individual or collective judgement, as well as techniques to help address these problems. It has been claimed that the presence of experts or common data (Faridani et al 2010), moderators (Black 2011), the use of visualisations of argument (Buckingham-Shum 2003) and computer simulations (Malone and Klein 2007) can provide ways of reducing the potential problems of group think and polarisation. If implemented successfully these features may help to ensure that a diverse range of opinions are heard and knowledge that contradicts an emerging consensus is not ignored or dismissed (Lorenz et al 2011).

Information Representation and Management

There was broad acknowledgement in the online deliberation literature that current forms of online communication were not designed and structured sufficiently to support deliberative decision making (Davies 2009). Poorly designed platforms were found to inhibit the deliberative process (Delbourne 2010), while Pingree (2009) felt that the true promise of online deliberation lay in the capacity for ICT to present novel forms of organisation and structure to support deliberative decision making. This challenge was summarised in the following questions.

- How should we understand the epistemological and normative demands of decision making?

- What kinds of information and communication does the system include and exclude?
- How does a system address information overload/noise?
- How does a system ensure decision making processes are transparent and accountable?

The collective intelligence literature breaks down the process of group decision making in a number of ways. Models such as McGrath's (1984) system of classification of tasks and Galbraith's (1960) STAR system can provide a framework for thinking about what tasks need to be supported in an online decision making platform. There are two issues to consider in this respect. As discussed, the frameworks that collective intelligence literature describe reveals the ambiguous nature of the way advocates of online deliberation talk about deliberation and the decision-making process. In this sense, one has to interpret the kind of tasks involved in online deliberation. For example, it would seem reasonable to assume that deliberation involves some combination of the following tasks identified in McGrath's (1984) framework; generation of ideas, selection amongst alternatives and the negotiation of conflicts and difference. The second issue to consider is the thought that individual platforms may not be intended to support all of the tasks and contexts that might be identified in our understanding of deliberation. Platforms may be designed to support the various stages of decision making but only in the context of a particular topic or field (Malone and Klein 2007). Other platforms and tools may be designed to support a particular stage of decision making (such as idea generation) or a specific problem identified with the decision-making process (such as the need to encounter alternative views) (Tepper 2003, Ellis and Wainer 1999). Online deliberation literature observes that increased access to information does not necessarily mean information is used, or used efficiently. The collective intelligence literature offers potential approaches to expanding this discussion, by exploring the issue of memory and attention in the context of group decision making.

In addition to providing frameworks for thinking about what an online deliberation platform involves in relation to organisational and epistemological tasks, the

collective intelligence literature also provides methods of argument visualisation that allow for knowledge representation. As discussed, models such as IBIS have been used as the basis for argument visualisation and analysis tools (Malone and Klein 2007, Buckingham Shum 2003). These models can be used to clarify the networks of issues, the positions and arguments relevant to those issues. The discussion above also highlighted the role of decision making tools and voting mechanisms to enable decision making between alternatives (Malone and Klein 2007, Linestone and Turoff 2002, Klein 2014).

There is a need to think about the extent to which argument visualisation models and decision making tools outlined in the literature actually meet the demands identified in more general discussions of group decision making processes, and potential gaps in the process of visualisation and filtering. For example, it would be reasonable to assume that deliberation involves appeals to different kinds of knowledge, such as statistical or anecdotal information. The extent to which visualisation techniques accommodate for these different types of data varies, as does the extent to which decision making tools are sensitive to different evaluative criteria and the challenges of making judgements across different data types. In this sense, we might anticipate that a decision-making tool that simply allowed some form of voting across alternatives might not allow for the kind of scrutiny advocates of online deliberation and participants may want.

There has been some acknowledgement in the collective intelligence literature that the understanding of deliberation in terms of argument visualisation and decision making is too narrow and insensitive to other processes involved. Malone and Klein (2007) suggest the need for computer simulations in addition to argument visualisation and decision making tools. They describe computer simulations based on quantitative models that are able to analyse complete scenarios relevant to a particular decision. They argue that such models would allow for a shared understanding grounded in factual information that would reduce unnecessary conflict, serving a similar function to expert testimonies and moderators in other experiments in deliberation (Malone and Klein 2007). Burbank et al (2012) make

similar arguments for unique simulations and models in their discussion of Widescope, a platform intended to support decisions over national budgets.

In this sense, an additional component is proposed as a way of supporting scrutiny of arguments related to a task, computer simulations specific to a given task that capture relevant objective information and provide a shared visual representation of the consequences of different courses of action. It remains unclear whether these would address the issues of scrutiny across different types of knowledge, and it is possible to anticipate a number of issues with the use of computer simulations as described by Malone and Klein (2007): who is responsible for the development of such models, what figures and information they base their models on and how they define the limits of the model is likely to be complicated and contested given how wicked and ill-structured problems present issues of uncertainty, with different framings and conceptualisations of social problems. This would suggest that while some disagreements or problems in decision making may be reduced by the use of a model, other disagreements are likely to persist as they are inherent to the complex nature of the issue. Other issues raised by the use of simulations and models include the costs to developers, the challenge of learning how to manipulate such models on the part of participants, and the question over which types of discussion would benefit from these models.

The collective intelligence literature provides ways of thinking about decision making and identifying why an online platform might be failing to support decision making, however the literature and tools developed do not present clear solutions to the challenges of online deliberation. The literature presents many alternative and contested approaches to thinking about decision making (Grudin and Poltrock 2012). For advocates of online deliberation, a number of issues remain unresolved, there is a need to consider in greater depth what tasks one wishes to support in a given decision making context, what techniques and tools exist to support it, and how we evaluate the success of these techniques and tools in relation to how well they are being applied and how alternatives may be more appropriate.

Conclusion

This chapter has outlined the field of collective intelligence, highlighting key ideas and themes. The discussion has considered how these discussions relate to concepts of deliberation found in the online deliberation literature and how the field might support our understanding of the challenges of online deliberation. Along with the field of informal logic, collective intelligence has generated a number of novel platforms and tools aimed at supporting practices relevant to online deliberation. The second part of this thesis provides an empirical analysis of innovative platforms and tools designed to support online deliberation. The following chapter explores practical developments in the field of online deliberation and provides an account of the methodological approach to the study of experimental online deliberation platforms.

Chapter 4: Online Deliberation in Practice: Methodology

Introduction

The first chapter introduced the field of Online Deliberation. It identified a distinction between research into common forms of online communication and efforts to design platforms supporting large scale deliberation (Shane 2004, Davies 2009). Research into common forms of online communication focused on lightly structured forums, often not designed explicitly to support deliberation (Loukis and Wimmer 2010). Davies and Chandler (2011) observe how this research has revealed the limitations of the open internet and lightly structured forums in supporting online deliberation. Following a review of the literature we identified a series of challenges facing online deliberation. Researchers have pointed to design and structure as a means of addressing some of these issues and challenges (Pingree 2009, Coleman and Moss 2012, Manosevitch 2014).

Our understanding of online deliberation, the challenges it faces and the potential of design is informed by experience and the study of online deliberation in practice (Coleman and Gotze 2001). The field of online deliberation is characterised by variety and constant change due to technological advances and innovations in practice (Manosevitch 2014). Practitioners developing experimental platforms provide practical examples and unique insight into how design choices might support online deliberation. The developers of these platforms are often influenced by fields outside of deliberative democratic theory, notably informal logic and collective intelligence. Chapters Two and Three outlined these fields and provided a discussion of the relationship between the theoretical approaches found in these fields and deliberative theory. Although the literature highlights the promise of design (Pingree 2009 Coleman and Moss 2012), research into design has often been limited (Towne and Herbslep 2012) and current research has focused on broad variables. In this sense, the online deliberation literature has often neglected research into novel and experimental platforms and the more nuanced and novel forms of design they utilise

(Pingree 2009, Delbourne 2010, Davies and Chandler 2011, Towne and Herbslep 2012).

This project provides an empirical study of platforms and tools that utilise experimental design choices to support deliberation. To the best of my knowledge, this is the first attempt to study this group of platforms from a deliberative democratic perspective. This chapter outlines the approach to the empirical study. The first section outlines the methodology of the study. The second section discusses the criteria for selecting exemplary cases for further study. The third section discusses methods of data collection and analysis. The fourth section provides information on the individual platforms and tools selected for analysis; including details on the background, objectives and design and existing research and applications of the platform.

Methodology

To explore current practices in experimental online deliberation platforms and gain a deeper understanding of the potential of design in addressing the challenges of online deliberation, the study focuses on a small number of exemplary cases. The study selects platforms and tools that enable us to explore the challenges of online deliberation in depth (Cresswell 2013). This section argues that this methodological approach allows us to navigate a number of challenges presented by the field and to fulfil the aims of this study.

The first issue we encounter concerns our definition and understanding of an "experimental online deliberation platform". As noted, experimental platforms have not been studied extensively (Towne and Herbslep 2012), there is therefore a lack of existing research to guide our definition and classification of this range of platforms. This challenge is exacerbated by the sense that the term "deliberation" is contested with no clear consensus on its basic characteristics (Coleman and Moss 2012). Furthermore, developers of the most successful and promising platforms are often influenced by fields distinct from deliberative theory (Manosevitch 2014).

Consequently, how developers talk about the objectives of the platform may differ from concepts familiar to deliberative theory. In this sense, the term “online deliberation”, if it is used, may be used and understood differently by different developers, producing very different kinds of platforms. Finally, many platforms and tools do not support all elements we might typically associate with a process of deliberation, for example notably few platforms explicitly support decision making. In some cases, platforms have been used in collaboration with offline processes, or to support a particular task such as idea generation.

In summary, a precise definition for identifying experimental online deliberation platforms does not currently exist in the literature and, in view of the considerations highlighted above, such an approach would be neither realistic or desirable for the purposes of the current study. The study therefore adopts a broad and flexible understanding of the term “experimental online deliberation platform”. This allows the inclusion of platforms influenced by other fields that remain relevant to the study by virtue of the context of their use and design features. This also allows the inclusion of innovative platforms that support limited elements of the deliberative process. As a minimal definition, to qualify for inclusion in this study a platform should allow more than one participant to express ideas and arguments in the context of public debate. The design and structure of the platform must also be able to demonstrate some feature aimed at supporting deliberation that distinguishes it from the lightly structured format of typical forms of online communication.

The second challenge concerns our methodological approach to studying these platforms and the potential of design. Current research into design has been limited and the methodological approaches adopted encounter challenges and are ill suited to the aims of the study. An initial challenge is the contested definition and conceptual criteria of deliberation (Naurin 2007). The move from conceptual criteria to evaluative standards presents further challenges in how deliberation, and the qualities associated with it, can be operationalised and meaningfully evaluated (see Neblo 2007). In a review of online deliberation literature, Coleman and Moss (2012) raise the concern that studies focus on different deliberative criteria and

operationalise them differently, generating problems for judging the success of different platforms and comparing performance across platforms. These concerns are particularly relevant to the study of design and experimental platforms. Studies have operationalised deliberative criteria using measures that assume specific design choices. For example, Friess and Eilders 2015 discuss research measuring how often participants in a forum quote or refer to each other as a measure of reciprocity. Applying this measure to a platform utilising an argument map cannot produce results for a meaningful comparison, for example if specific authors are not identifiable for citation it may measure no reciprocity, or, since every argument is connected to another point in the map, it may measure absolute reciprocity. In some cases, researchers have counted words per message to judge, quite indirectly, how often participants justify their beliefs (Kies 2010s). This is a deeply problematic measure of justification, that would produce very different results in platforms that deliberately limited the word count of contributions or emphasised voting over writing. The design choices of experimental online deliberation platforms vary significantly between platforms, thus existing approaches to operationalising deliberation, that assume specific design choices, would not be helpful for studying this group of platforms.

Studies exploring design, such as Davies and Chandler (2011) and Black (2011), have discussed broad design variables such as differences between synchronous and asynchronous communication, or anonymous and identifiable participants. This may be contrasted with the more nuanced range of design choices displayed by experimental platforms. These variables include various approaches to interface design, aesthetics, and choices concerning argument visualisation and representation. These variables may significantly impact the experience and behaviour of participants, the quality of deliberation and the success of the platform. A further element is the sense in which current approaches attempt to establish a causal relationship between a specific design choice and an outcome in terms of deliberative quality. This approach requires focusing on one design choice, controlling for confounding variables arising from other differences in design as well as external factors such as the context of its use. This is a challenging task; Karlsson's

(2010) study of deliberation in 28 identically designed forums highlights the significance of contextual factors raising concerns for current approaches to studying design. It is also arguably an unhelpful approach when studying experimental online deliberation platforms, which vary greatly with respect to their design chocies and the context of their application. Although Scheuer et al (2010) are discussing computer supported argumentation systems, their comments on the challenges facing empirial study are pertinent to online deliberation platforms, given the similar conditions of variety between systems and very different contexts of application. They write:

> A simple explanation for the lack of studies that systematically compare different argumentation system designs is that it is quite difficult to practically do such studies; varying factors in a controlled manner would require eliminating confound [variables], which is quite difficult when two existing software systems are compared as a whole. (Scheuer et al 2010:49)

In view of the methodological challenges discussed above the study adopts an exploratory case study approach. An exploratory approach is most appropriate given the lack of existing research in this area and the flexible definition of the population of cases the study is adopting (Shields and Rangarajan 2013, Reiter 2013, Schutt 2015). An exploratory case study approach is most helpful in addressing the aims of the study given the difficulties in eliminating confounding variables following the variety in design approaches and context of application. This allows the study to explore the wider and more nuanced variety of design choices displayed by experimental platforms under the circumstances in which they are found (Yin 1994), allowing consideration of the impact of the design choices of the system as a whole. Given the methodological approach adopted, the study will not seek to establish strong generalisations or causal links between specific design choices and outcomes on deliberative quality. As discussed above this would be a problematic task and would limit the scope of the study. The study will focus on a small number of online deliberation platforms and tools that represent exemplary cases. Although this focus limits the capacity of the study to explore the full range of potential innovations, it

allows for in-depth exploration of the experiences of the platforms and the potential of design. The following section will review experimental online deliberation platforms and discuss the criteria for selecting exemplary case studies. This will be followed by a section outlining the approach to data collection and analysis of these platforms.

Selecting Cases

Technology demonstrations have documented a number of examples of experimental online deliberation platforms (for example Conklin (2008), Tauro et al (2008) Fishkin (2008), De Liddo and Buckingham-Schum (2010b)), and further examples have been identified and collected on the sites ParticipateDB and Participedia.net (Towne and Herbsleb 2012). ParticipateDB lists around 350 tools and services for web based participation (ParticipateDB 2017). Scheuer et al (2010) provide a review of computer supported argumentation systems, some of which relate to the criteria for online deliberation platforms outlined above. Mark Klein (2017) has produced an overview of collective intelligence tools, creating and briefly analysing a list of around 90 platforms, as well as a paper seeking to categorise available large scale online deliberation platforms (Klein 2015).

ParticipateDB provides a taxonomy of 24 classes of platform, the taxonomy defines platforms in terms of the organisation of information as well as their purpose:

Argument mapping
Audience response system
Budget simulator
Budget visualization
Collaborative document writing
Content management system (CMS)
Crowdfunding
Discussion forum
E-learning platform
E-voting

Electronic mailing list

Group decision support system (GDSS)

Ideation & brainstorming

Live video streaming

Online consultation suite

Online dialogue and deliberation

Online survey

Social media

Virtual townhall

Virtual whiteboard

Virtual world

Web conferencing

Weblog

Wiki

(ParticipateDB 2017)

In reviewing potential platforms, this study has used ParticipateDB, Mark Klein's analysis of collective intelligence tools, as well as a search for online deliberation systems. The study identified minimal criteria to qualify for inclusion in the study, these were applied to the platforms identified from the search. ParticipateDB for example includes many platforms that utilise lightly structured forums or support activities distinct from deliberation, such as e-voting and e-learning, and were therefore not considered relevant to the current study. The review of potential platforms revealed a further need to consider practical issues in selecting platforms. Klein (2017) observes in his descriptions that many of the platforms and tools listed are no longer active (for example Ahoona), may not have been used, or have no evidence of large scale use (Cluxton). In such cases, there is limited material available for in-depth study and opportunity for assessing the potential of design in addressing the challenges of online deliberation. In view of these issues, the selection of cases considers practical issues such as the availability of material and indications of substantial use of the platform. These considerations include ease of access, evidence that the platform has supported large scale use or sustained participation

over a period of time, the availability of material and literature on the platform that provide evidence of the platforms application and influence.

In addition to basic criteria and practical considerations, the review of potential platforms also considered approaches to design displayed by the platforms. As noted, informal logic and collective intelligence have been influential in this area; developers have produced platforms and tools designed as practical applications of techniques and approaches discussed in these fields. For example, the use of argumentation schemes to organise and support real world debate (Parmenides), and the use of gamification to support participant engagement (@stake). Focusing on notable examples of these applications allows the study to explore the theoretical issues and questions highlighted in the discussions of Chapters 2 and 3, and explore the potential of these approaches for addressing the challenges of online deliberation. In addition to notable applications of theoretical influences the study also considers trends in design that enables us to make sense of the field and select examples for further study.

There is little existing research to guide our review and categorisation of experimental online deliberation platforms. Klein's (2015) review of "Crowd Scale Online Deliberation" is a notable example of an overview of this area. Klein (2015) identifies five different categories of online deliberation systems. These are time-centric, question-centric, topic-centric, debate-centric and argument centric. This system of categorisation is based on how information is structured and visually represented. Scheuer et al (2010) provide a review of computer supported argumentation systems. While this review is not specific to deliberation systems, the categories and patterns identify similar features; for example, time-centric corresponds with chat and forums, debate-centric corresponds with containers, argument centric corresponds with graphs in Scheuer et al's. Time centric systems, including blogs, chatrooms and web forums, may be understood as representing the more typical, lightly structured forums discussed in other literature (Towne and Herbsleb 2012). In question-centric platforms (examples provided include, stockoverflow.com, IdeaScale and Mindjet), a central question organises

information, but there is no further organising or curating principle that ensures information is not repeated, nor is there a process to help identify preferable ideas or identify critiques and critical discussion of ideas. Topic-Centric systems, such as wiki's, collect information around a topic, and are described as capturing consensus while controversial aspects of debate are moved to talk pages that are organised according to the time-centric principle described earlier. Debate-centric systems (examples include, whysaurus.com, Debatepedia.com, debatewise.org (Klein 2015)) present information in the form of pros and cons and are often curated to ensure an effective overview of a topic with minimum redundancy of information. Finally, Klein (2015) outlines argument-centric systems. These are systems that typically present information in the form of argument maps or trees, identifying central questions and ideas, followed by arguments for and against and reasons and evidence supporting those arguments.

Klein's (2015) discussion can be understood as an argument for a particular approach to online deliberation systems, specifically argument-centric systems of which he is a noted developer. The discussion provides a useful approach to navigating the range of potential online deliberation systems; time-centric and question-centric platforms describe lightly structured approaches that are not relevant to this study. Debate-centric and argument centric constitute two common approaches to organising information amongst platforms that are clearly relevant. In addition to the use of argument maps and the pro and con lists of debate-centric visualisations, the review identified two further general trends in approaches to design and visualisation techniques; annotation and group clustering. Some of the platforms and tools reviewed used annotation of existing web pages as an approach to deliberation (for example, Hypothesis and Rbutr). Annotation involves providing an extra layer of meaning to a given web page by allowing users to annotate it and see other annotations including links to other pages. Other platforms and tools will represent information in terms of group clustering, in which participants are represented in spaces and grouped in such a way as to reflect their support for particular positions (for example ConsiderIt and Pol.is). Group clustering is another form of visual representation which allows users to view the positions of other individuals in a

community, for example reflecting how strongly different users agreed or disagreed with a statement. Group clustering can give a representation of participants relative to positions without attempting to place those positions in the context of an argument structure relative to other positions. Such an approach, can be understood as a visualisation technique that provides social information concerning the debate in contrast to information relating to the content of the argument.

Within these general trends, the platforms and tools reviewed display a range of more nuanced choices in relation to interface design, aesthetics, and the combination of other tools and techniques to support different aspects of deliberation. For example, while we can talk generally of the approach of argument mapping, the platforms and tools will differ in a number of respects; the ontology of the argument map may vary, with different choices on the elements that can be used to compose a map; choices over word limits or the visibility of replies and counter arguments; and the general look and aesthetics of the argument map. These factors may greatly influence the success of the platform and its ability to address certain challenges; for example, aesthetic considerations may impact the capacity of the platform to attract and maintain participant engagement. Our review of online deliberation platforms also found that platforms may combine different approaches to argument visualisation, and they may utilise other tools or design approaches that help address challenges or issues associated with a given approach to visualisation. For example, ConsiderIt combines both debate centric visualisations in the form of pro and con tables, but also displays group clustering and allows for further analysis of this data (for example the levels of support for positions based on the demographics of the group). Another tool called the Deliberatorium features both argument centric and time centric systems of communication in the form of an argument map and a chat function. Finally, some approaches found in practice do not fit easily into any category of visualisation or design approach already identified; for example, Parmenides draws on argumentation schemes but organises information through the presentation of a dialogue with the participant.

Our review has identified trends in design and visualisation techniques amongst online deliberation platforms. These approaches appear to be commonly perceived as presenting potential solutions to the challenges of online deliberation. The study seeks to select platforms that represent notable or successful examples of these approaches; platforms that combine these approaches and techniques in interesting ways, as well as novel and unique approaches. The purpose is to capture a sense of general and notable trends in design approaches and explore how they may address challenges of online deliberation. The study does not seek to make strong generalisations from the experiences of selected platforms, which given the diversity of the population of cases and methodological approach would be problematic. In summary, the selection criteria are outlined below.

- The platform or tool meets the minimal criteria of supporting online deliberation and demonstrating novel and relevant design features that distinguish it from lightly structured forums.
- Practical considerations: ease of access to the platform, evidence that the platform is successful and has received large scale or sustained participation, the availability of material and literature on applications of the platform.
- Instances where the platforms demonstrate an interesting application of concepts and techniques discussed in the informal logic and collective intelligence literature
- Instances where the design choices represent notable applications of common trends or unique approaches to visualisation and structure that can be linked to engaging with the challenges of online deliberation.

Where possible the platforms and tools available were trialled and reviewed according to the criteria above. From this process, a selection of platforms and tools were identified as exemplary case studies for further exploration. The following section will outline the approach taken to the analysis of these platforms and tools.

Analysis of Cases and Interview Method

The study is interested in exploring the potential of design and structure to address the challenges of online deliberation. These challenges were identified in Chapter 1

and organised around the themes of participant engagement, participant behaviour and citizen capacity, information representation and management, and feasibility and scale. A series of issues and questions relevant to design were identified within each theme. These provide the framework for the analysis of the platforms and tools selected for in-depth study. The themes and the associated issues and questions are summarised below:

Participant Engagement: concerns the challenge of attracting and sustaining participation. Questions for the design of platforms include:

- How design can ensure the platform is easy to learn and easy to use?
- How can a platform be designed to be appealing or fun to use? This includes considerations such as incentives, gamification, and aesthetics of design.

Participant Behaviour and Citizen Capacity: concerns the challenge of encouraging considered deliberation and avoiding the problems of trolling, polarisation and echo chambers. Questions for the design of platforms include:

- How the design supports citizen capacity, including qualities such as critical thinking?
- How the design encourages positive behaviour and engagement with opposing views?
- How the platform discourages trolling and other negative behaviour?

Information Representation and Management: deliberation involves a range of tasks and can be understood and represented in various ways; this presents epistemological and normative challenges concerning the representation and management of deliberation. Questions for the design of platforms include:

- How the debate is framed and represented? What features of deliberation are being represented and which excluded?
- How do the choices of information representation and management deal with the potential problems of noise and information overload?

- To what extent does the system manage decision making, including filtering debate, editing, verification and other critical work involved in deliberation?

The Feasibility of the Platform and Large Scale Deliberation: the extent to which the demands placed on staff, participants or design can be realistically met and sustained. Questions for the design of platforms include:

- What demands are placed on the running of the platform, for staff, organisers and participants and how are these demands effected by an increase in the number of topics or participants on the platform?
- How realistic and desirable is large scale deliberation on the platform?
- How could the platform be applied in real world decision making in a way that is transparent and accountable?

In order to address these issues and gain a more complete understanding of the platforms and tools, a range of different types of data will be collected (Creswell 2013): Direct experience of using the platform in practice; an analysis of the literature available on the platforms, including demonstration and research into practical applications; semi-structured interviews with developers and those involved in applying the platform. These different sources of information enable greater understanding of the functioning of the platform and experiences pertaining to the challenges identified. Direct experience of the platform allows for a greater understanding of how easy the platform is to learn and use; the aesthetics of design; a sense of the nature of debates, conduct of participants; and how well information is managed and represented. Analysis of existing literature and research helps identify the influences and objectives of the platform, studies into applications of the platforms can help reveal areas where it has been successful, challenges encountered, and how it may be used to support decision making. Finally, the analysis of the platforms draws on semi-structured interviews of developers and individuals involved in the application of the platforms in practice. These interviews allow for greater insight into the experiences of experimental online deliberation platforms, the intentions behind design choices and the demands of running the

platform, and challenges experienced over the long-term use of the platform. These experiences and issues would not necessarily be revealed through direct use of the platform or individual studies.

Following the selection of case studies, potential interviewees were identified and contacted. The study contacted individuals who were involved in the development, running or application of the platform. It was felt their perspectives would provide insight into the aims of the platform and challenges experienced. The interviews were semi-structured, the questions were organised around the thematic challenges identified in chapter 1: participant engagement, participant behaviour and citizen capacity, information management and filtering and feasibility and scale. Interviewees were also asked broader questions about their experiences with online deliberation and their perspectives on the future direction and challenges of online deliberation. This enables an analysis that is focused on the themes of the study, while also allowing other issues to emerge. The study interviewed 10 people. The study was unable to arrange an interview with developers involved in the following platforms; Arvina/OVA, Cohere/Evidence Hub or Climate CoLab. They are included in the study because of their novel characteristics. A schedule of interviewees and the interview questions are provided in the appendices.

Outline of Case Study Platforms

Eleven platforms and tools were selected as exemplary cases for further study, these are:

@stake
Arvina and Ova
BCisive/Rationale
Climate CoLab
Cohere/Evidence Hub
Consider It

Debategraph

Deliberatorium

Parmenides

Rbutr

Truthmapping

This section provides a description of each of these platforms; providing information on the background of the platform, design features, illustrative screenshots of the platform, and reviews existing studies and applications of the platform.

@Stake

Background, Objectives and Design of the Platform

@Stake is a "role playing online card game developed to foster empathy and collaboration" (eLab 2017a:1) and "enhance deliberation in real-world processes" (eLab 2017b:3). @Stake was developed by the Engagement Lab, an organisation that seeks to produce games for social change, participation and engagement (eLab 2017a: 1). The developers describe the game as relying on "rapid fire ideation, discussions facilitated through role playing, experimentation with ideas, and collaboration among a diversity of stakeholders" (eLab 2017b: 3).

@Stake is a card game that takes about one hour to play. It requires the division of large groups into smaller groups of 4- 5 players. Participants are assigned characters through cards. The card contains biographical information and an agenda, visible only to the participant. The agenda provides details of the character's objectives, with points attributed to each objective. One person of the group is elected as Decider for the round, with which comes various responsibilities. Tokens form a currency of the game, each player is given three tokens, with an additional three tokens in a pot and five tokens for the Decider.

Distribution of tokens (eLab 2017b: 4)

Character card (eLab 2017b: 11)

The rounds consist of the following stages:

Introduction: Participants introduce themselves in character

Brainstorm: The Decider announces the issue, participants have one minute to develop a proposal

Pitch: Moving clockwise from the Decider each player has a minute to pitch their proposal. They may use tokens to allow themselves extra time.

Deliberate: The Decider leads a follow up discussion, participants may ask each other about their proposals, offer counter arguments and suggest amendments to one another's plans. Tokens may be used to extend time.

The Decision: The Decider announces a winning proposal. The player who proposed this wins all the tokens in the pot, plus bonus tokens based on points on their agenda. All other players score points for their agenda items, if the winning proposal satisfied these requirements (determined by the Decider). The winner then becomes the Decider for the next round (or alternatively passes this on to someone else) (eLab 2017b: 5- 6)

@stake was initially developed as a face to face card game in 2014, the developers have since produced a digital mobile version (Engagement Lab 2017). This version simplifies the rules, reduces the need for facilitation and allows for easier tracking of ideas generated during the game and the experiences of the players (Gordon et al 2016). The game would appear to require bespoke cards for each event it is applied to, with characters and agendas relevant to the event. In contrast to many of the other platforms and tools explored in this thesis, the developers make explicit reference to deliberative democratic theory and the desire to support the goals and outcomes of deliberative democracy (Gordon et al 2016). @Stake and the other projects developed by Engagement Lab can be understood as the most explicit example of "gamification", as discussed in the collective intelligence literature, available amongst the platforms and tools reviewed. Although it aims to support deliberation and decision making in general, the developers also stress the role it can play in supporting empathy building between participants (Gordon et al 2016).

Images and Screenshots of the Platform

An example of the cards is reproduced below[1].

[1] https://medium.com/engagement-lab-emerson-college/announcing-a-printable-stake-game-211f76804086#.uy36q159k

Literature and Applications of the Platform

In addition to information on the engagement lab website, the developers produced a paper for the 2016 CSCW (Computer Supported Cooperative Work) conference about the platform. This paper identifies a lack of research into "civic games", it outlines the rules and mechanics of the game and describes a pilot study comparing the game to a traditional ice breaker (Gordon et al 2016). The paper reports the findings of the pilot study as positive, finding that role playing may encourage participants to be more comfortable with public speaking and engagement, as well as greater capacity to empathise with others and retain information about their ideas and personalities (Gordon et al 2016). Michelson (2015) also reports on the results of playtests of the games; the platform was used as a warm up activity by architecture and planning design firm Utile in the Imagine Boston 2030 initiative. @Stake was also piloted in three Participatory Budgeting meetings in New York City in Autumn 2014 (eLab 2017a). A study of this event used participant observation, survey data, and follow up interviews to evaluate a number of issues including whether gameplay increased empathy, efficacy, affinity towards civic engagement, and future participation. One of the observations of this study was the sense in which some participants objected to spending time on a game (eLab 2017a). The game has been used in a variety of settings including organisational planning, UNDP policy meetings on youth unemployment in Moldova, Egypt and Bhutan, educators' curriculum design workshops, and several academic conferences (Gordon et al 2016:271, eLab 2017a).

Arvina and Ova

Background, Objectives and Design of the Platform

Arvina is web based discussion software, that "allow participants to debate a range of topics in real-time in a way that is structured but at the same time unobrtusive" (Lawrence et al 2012:1). Arvina and OVA were developed by the ARG-tech, Centre for Argument Technology at the University of Dundee. ARG-tech develops tools aimed at argument mining, argument visualisation and analysis and the use of

artificial intelligence in dialogue. The centre has been influential in this field and has worked in collaboration with the BBC and IBM debating technologies (Reed 2017). Arvina and OVA are tools developed to support argumentation.

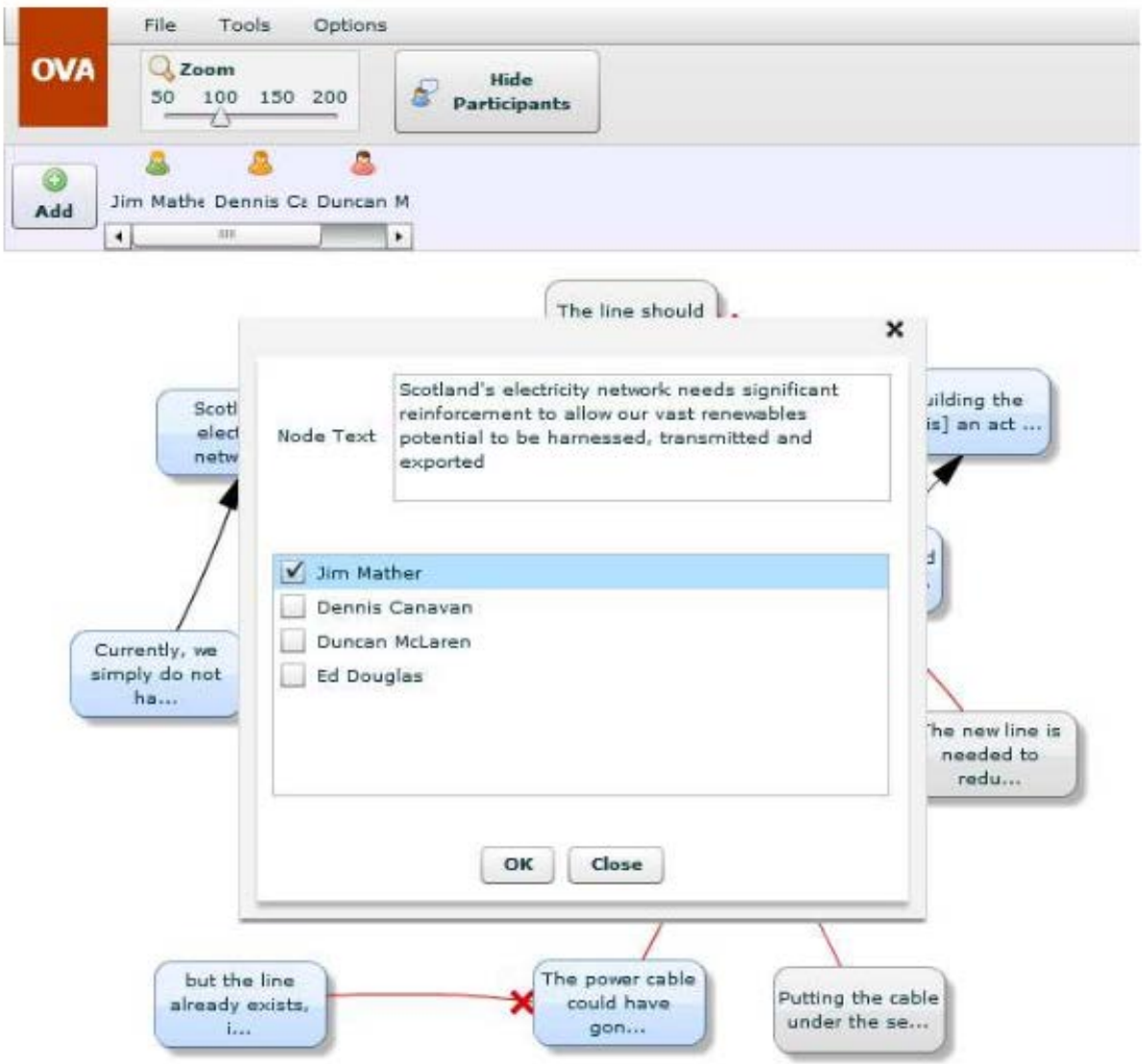
Arvina and OVA are an application of Argument Interchange Format (AIF) theory that has been used to support political debate. OVA (Online Visualisation of Argument) is a tool for analysing and mapping arguments online. The interface allows users to highlight text on a web page and extract this to a premise which can be used to support or challenge other premises. Missing premises (or enthymemes) can also be added by users. Arvina is a dialogue tool that uses google wave, an online tool which allows for real time communication and collaboration (Google 2010 in Snaith et al 2010:7). Arvina is a Wave application which builds on the Google API, allowing a user to choose a topic from any previously analysed AIF resources. The AIF resource is examined to determine the participants involved in the dialogue and a new robot is added to the wave representing each of these participants. The participants may be human or artificial, with artificial participants using knowledge assigned from the AIF resource.

Arvian and OVA are relevant to the current study for a number of reasons. Arvina and OVA represent an example of the use of artificial intelligence in online deliberation platforms, and an attempt to provide some formal structure to natural language argument that can be used across different platforms. Artificial intelligence and particularly the work of Chris Reed and ARG-tech were described by a number of other developers in this area as being particularly influential and promising as a direction for online deliberation. This is an area that is particularly relevant to issues of feasibility and scale as well as information management.

Images and Screenshots of the Platform

Figure 1. The Arvina Interface

Arvina Interface (Lawrence et al 2012:2)



Premise properties in OVA Showing Participants (Snaith et al 2010:5)

Literature and Applications of the Platform

Arvina and OVA were applied in the context of a proposal to build a transmission line for the Beauly to Denny power line through areas of outstanding natural beauty (Snaith et al 2010). The purpose of the study was to test the capacity for interchange between different formats, argument visualisation and dialogue format using AFI theory. The study observed that the tools demonstrate that formally describable processes of deliberation can be linked to the formally describable structures of knowledge. It claimed that much remained to be done to expand and refine the tools,

and integrate the tools with other parts of the deliberative process, such as inquiry and decision making. Lawrence et al (2012) tested Arvina's capacity to support human and artificial intelligence groups in mixed initiative argumentation. Lawrence et al (2015) discuss the challenges of current argument mining techniques to identify complex structural relationships between concepts, a lack of consistency in formatting, and a lack of large quantities of appropriately annotated arguments to serve to train and test tools. In efforts to address this, researchers have turned to other online tools (including several discussed in this study, Debategraph, Truthmapping and Rationale) and sought to convert them to AIF formats (Lawrence 2015).

BCisive/Rationale

Background, Objectives and Design of the Platform

BCisive allows the creation of decision maps to "capture discussion, organise ideas, explore options, test hypothesis and analyse reasoning" (BCisive Online 2017). Rationale claims to allow users to make argument maps to "structure arguments, analyse reasoning, identify assumptions and evaluate evidence" (Rationale Online 2017). BCisive and Rationale are tools developed by Austhink and represent commercial successors to Reason!Able (Scheuer et al 2010). The tools are currently run by the ReasoningLab; both tools allow for the collaborative construction of argument maps. The software code for the tools are identical, however the interface allows for different options in map construction (Kunsch et al 2014). BCsisive aims at supporting decision making while Rationale is used as an educational tool for supporting critical thinking and developing argument in essays.

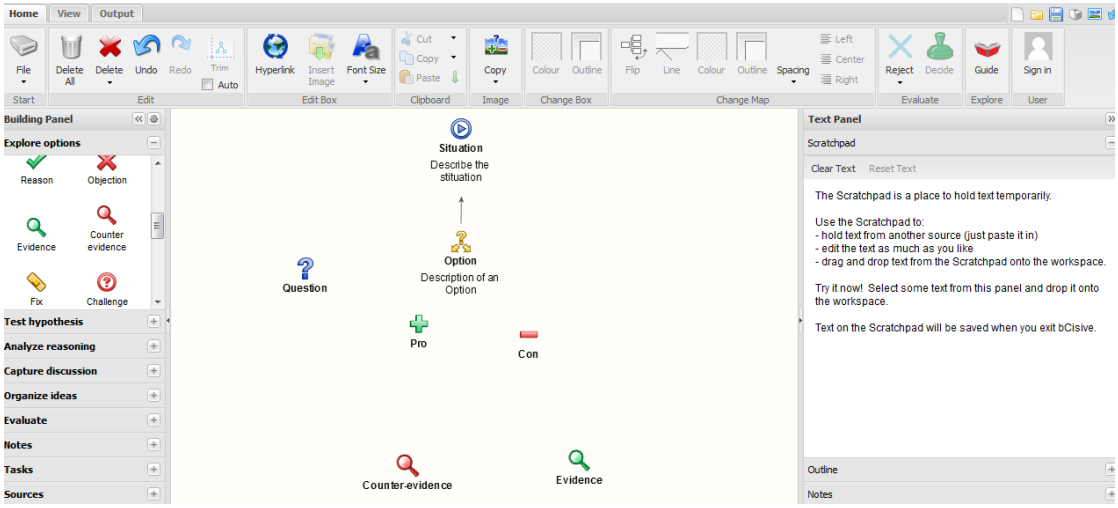
The descriptions for the argument visualisation ontology are different for each tool. The basic ontology of BCisive allows for the construction of maps from the following: Situations, Options, Pros, Cons, Reason, Objection, Evidence, Counter Evidence, Questions, Challenges and a Fix. In the case of Rationale, maps are based on the following ontology: contention, reason, objection, note, example and co-premise. There are further options to identify the nature of different types of evidence or basis

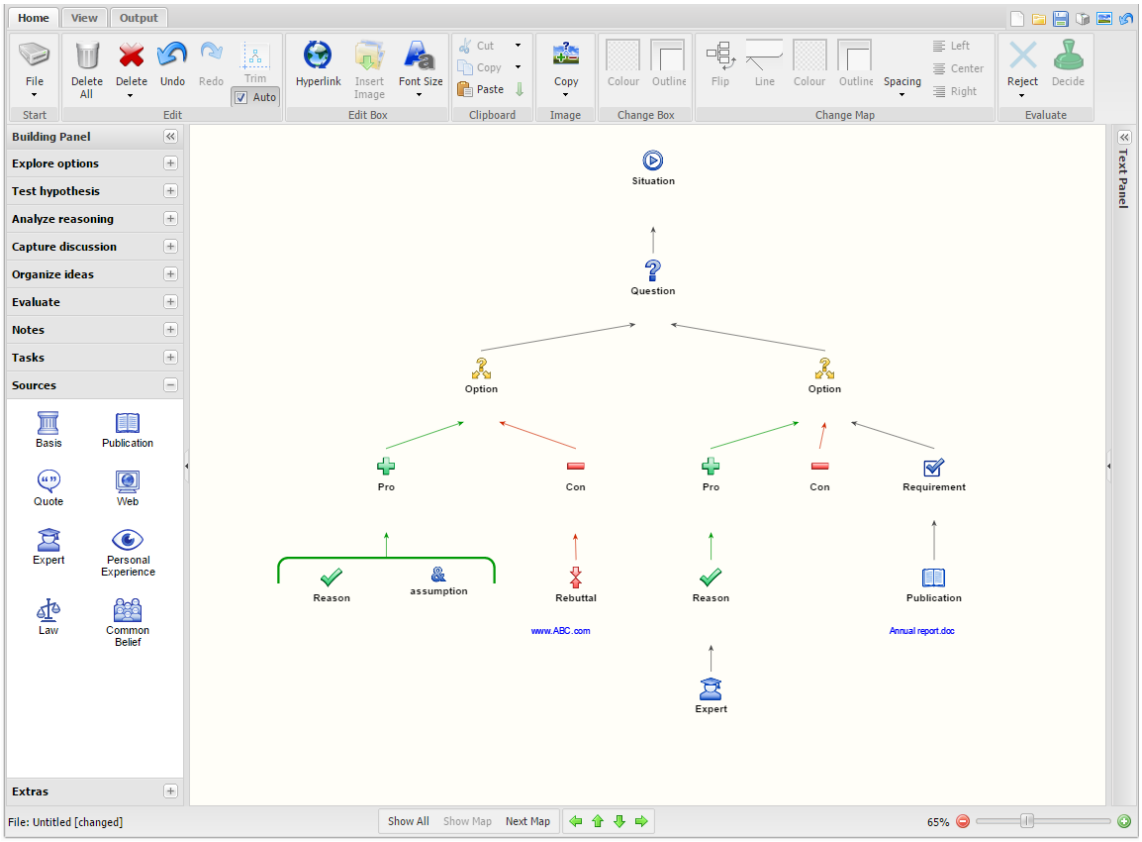
including: Common belief, data, case study, assertion, law, quote, statistic, personal experience, and publication.

Bcisive and Rationale are characteristic of the argument mapping tools available in online deliberation. They allow relatively extensive options in constructing argument maps, including task specific items. Participants are free to construct maps and use categories however they choose, however there are prompts. For example, the "rabbit rule" prompt alerts participants if something is mentioned in the conclusion that is not mentioned in the reasosn (Twadry 2004). The developers involved in Rationale are currently developing the use of probablisitic judgements in argument maps, which would affect the way the system organises the map. This is particularly relevant to the challenge of information management (how well platforms can manage different data types). In addition to these features the developers are also developing ways of allowing real time collaboration on argument maps in which authors can see the changes their partners intend to make in relation to an argument map. In this sense Bcisive and Rationale are good examples of argument mapping approaches with more novel features to support decision making and critical thinking.

<u>Images and Screenshots of the Platform</u>

<u>BCisive</u>

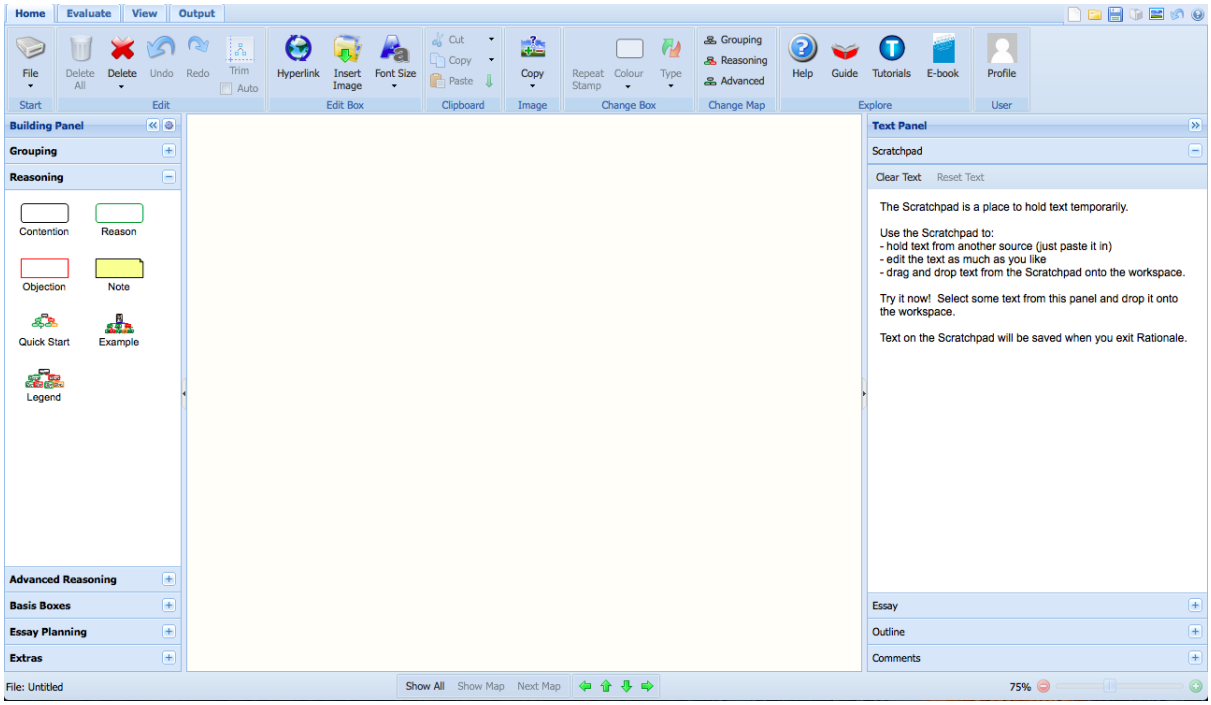




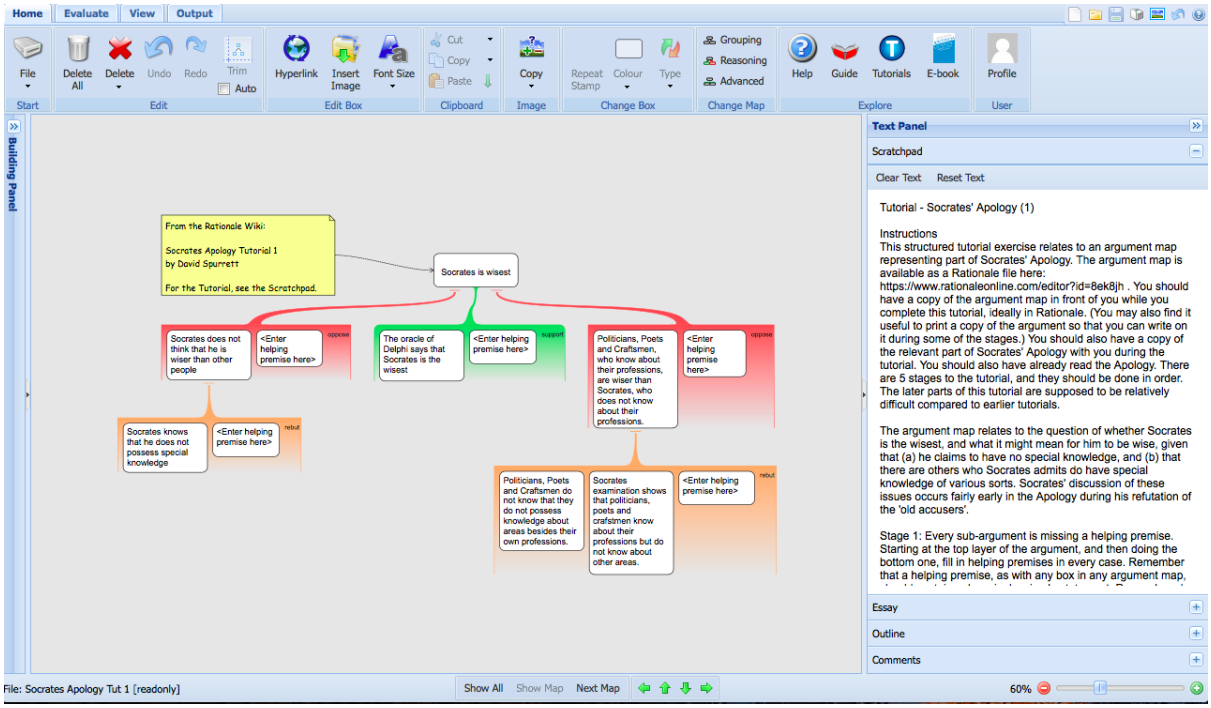
Argument map interface for BCisive[2]

[2] https://www.bcisiveonline.com/editor/

Rationale



Rationale argument map editor interface[3]



Rationale argument map example[4]

[3] https://www.rationaleonline.com/editor/

[4] https://www.rationaleonline.com/editor/#?id=8ek8jh

Literature and Applications of the Platforms

A literature review reveals seven papers on Rationale, Bcisive and an earlier version of rationale called Reason!Able. Scheuer et al (2010) include Rationale and Reason!Able in their review of CSA systems. Kunsch et al (2014) compares the use of Bcisive and Rationale in the context of education for business students. They suggest that Rationale was preferable for demonstrating the basics of argument mapping, while BCisive was better to analyse business cases and present findings due to its capacity to conduct more complex analysis and compatibility with formats such as PowerPoint. Lengbyer (2014) uses rationale to explore the use of argument mapping to support decision making in specific cases rather than for general educational purposes. There is discussion of the use of Rationale to support lawyers in Australia (Drummond 2006 in Van Gelder 2007) and helping judges with expert testimony (van Driel and Prakken 2010), the later concluding that it was more likely to be helpful for educational and training purposes. Rationale has been tested in other educational settings finding positive results when testing students' critical thinking skills (Tawdry 2004) and understanding of the material (Davies 2009b). The literature has tended to focus on Rationale or its earlier versions in an educational context. BCisive appears to be a later development intended for use in the private sector as a tool for supporting decision making in organisations (Reasoning Lab 2017). There has been more take up for the Rationale tool, which has been used in various education settings by students and as part of courses, notably in Amsterdam and Australia (Reasoning Lab 2017). There are free online versions available for both tools.

Climate CoLab

Background, Objectives and Design of the Platform

Climate CoLab is developed by the MIT Center for Collective Intelligence. It describes the aims of the project as attempting to address wicked problems, specifically climate change, through collective intelligence. The project appeals to the idea that it is creating an open problem solving platform drawing on the success of projects such as Wikipedia (Malone et al 2009).

Climate CoLab involves contests where participants can put forward and discuss ideas to address the problem of climate change. A contest consists of different stages and elements. People can propose solutions to specific problems identified on the site, such as land management and energy supply. There is a further stage whereby proposals are integrated toward the development of a comprehensive plan that could be feasibly adopted as national policy. A final stage considers whether the comprehensive plan meets established targets (Malone et al 2009). The proposals are assessed by expert judges, though there are plans to replace this process with a form of crowd-based assessment. For the first three years Climate CoLab involved one or two contests per year, from 2013 they introduced contest families of 17 or more contests that seek to break down the issues of climate change which are then integrated (Malone et al 2017).

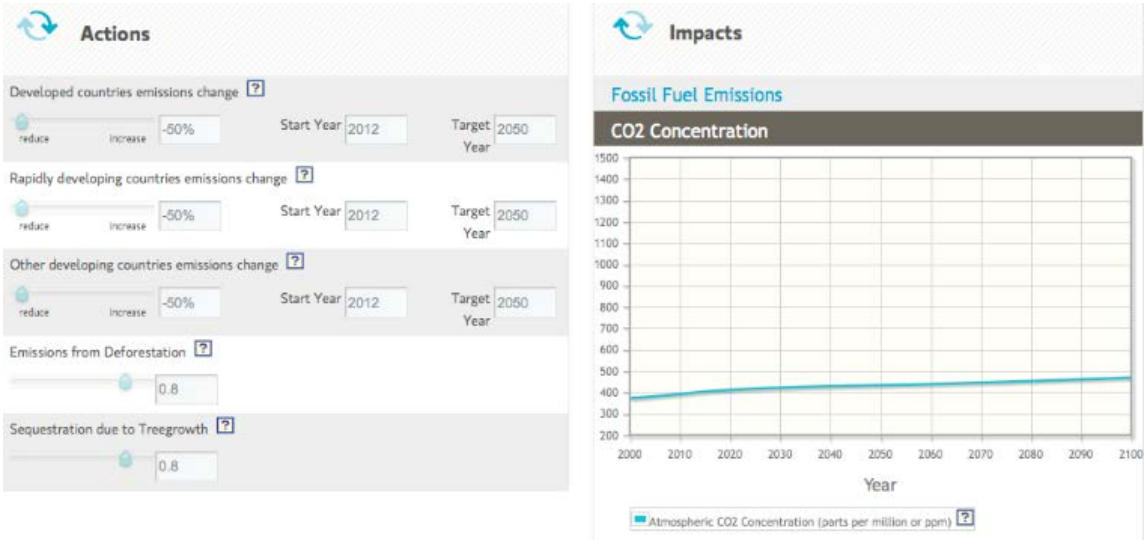
Climate CoLab involves three design elements supporting collective decision making: model based planning, online debates and voting. Model based planning allows participants to use simulation models to provide information about the impact of different proposals. The literature describes how the system uses the C-LEARN model, an online version of C-ROADS, a climate change policy simulator (Malone et al 2009). C-LEARN takes as input a set of regional commitments to emission reductions and produces as outputs projections of carbon concentration, temperature change and sea level rise. These outputs are then used to drive eleven additional models used by Climate CoLab, which predict anticipated economic costs, qualitative impact to human and physical systems (such as argriculture, water and health).

Online debates utilise a system similar to Deliberatorium and Compendium (see later), providing greater structure than traditional forums and classifying each contribution as (1) a question, (2) a position (proposed solution to the question), (3) an argument for, or (4) an argument against. Some debates capture arguments and information that cut across issues that underlie a number of different plans, thus plan creators are encouraged to specify what positions their plans take on cross cutting issues (Iandoli et al 2008). Finally participants can vote on debate positions and plans

that they prefer, allowing users to identify promising proposals for the contests. Cash prizes are awarded to the proposals that are judged to be the best overall in the contest.

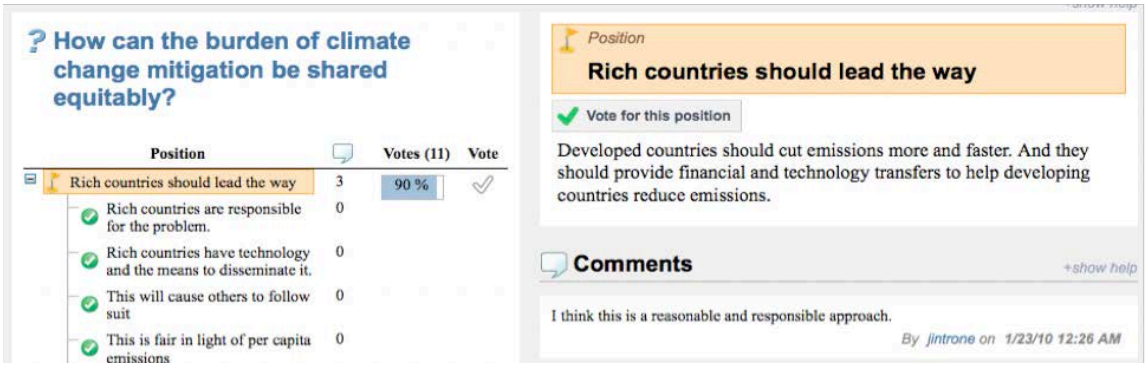
Climate CoLab is relevant to the current study for the following reasons: Climate CoLab is an ambitious and well established platform that has a large number of participants. The platform provides a decision making mechanism in addition to idea generation and debate. Through the climate change policy simulator and the use of judges and moderators, the platform also seeks to verify information provided in debate and ground claims made into a shared understanding of the facts. These features are of particular relevance to the theme information management, and issues concerning how platforms deal with contested knowledge, moderation and different data types. The project is also well resourced as it is able to award $10 000 to the best overall proposal per contest. This is significant when thinking about feasibility and scale and the sustainability of online deliberation platforms. The platform uses a number of different techniques to address different challenges in online deliberation and represents an interesting approach drawing from the field of collective intelligence.

<u>Images and Screenshots of the Platform</u>



Introne et al (2011:5)

Simulation Model



Climate CoLab Debate Interface (Introne et al 2011:6)

Literature and Applications of the Platform

The Climate CoLab has been conducting contests since 2009 and these applications have been documented in different research papers (see for example, Malone et al 2009, Introne et al 2011). The project has over 85 000 participants including 200 experts on climate change and related fields (Malone et al 2017). Duhaime et al (2015) used online surveys and an analysis of web activity to develop a picture of the characteristics and behaviour of the Climate CoLab security. It found that the community was geographically diverse, and tended to be highly educated and experienced with climate change issues. It also found that those outside the usual conversations about climate change are influenced by and contribute effectively to collective problem solving. Members who did not have graduate education previous climate change experience or did not live in the United States reported significantly higher levels of learning, belief change and increase in climate related activity as a result of participation, and these members, and women, were at least as likely to submit high quality proposals (Duhaime et al 2015). Through the later implementation of contest webs, Malone et al (2017) explored whether participants would reuse their own and other's work effectively, and whether participants would be able to explore multiple combinations of interchangeable parts (of solutions). The results of their experiment were found to be positive, observing their system

facilitated widespread knowledge sharing and reuse, and the combining of solutions at multiple points of aggregation (Malone et al 2017).

Cohere/Evidence Hub

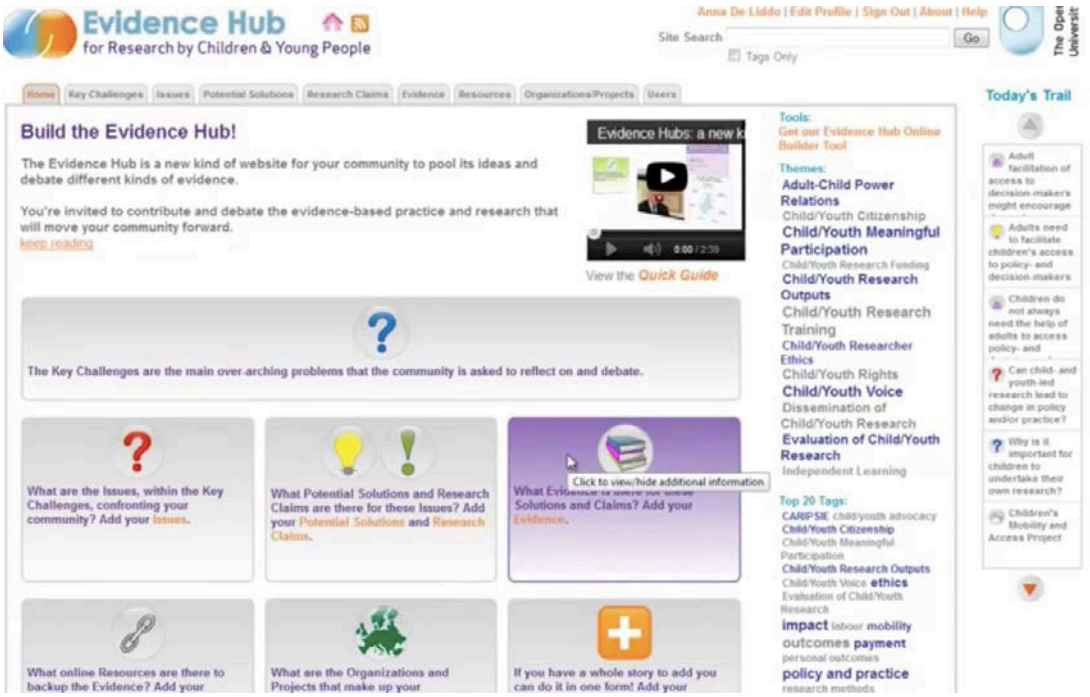
Background, Objectives and Design of the Platform

Cohere is a project developed by the Knowledge Media Institute at the Open University. It is a visual tool to create, connect and share ideas. De Liddo and Buckingham Shum (2010b) identifies contested collective intelligence as a distinct area of collective intelligence, with Cohere developed as a prototype for testing their design rationale for these ideas. Evidence Hub is part of this project and aims to provide a platform for collaborative knowledge building based on the concept of contested collective intelligence (De Liddo and Bukingham Shum 2013), allowing users to pool and map knowledge around a specific issue or theme.

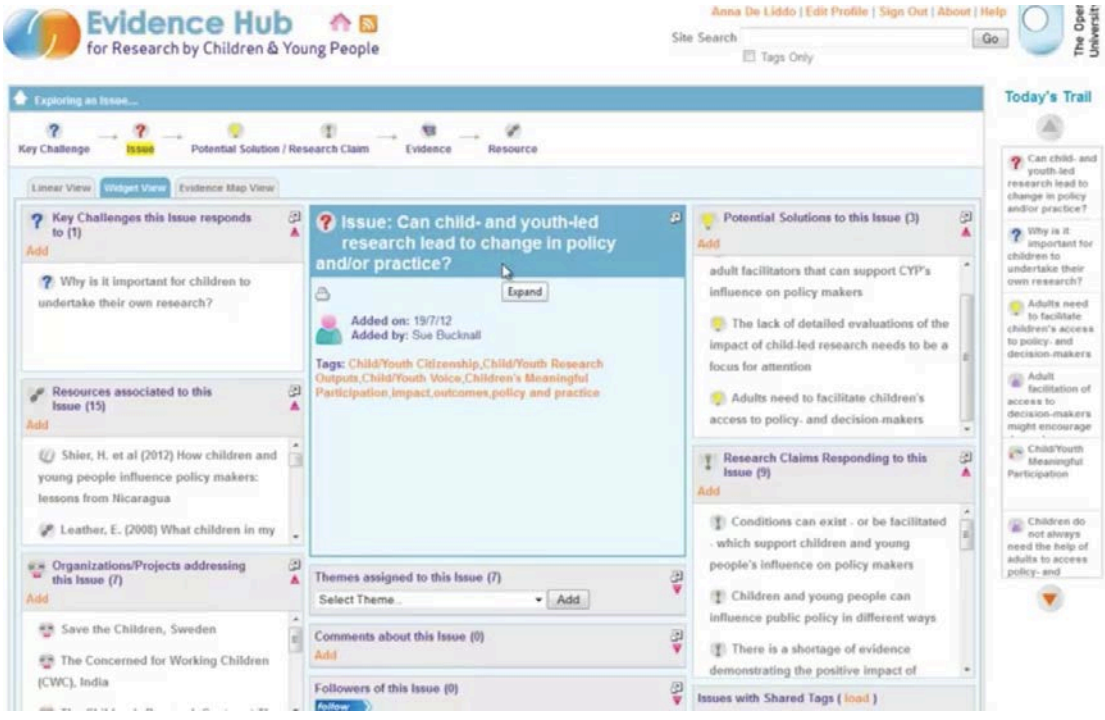
The evidence hub organises information according to the following categories: key challenges, potential solutions, research claims, evidence and counter evidence, and resources on the web. In addition to this attempt to pool relevant knowledge around different individuals and researchers working on projects, this is mapped geographically and also according to themes and questions.

Evidence Hub is an ambitious project that utilises a number of different approaches, including annotation, argument visualisation, chat functions for debates to support collaboration and deliberation as well as providing a resource to collect evidence around a given debate. Its use of various approaches to argument visualisation and information management make it an interesting case for further exploration. The developers draw expicitly on collective intelligence literature as well as informal logic theorists such as Walton (Evidence Hub 2017) and the tools can be understood as a mature and influential example of an application of these theories in practice.

Images and Screenshots of the Platform



Mapping Argumentation Chains in the Evidence Hub[5]



Evidence Map[6]

[5] http://rcyp.evidence-hub.net/?max=20&orderby=date&sort=DESC&filternodetypes=Challenge#home-list

[6] http://rcyp.evidence-hub.net/explore.php?id=861572362500105612001342686197

Literature and Application of the Platform

The E-Hub website describes examples of hubs running in collaboration with external partners, including the Community of Practice for the Institute of Health Visiting (a closed Hub) and the Systems Learning & Leadership Hub (University of Bristol). Open University community Hubs include the Open University in Scotland's Work & Learning Hub, and the Open University's Faculty of Education and Language Studies department through their Hubs for Reading for Pleasure, and Research by Children and Young People (Evidence Hub 2017). De Liddo and Buckingham Shum (2013) describe the concept of Evidence Hub and its development in response to experiences following its use in the context of health care and education. This work highlighted a pervasive challenge of a trade-off between the need for structure to maximise the signal-to-noise-ratio and permitting people to make contributions with very little indexing or structure that requires less learning. They suggest that this is a problem that is far from solved.

Consider It

Background, Objectives and Design of the Platform

ConsiderIt "helps individuals make sense of complex issues through familiar deliberative activities" (ConsiderIt 2017). It is described as a novel platform for supporting public deliberation on difficult decisions (Kriplean et al 2012). The platform allows users to create forums and introduce questions or proposals for a community to address. The community can then contribute to this forum by identifying their position on a scale of agree/disagree or high priority/low priority, and selecting the most important pro and con points for a given position. ConsiderIt then presents a visual representation of the community as a whole, it shows opinions along a scale of agree to disagree, along with a list of ranked pros and cons.

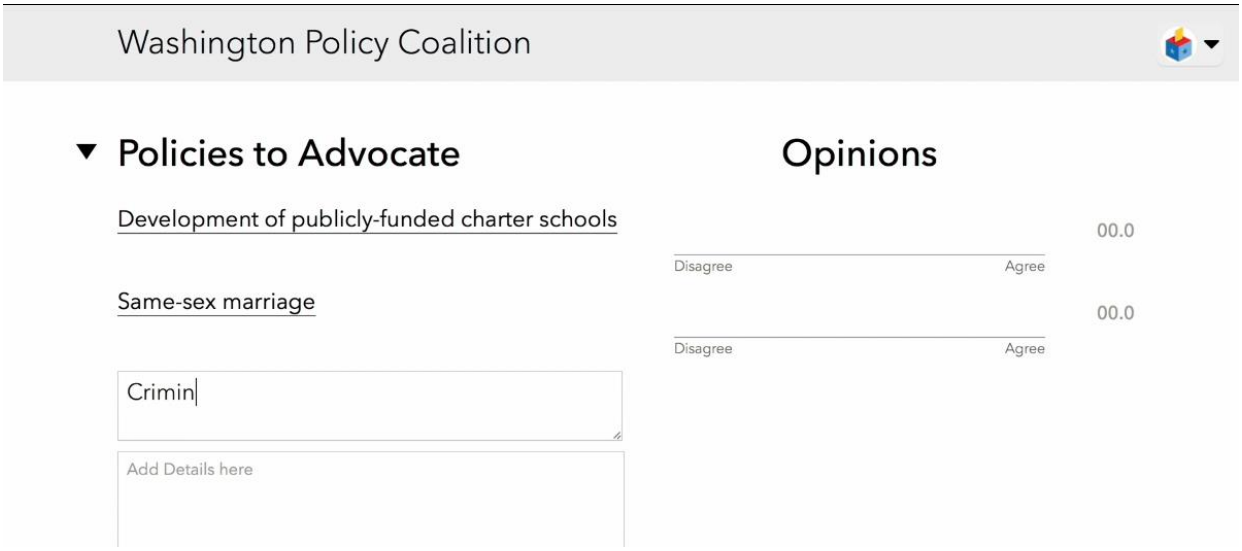
ConsiderIt combines a number of different approaches to visualising argument and debate. It represents pros and cons to a given proposal, but it also maps groups to show the social context of an individual's position. Users can interact with this

visualisation to identify groups with shared opinions and points of consensus amongst otherwise disparate parties. In this sense, the system allows people to voice their opinions while also giving them the opportunity to recognise areas of agreement with political opponents. ConsiderIt also allows for potentially more nuanced understanding of differences by allowing participants to articulate different pros and cons and also place levels of priority on arguments and proposals. The developers argue this supports empathy, mutual understanding and areas of consensus. For example, if 80% of people who oppose an idea share the same two concerns that can be resolved, this suggests an opportunity for addressing the conflict (Freelon et al 2012). The developers of the platform have also attempted to address the problem of verification of facts in online deliberation, albeit externally in applications of the platform.

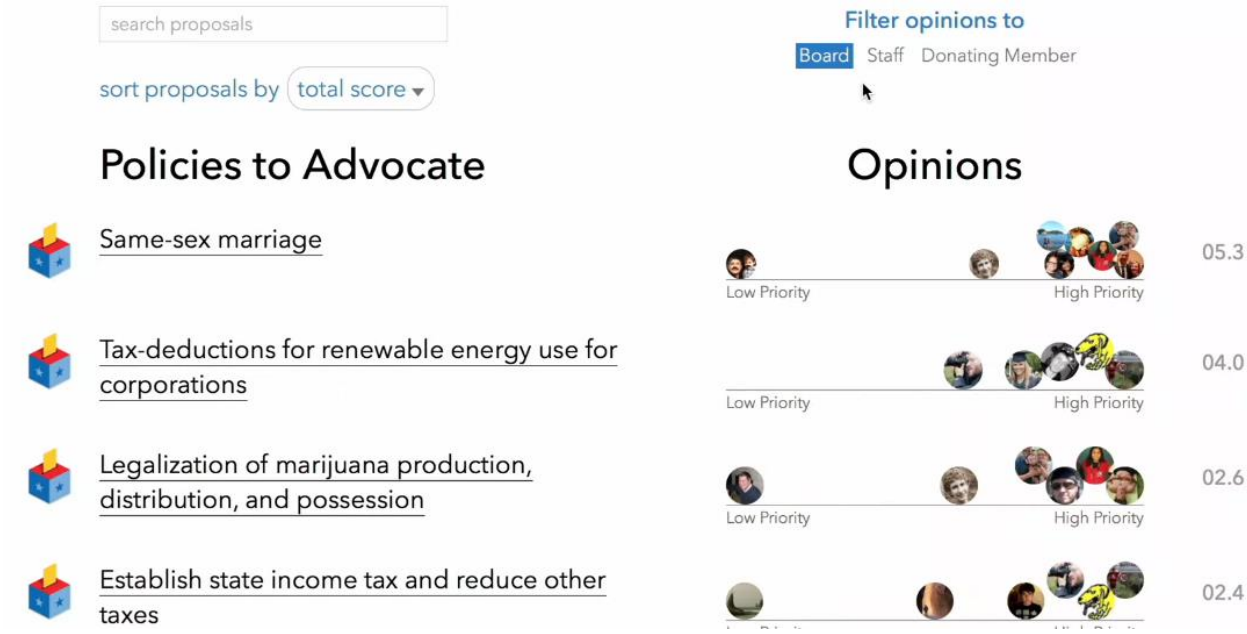
The features described above distinguish ConsiderIt from the other available examples of platform visualisations using pros and cons tables. ConsiderIt has also been described as using gamification in its approach to tutorials and aesthetics. Given the sophistication of its design choices and the well documented applications of its use, it makes an interesting case for further exploration.

Images and Screenshots of the Platform

The screenshots below illustrate the design of ConsiderIt, and the process of generating and contributing to a forum discussion.

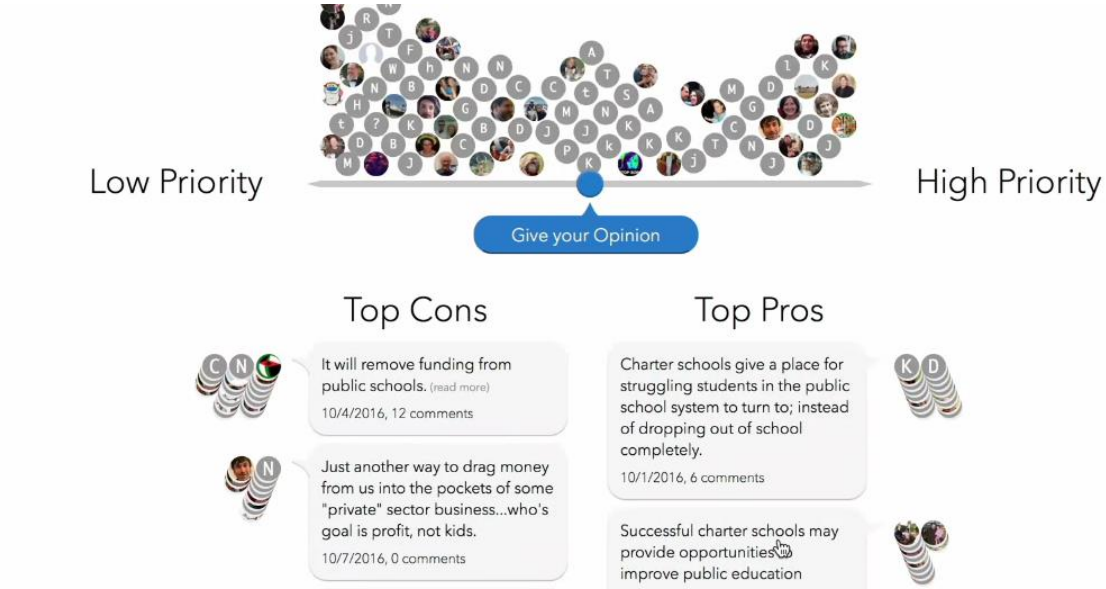


Displaying a user creating a forum and policies for a community to discuss[7]

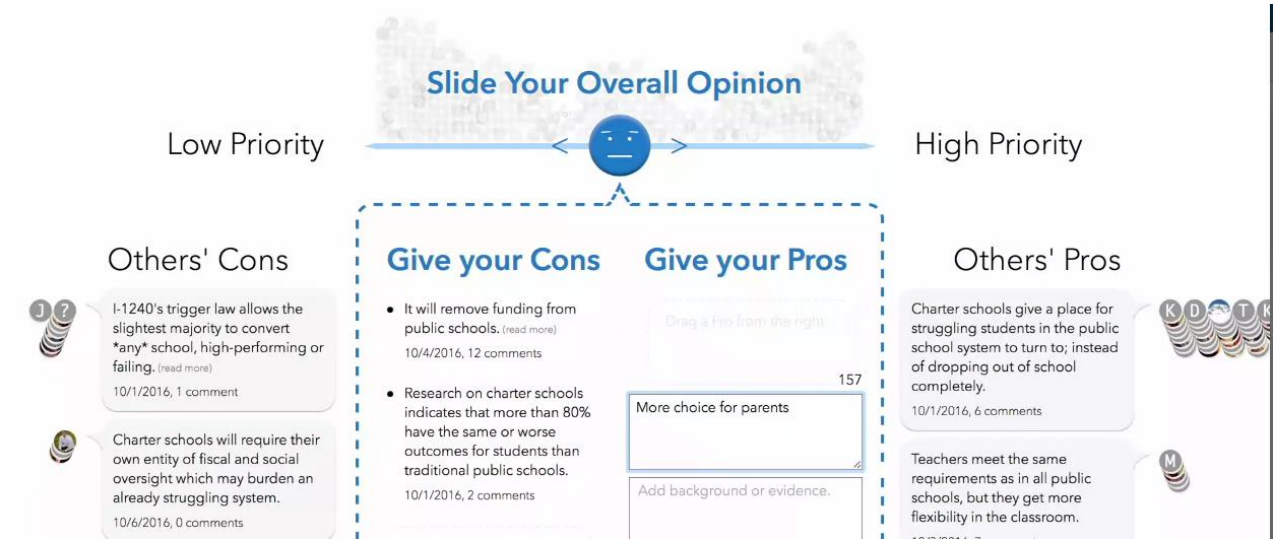


Displays the representation of a community in relation to the priority that is placed on given topics of discussion or policies [8]

[7] https://consider.it
[8] https://consider.it



Displaying the visualisation of a specific topic or policy, allowing users to see top pros and cons and the general consensus of the group[9]



Displaying a user introducing an argument[10]

Literature and Applications of the Platform

The literature on ConsiderIt shows it has been applied and tested in a number of situations. It began as part of a project called the “Living Voters Guide”, that included

[9] https://consider.it
[10] https://consider.it

an experiment in a U.S state election allowing residents to debate nine ballot measures (Kriplean et al 2012). Although the Living Voters Guide is no longer active the platform continues to be applied in other citizen engagement projects and it is also available for free for public use and through a paid plan with additional features (ConsiderIt 2017). Research has tested how well the platform encourages engagement with different views (Freelon et al 2012), participants' perceptions of different standpoints and their own knowledge of the subject (Stiegler and de Jong 2015). These studies have generally found positive results for the platform, additionally different variations of the platform have been tested in the context of a debate on Greece and the European Union (Stiegler and de Jong 2015). The developers of the platform have also engaged with the problem of verification and the trustworthiness of sources and claims appealed to in online deliberation (Freelon et al 2012 and Kriplean et al (2014)). Kriplean et al (2014) trialled the use of librarians as fact checkers in one example of the Living Voters Guide. The trial used a quantitative analysis of the use of the fact checking services, finding 14.2% of claims were subject to fact checking requests, and half of these concerned claims of fact while the others involved claims of principle or other claims that were not verifiable (Kriplean et al 2014). The trial also evaluated the experience of participants and librarians. It found that two thirds of those who had had their submissions fact checked felt the process had been fair (none claimed that it had been unfair), while many users expressed desire for better communication with the fact checkers (for example the ability to respond to the results of the fact check). The librarians reported positive experiences of the process, they felt they were able to conduct fact checking in a neutral manner, although some highlighted the fact that they felt they lacked the legal expertise to correctly respond to some issues. While the study found the process was broadly successful, they acknowledged problems with applying this approach to large scale deliberation (Kriplean et al 2014). Travis Kriplean (the developer of the platform) also describes how the platform has been used with the bit coin community and other open source communities, in large organisations to support strategic planning efforts and in schools as an educational tool to support critical thinking. He also describes future plans to use the tool in join initiatives project in Hawaii, involving the Hawaiian language in a number of schools.

Debategraph

Background, Objectives and Design of the Platform

Debategraph is described as a service which allows individuals and "communities of any size to externalize, visualize, question and evaluate all of the considerations that any member thinks may be relevant to the topic at hand" (Debategraph 2017). The visualisations present colour coded maps based on the following criteria: issues (or questions), positions, arguments for or against. The maps are open to editing by the general public, and the ideas submitted in the map can be rated by others. The strongest arguments are indicated by the width of the arrows connecting the ideas in the map. The ontology of the argument map is not explicitly grounded in a particular theory of argumentation; the basic building blocks of the map share similarities with other argument maps, however it develops a much more complex range of connections between ideas and relationships between maps. In addition to an extensive range of connections, the maps also flow into one another, allowing participants to navigate from one issue to another. The ontology of the Debategraph is outlined in the visualisations below:

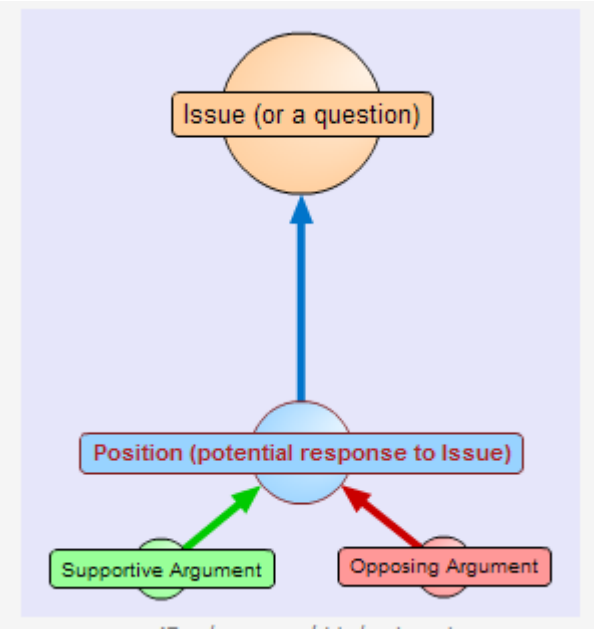
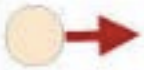


Illustration of the basic ontology of the argument map[11]

Following this basic ontology the system develops a more elaborate set of connections between ideas, identified with different coloured arrows. The table below details the range of connections available for ideas.

	Map Home	The starting point of a map / debate – which may include many issues – that describes the broad subject area addressed by the map / debate.
	Issue	An issue or question arising within the map / debate.
	Position	A potential answer or option suggested in response to an Issue or question.
	Component	A distinct part of a complex position; identified separately and analyzed on its own merits.
	SupportiveArgument	An argument that supports another idea (for example a position or another argument).
	OpposingArgument	An argument that opposes another idea (for example a position or another argument).
	ArgumentGroup	A broad set of arguments that can be interpreted as net supportive or net opposing depending on the relative weight attached to each—e.g. when a humanitarian case is made in favour of waging a war (to relieve suffering under a dictatorship) AND against waging the war (innocent people will die).
	PartArgument	A co-premise that works with other co-premises to support an argument or conclusion.

[11] http://debategraph.org/Stream.aspx?nid=400384&vt=bubble&dc=focus

	Decision	A decision taken in response to an Issue
	Task On Schedule	A task that is expected to be completed on time
	Task at Risk of Delay	A task that is falling behind schedule.
	Task Overdue	A task that is overdue.
	Task Completed	A task that has been completed.
	Protagonist	A significant actor in a map / debate (to whom arguments may be attributed).
	Map Note	A note about the map structure, moderation policy, development schedule, etc.

Table detailing relationships between items on a map[12]

In addition to the hierarchical structure forming the basis of the maps, there are also a series of connections called “cross links” which provide links between maps or information about the map itself (for example instances of inconsistencies or equivalence). These are detailed in the table below.

[12] http://debategraph.org/Stream.aspx?nid=400384&vt=bubble&dc=focus

	Advocacy	Identifies an idea advanced by a particular Protagonist
	Causation	Signals that one element causes another element to occur
	Categorization	Places a map within particular category on the main public Debategraph.
	Citation	Cross-relates a Protagonist to another element on which the Protagonist is cited *(NB: Citation cross-relations are only displayed when navigating via the Protagonist)*
	Consistency	Signals that one element is consistent with another
	Contingency	Signals that a Task is contingent upon another Task.
	Equivalence	Signals that two elements are essentially equivalent
	Explanation	Signals that one element explains another element
	Grounding	Asserts that the one element provides the grounds for another
	Inconsistency	Signals that one element is inconsistent with another

→	Pointer	Cross-links two elements without implying any semantic relationship between the elements (*NB: Pointer cross-relations are only displayed when navigating from the Source to the Target*)
→	Relevance	Indicates that one element is related to another in an unspecified way
→	Responsibility	Identifies that a Protagonist is responsible for a task
→	Variation	Asserts that one element is a variation of another element

Table showing "cross links", relationships between items on the map and other maps[13]

Debategraph provides a side menu offering further help in construction of maps and additional details; there are alternative ways of viewing the maps which allow for the inclusion of images and videos. The maps can be embedded on other sites, with changes made to a map on a given site shared across the other maps. The maps can be navigated such that when a user clicks on a particular element of the map, the perspective of the map changes revealing further connections. In this sense Debategraph hopes to capture the interconnected nature of many issues that are subject to argument mapping.

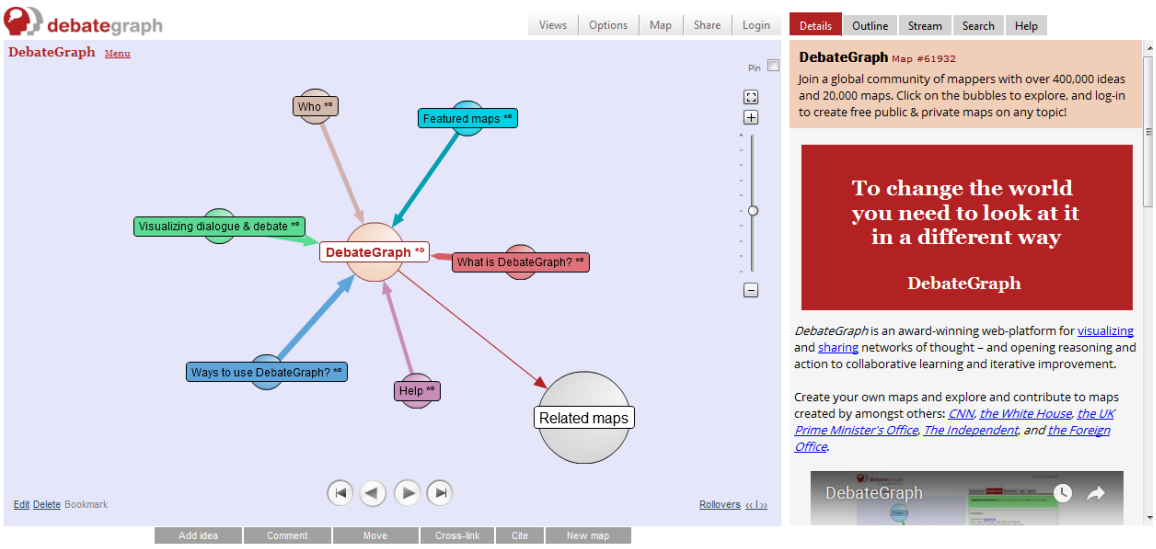
In comparison to platforms taking a similar approach to argument mapping and visualisation, Debategraph could be said to offer a richer experience in relation to the kinds of media it supports, the options it allows for visualisation and navigation, and the aesthetic of the platform. The platform includes a number of novel features not found in more basic argument mapping platforms, notably the maps' capacity to rearrange themselves around particular points as users navigate and the extensive

[13] http://debategraph.org/Stream.aspx?nid=400384&vt=bubble&dc=focus

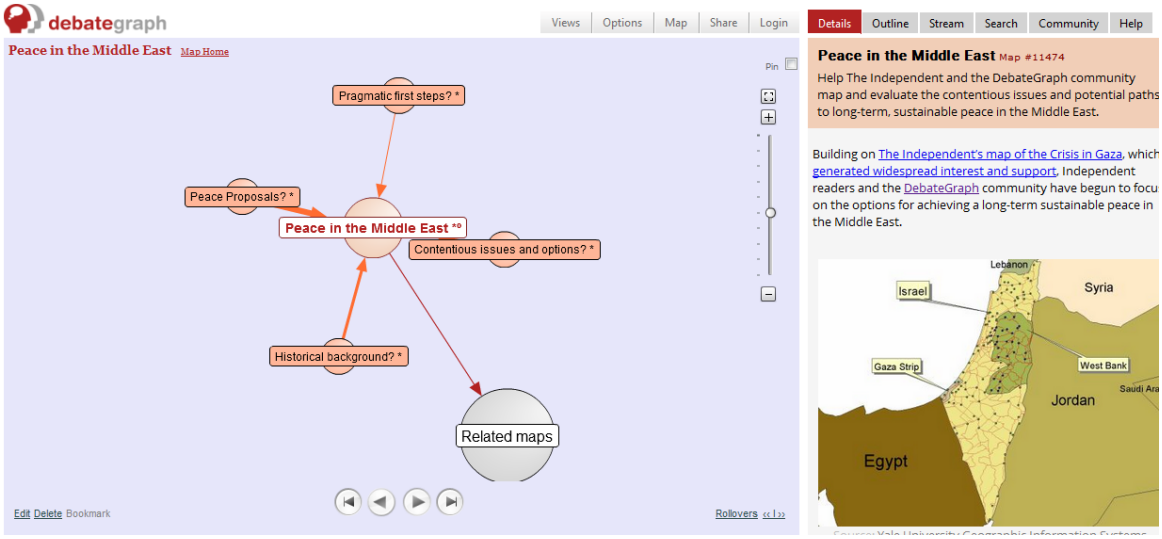
ontology of the maps. This provides an interesting approach to issues of framing and structuring debate. Of the platforms reviewed, Debategraph is one of the most successful in relation to applications by other organisations and existing research and literature. The relative success of the platform and novel design choices make it very relevant for the purposes of the current study.

Screenshots and Images of the Platform

The screenshots below provide illustrations of the design of debategraph.



Opening page of Debategraph[14]



Example of Debategraph map[15]

[14] http://debategraph.org/home

[15] http://debategraph.org/Stream.aspx?nid=11474&vt=bubble&dc=focus

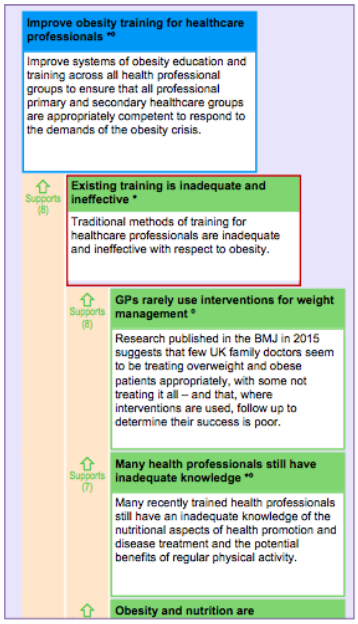


Figure 2. A DebateGraph proposal (blue box) is backed up by a number of supporting arguments (green boxes).

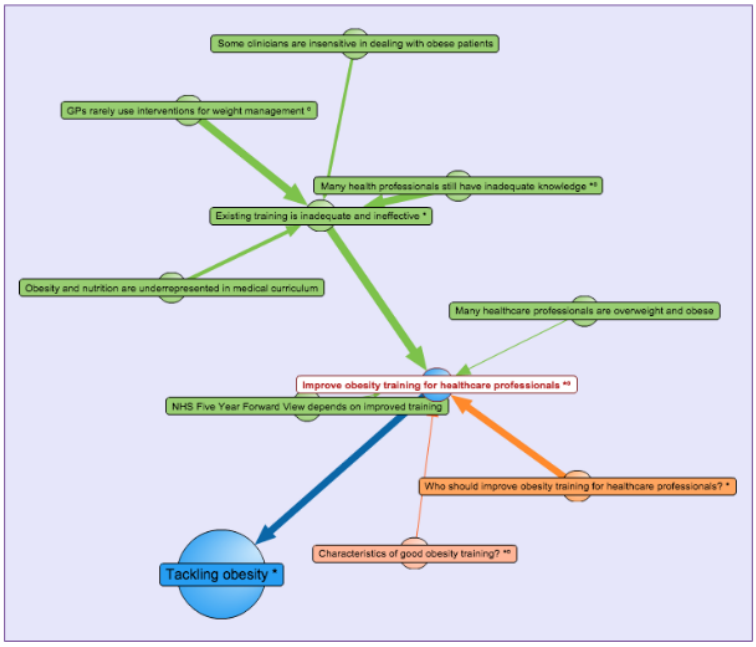


Figure 3. Zooming out from the proposal in Figure 2 reveals that it is part of a wider discussion on improving obesity training in healthcare professionals.

(Tambouris et al 2011:4)

Literature and Applications of the Platform

The Debategraph site claims that the platform is being used in over 100 countries and lists applications in areas including "education, health, governance, media, conferences, group facilitation, conflict resolution and public consultation and planning" (Debategraph 2017). It has been used by organisations such as CNN, the White House (on open government), the UK Prime Minister's Office (on media policy), The Independent, Bill and Melinda Gates Foundation (on global health), and the Foreign Office (Bullen and Price 2015, Debategraph 2017). Tambouris et al (2011) observe that Debategraph is one of the most mature and stable examples of argument visualisation tools, and there have been studies using the tool in a number of different contexts. Bullen and Price (2015) explore the use of Debategraph in supporting analysis of complex policy problems, specifically obesity. One policy maker involved in the study emphasised the potential of Debategraph as a method of collecting various different types of data on an issue and presenting it clearly, with less interest in its capacity to support debate (Capehorn in Bullen and Price 2015). Crossley-Frolick (2017) explores the use of debategraph in educating undergraduate

political science students. A class used debategraph to engage in debates concerning complex issues such as policy on climate change and sex trafficking. Crossley-Frolick found that the tool did improve students' understanding of the topic, yet the students reported issues with the navigation system and ease of use of the platform. A further issue highlighted was privacy, as users who were not part of the class began editing debates. Tambouris et al (2011) studied the experiences of policy makers and experts using Debategraph in the context of European legislation. In this study Debategraph was used in conjunction with other software called WAVE. The study found mixed results again with the usability of the platform, though participants noted that ease of use improved after a short learning period. Participants noted that the platform was attractive and would be most appropriate for analysis and drafting and evaluation of policy, as well as consultation on policy, while it would be less useful for formulation or implementation of policy (Tambouris et al 2011). Scheuer et al (2010) note Debategraph's support for large scale argumentation and large community use. They highlight potential problems with graphical representation being used for debates, notably that they might feel unnatural and unintuitive and depending on the topic and number of participants, the boxes and arrows may be substantial leading to the maps becoming cluttered and hard to read.

Deliberatorium

Background, Objectives and Design of the Platform

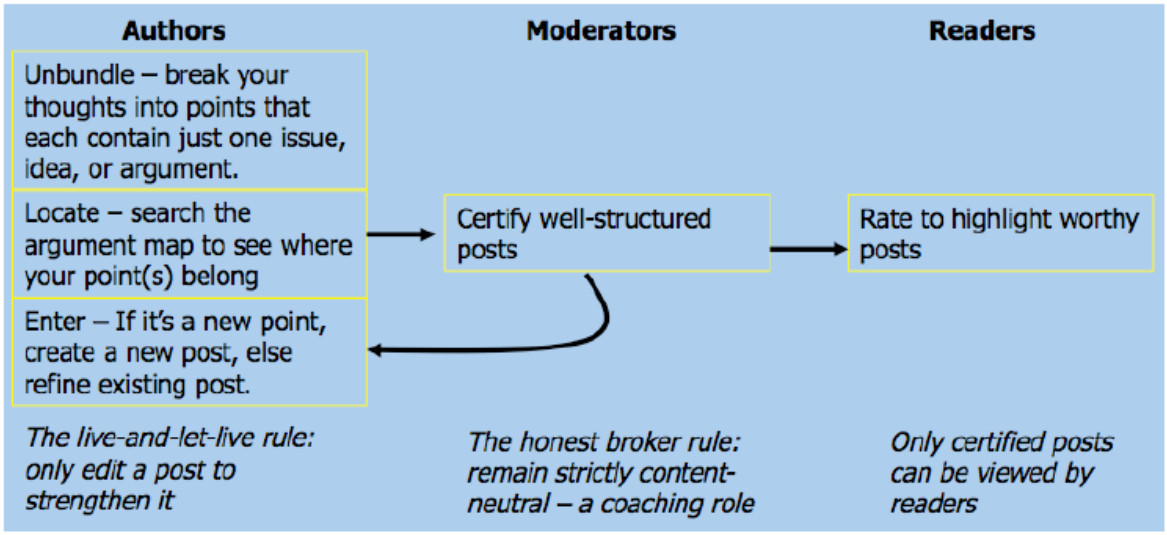
The Deliberatorium (formerly known as the Collaboratorium) is described as an "innovative internet tool whose goal is to enable better collaborative deliberation" (Deliberatorium 2017). The project is developed and led by Mark Klein at MIT and draws on the field of collective intelligence and specifically the IBIS to map arguments. Discussion is organised by topic and broken down into the following components:

Issue: A problem that needs to be solved

Idea: An approach for addressing that issue

Argument: A point for (pro) or against (con) an idea (Deliberatorium 2017)

The literature on the deliberatorium describes the following expectations of authors, that authors submit a single issue, idea or argument, that it not replicate a point that has already been made, and should be attached to the appropriate part of the map. Posts should only be edited to strengthen them, if one disagrees one should create a new post that counters the idea (the live and let live rule) (Klein 2011). To guide argumentation, moderators evaluate posts for correct structure and validity (Scheuer et al 2010:8)



The map-building process used by the Deliberatorium.

(Klein 2011:5)

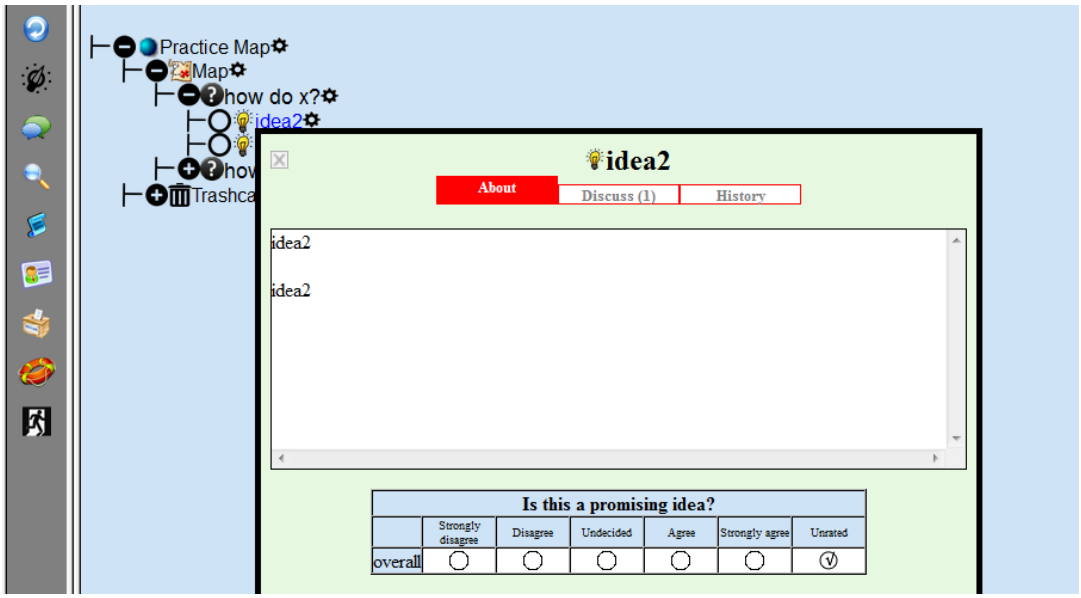
It is estimated that 1 moderator for every 20 contributors is required for sufficient maintenance of the Deliberatorium (Klein 2011). In addition to the map there is a chat room area for less formalised conversation.

The platform provides a good example of the argument mapping approach, based on the IBIS approach common in collective intelligence literature. It is supported by applications in practice that demonstrate its use in large scale discussions leading to a decision (discussed in greater detail below). The developers directly describe the intention to address challenges relating to feasibility and scale, participant behaviour and citizen capacity as well as information management. The platform is also a

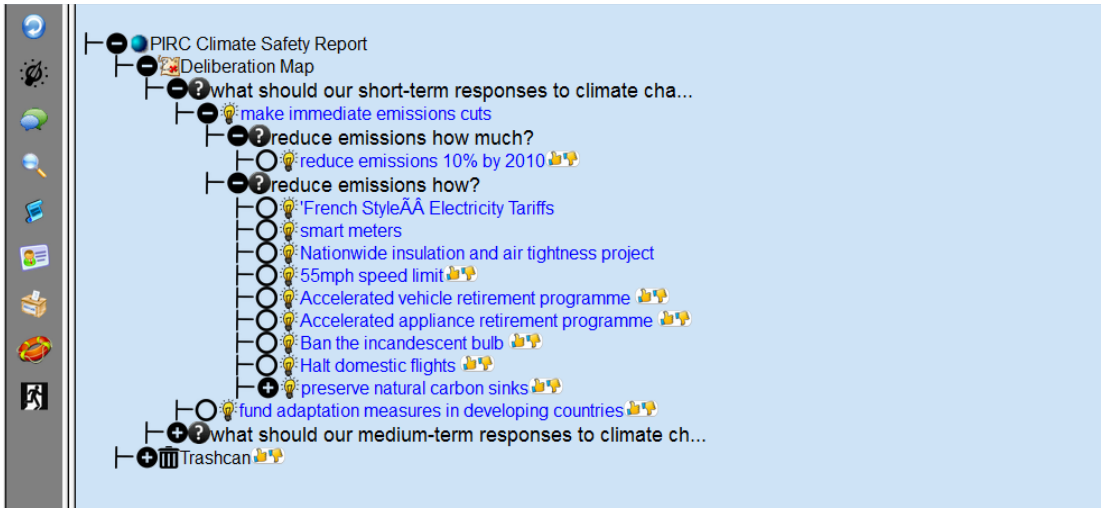
notable example of the combination of synchronous and asynchronous communication to support deliberation (Delborne et al 2011).

Images and Screenshots of the Platform

The screenshots below provide an illustration of the visual representation and aesthetics of the delibratorium. The Scholio project is currently working on the aesthetics of Deliberatoirum.

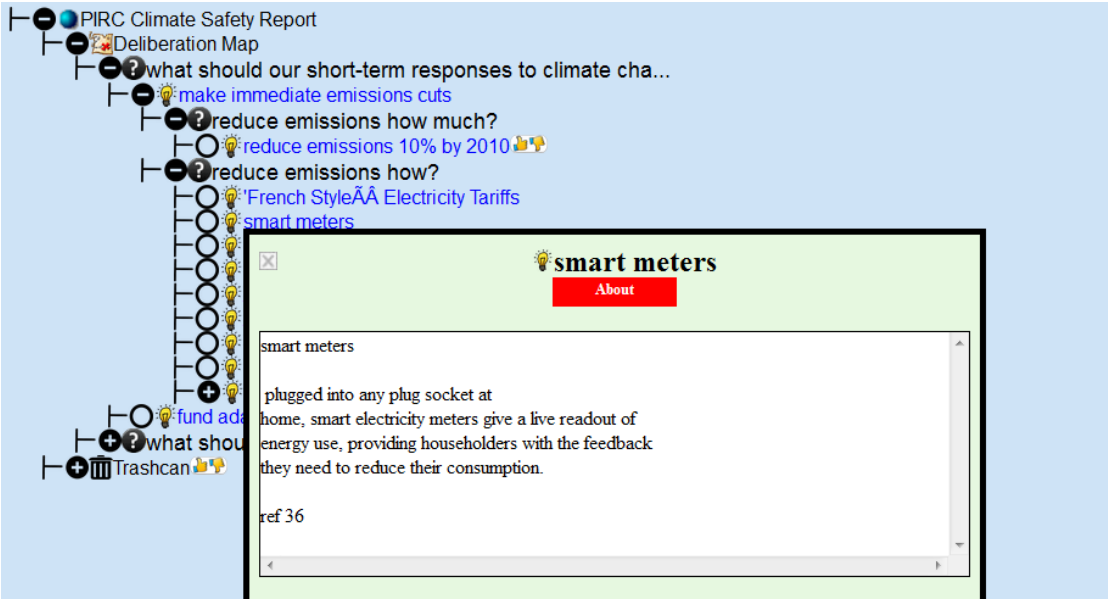


Displaying how users can introduce an idea and vote on it[16]



[16] http://franc2.mit.edu:8000/ci/show-top

Displaying the general argument map[17]



Displaying a user clicking on an individual idea in an argument map to get further detail[18]

Literature and Applications of the Platform

The Deliberatorium has been tested and applied in a number of settings. Initially "The Carbon Offsetting Thought Experiment" attempted to translate a 13 page discussion into a much more succinct 8 item deliberation map (Klein et al 2012). The first major evaluation of the Deliberatoirum involved 220 masters students at the University of Naples in a debate about bio fuels. The experiment focused on whether the demands of structure would put off participants, and whether moderators were able to deal with the demands of large scale participation. The research reported that neither of these concerns were problematic and they observed very high levels of user participation (Klein 2011). The students created a map that was judged by content experts to represent a remarkably comprehensive and well organised review of the key issues and options around bio fuel adoption (Klein 2011). Further evaluations of

[17] http://deliberatorium.mit.edu/

[18] http://deliberatorium.mit.edu/

the Deliberatorium have taken place with Intel Corporation, US Bureau of Land Management, the University of Zurich and HMC Inc (Klein 2011). The Deliberatorium has been used by the Italian Democratic Party in an internal party debate over electoral reform. This experiment involved 400 people, with two groups of 160 participants assigned to discuss the topic through either the Deliberatorium or through a standard forum. It found that the restricted structure of discussion did not affect users' retention rate nor their average daily activity, while the argument map reduces the quantity of ideas posted by users, the ideas posted tended to be more developed in terms of supporting arguments (Klein et al 2012). This suggests certain advantages and disadvantages to the tool that may determine where it is best applied. Scheuer et al (2010) discuss Collaboratorium, an earlier version of Deliberatorium, describing how the platform supports the notion of collective intelligence by allowing participants to rate contributions, the highest rated being considered the community's decisions.

Parmenides

Background and Objectives of the Platform

Parmenides is described as an "e-participation forum... a system for deliberative democracy that allows the government to present policy proposals to the public and lets the public submit their opinion on the policy and its justification" (Parmenides 2017, Cartwright et al 2009). In other literature Parmenides has been described as a platform that collects arguments for and against a given proposal (Atkinson et al 2004).

Parmenides is informed by informal logic, specifically a modification of the argumentation schemes of Walton and the Belief Desire Intention architecture (Atkinson 2005). This guides the platforms heavily structured interface design. The platform webpage explains that "Parmenides exploits two methods of argument representation: Argumentation schemes to structure policy proposals and argumentation frameworks to diagrammatically analyse the opinions submitted by users" (Parmenides 2017). It consists of four main components: a debate creator (administrators can create a debate by instantiating elements of the argumentation

scheme); the Parmenides interface (allowing people to participate and submit their opinions); administration tools (allowing argumentation schemes to be added); and analysis tools (allowing information submitted to be analysed using argumentation frameworks and value-based argumentation frameworks) (Cartwright et al 2009).

Parmenides dialogue structure sees the justification for an action as involving the following argumentation scheme: an understanding of the current situation; a view of the situation which will result from the performance of the action; features of the new situation which are considered desirable (the aspects which the action was performed in order to realise); the social goals which are promoted by these features (the reasons why they are desirable) (Atkinson et al 2004). From this scheme, a series of potential ways of 'attacking' a proposal are identified.

Table 1. Table of Attacks

Attack	Variants	Description
1	2	Disagree with the description of the current situation
2	7	Disagree with the consequences of the proposed action
3	6	Disagree that the desired features are part of the consequences
4	4	Disagree that these features promote the desired value
5	1	Believe the consequences can be realized by some alternative action
6	1	Believe the desired features can be realized through some alternative action
7	1	Believe that an alternative action realizes the desired value
8	1	Believe the action has undesirable side effects which demote the desired value
9	1	Believe the action has undesirable side effects which demote some other value
10	2	Agree that the action should be performed, but for different reasons
11	3	Believe the action will preclude some more desirable action
12	1	Believe the action is impossible
13	2	Believe the circumstances or consequences as described are not possible
14	1	Believe the desired features cannot be realized
15	1	Disagree that the desired value is worth promoting

(Atkinson et al 2004:314)

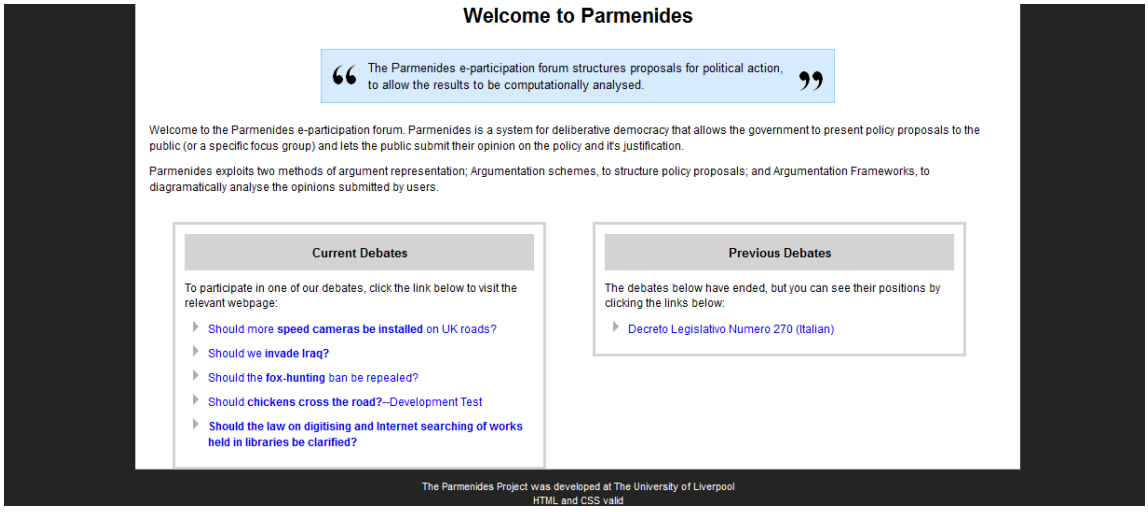
Attacks 12, 13, 14 and 3 (detailed in the table above) are neglected on the grounds that the developers felt that an argument proposed through their system could be presumed to be sound and describe actions that were possible. The remaining attacks are used for the structuring of an interface that guides the user through a justification for a proposal, giving users the opportunity to disagree at selected points

and collecting information on where most users disagree with a proposal. Attacks 7, 8, 9 and 11 are used in the structure as the basis to allow users to submit alternative proposals for action (Atkinson et al 2004). In addition to the platform itself there are further tools to support information gathering with Parmenides including a debate creator, profiling information of those who participate and analysis tools (Parmenides 2017).

Parmenides is unique amongst online deliberation platforms in its approach of taking users through a heavily structured dialogue process. It represents an interesting application of informal logic theory to the problem of online deliberation. Applications of the platform however are limited and the current publicly available version of the platform is restricted to four specific debates.

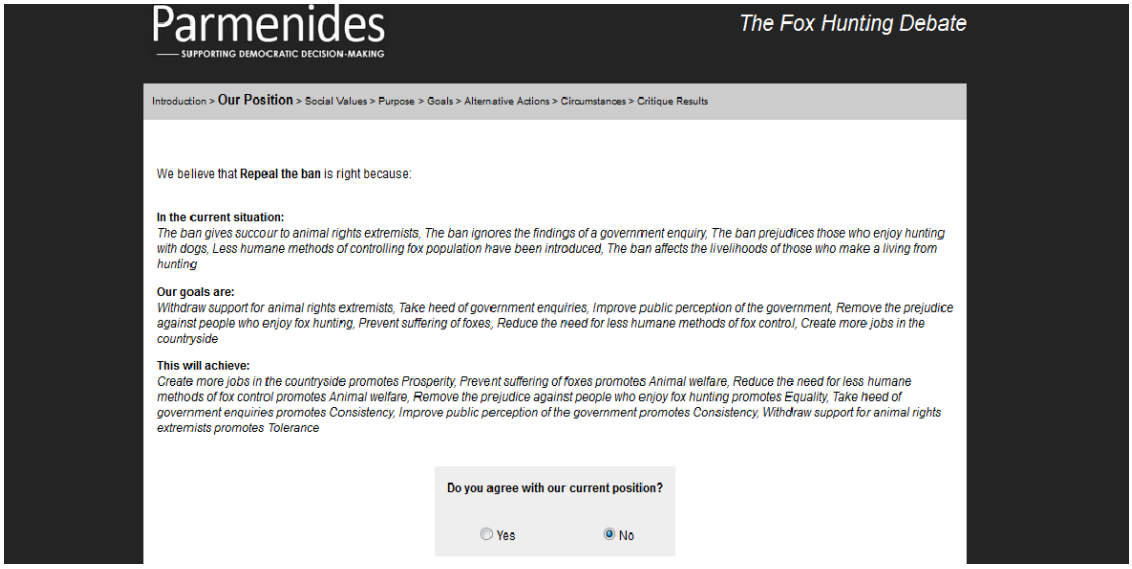
Images and Screenshots of the Platform

The design of Parmenides is illustrated below with the example of a fox hunting debate.

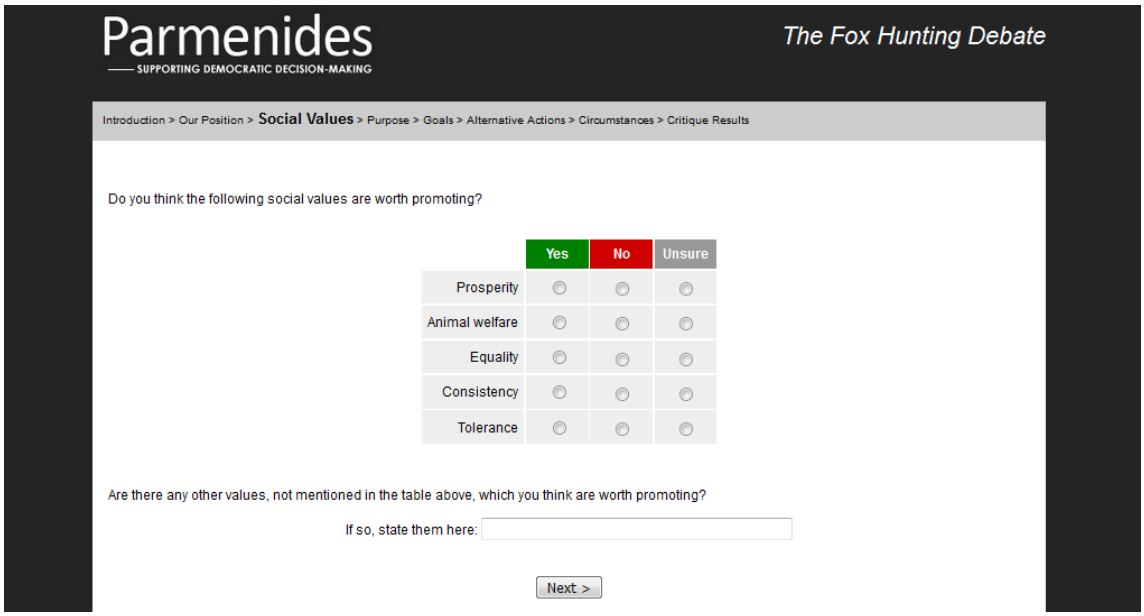


Displaying home page of the Parmenides platform[19]

[19] http://cgi.csc.liv.ac.uk/~parmenides/foxhunting/



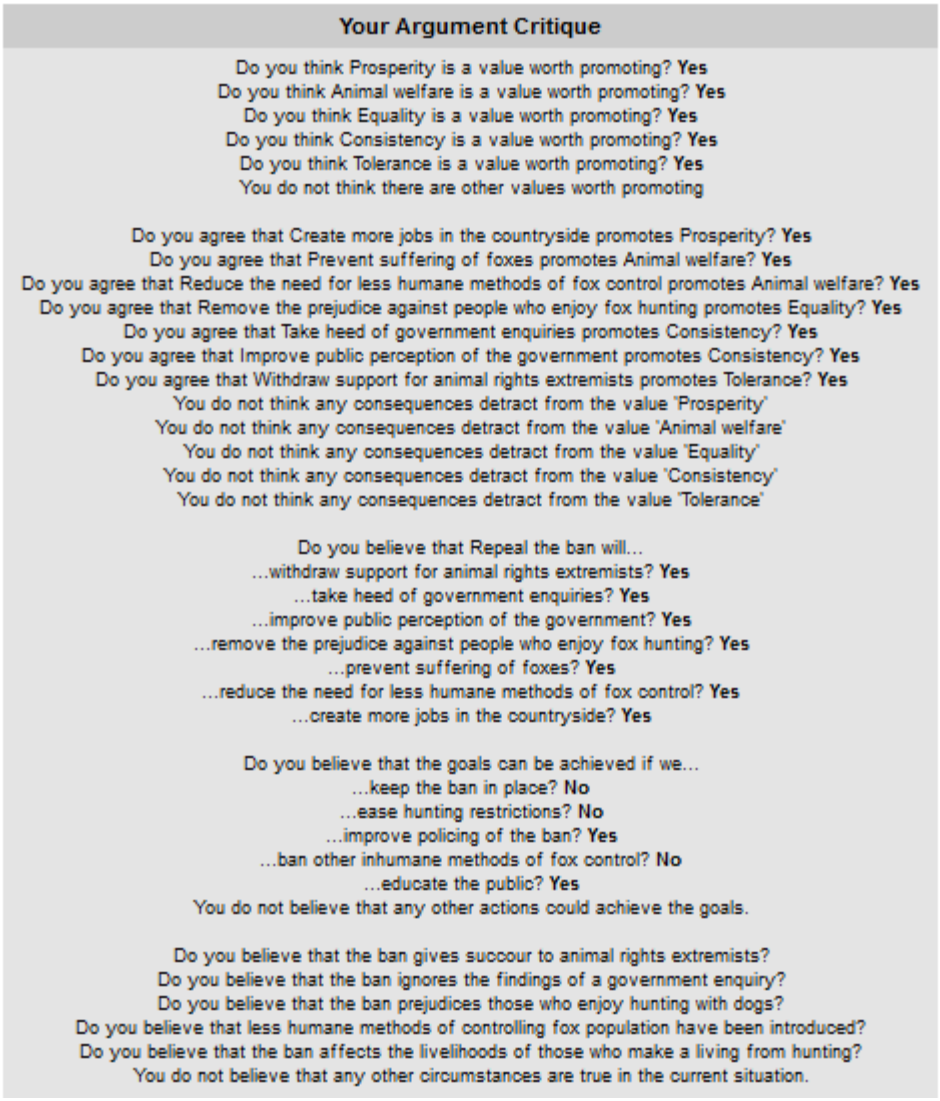
Displaying introduction to specific topic, in which a user gives their initial response[20]



Displaying an example of the structured interface, in which a user indicates their commitment to particular values, and is given the option of including any additional values relevant to the topic[21]

[20] http://cgi.csc.liv.ac.uk/~parmenides/

[21] http://cgi.csc.liv.ac.uk/~parmenides/foxhunting/



Your Argument Critique

Do you think Prosperity is a value worth promoting? **Yes**
Do you think Animal welfare is a value worth promoting? **Yes**
Do you think Equality is a value worth promoting? **Yes**
Do you think Consistency is a value worth promoting? **Yes**
Do you think Tolerance is a value worth promoting? **Yes**
You do not think there are other values worth promoting

Do you agree that Create more jobs in the countryside promotes Prosperity? **Yes**
Do you agree that Prevent suffering of foxes promotes Animal welfare? **Yes**
Do you agree that Reduce the need for less humane methods of fox control promotes Animal welfare? **Yes**
Do you agree that Remove the prejudice against people who enjoy fox hunting promotes Equality? **Yes**
Do you agree that Take heed of government enquiries promotes Consistency? **Yes**
Do you agree that Improve public perception of the government promotes Consistency? **Yes**
Do you agree that Withdraw support for animal rights extremists promotes Tolerance? **Yes**
You do not think any consequences detract from the value 'Prosperity'
You do not think any consequences detract from the value 'Animal welfare'
You do not think any consequences detract from the value 'Equality'
You do not think any consequences detract from the value 'Consistency'
You do not think any consequences detract from the value 'Tolerance'

Do you believe that Repeal the ban will...
...withdraw support for animal rights extremists? **Yes**
...take heed of government enquiries? **Yes**
...improve public perception of the government? **Yes**
...remove the prejudice against people who enjoy fox hunting? **Yes**
...prevent suffering of foxes? **Yes**
...reduce the need for less humane methods of fox control? **Yes**
...create more jobs in the countryside? **Yes**

Do you believe that the goals can be achieved if we...
...keep the ban in place? **No**
...ease hunting restrictions? **No**
...improve policing of the ban? **Yes**
...ban other inhumane methods of fox control? **No**
...educate the public? **Yes**
You do not believe that any other actions could achieve the goals.

Do you believe that the ban gives succour to animal rights extremists?
Do you believe that the ban ignores the findings of a government enquiry?
Do you believe that the ban prejudices those who enjoy hunting with dogs?
Do you believe that less humane methods of controlling fox population have been introduced?
Do you believe that the ban affects the livelihoods of those who make a living from hunting?
You do not believe that any other circumstances are true in the current situation.

Parmenides (2017) Displays a summary of a user's responses to a particular argument[22]

Literature and Applications of the Platform

A version of Parmenides is publicly available and allows for the exploration of four current debates, including fox hunting and speed cameras, and a record of one previous debate. Although the literature discusses Parmenides use in the context of e-participation and e-democracy (Atkinson et al 2004, Cartwright et al 2009), the application of the tool in this area has been limited and the focus of its current use has moved towards private application in the field of law. Atkinson et al (2004) argued that Parmenides was usable by its target audience and can be used to identify

[22] http://cgi.csc.liv.ac.uk/~parmenides/foxhunting/

points of disagreement, and record them so that the weight of opinion on various issues can be gauged. Cartwirght and Atkinson (2008) document the development of tools for e-democracy, including allowing the system to collect opinions on different topics, analyse data, and demographic profiling of users. The paper describes the intention to conduct large scale field tests to validate the effectiveness of the system.

Pol.is

Background, Objectives and Design

Pol.is "helps organisations understand themselves by visualizing what their members think (Pol.is 2017). It aims to allow the gathering of open ended feedback from large groups of people. Users click "agree", "disagree" or "pass" in response to statements others have contributed. Users are able to submit their own comments; however, they are not allowed to reply directly to a comment. Pol.is runs statistical analysis on these voting patterns, surfacing opinion groups, comments that brought groups together and comments that found broad consensus (Pol.is 2017). It then provides a visual representation of these groups and clusters of opinion. The decision to represent clusters of opinion rather than placing those opinions in the context of an argument map and not allowing direct responses to messages distinguishes Pol.is from many other approaches to online deliberation and online communication in general.

Pol.is was conceived during the time of the Arab Spring and Occupy Wall Street movement, and sought to develop a comment system that could scale up and retain coherence with large groups of people. The developers of Pol.is claim that the design choice of not allowing replies is key to making it possible to make sense of large groups; it is claimed that arguments do not scale, and the moment one begins to track a conversation between individuals, and other people's responses to specific comments, then that sense of scale breaks down (Megill 2016).

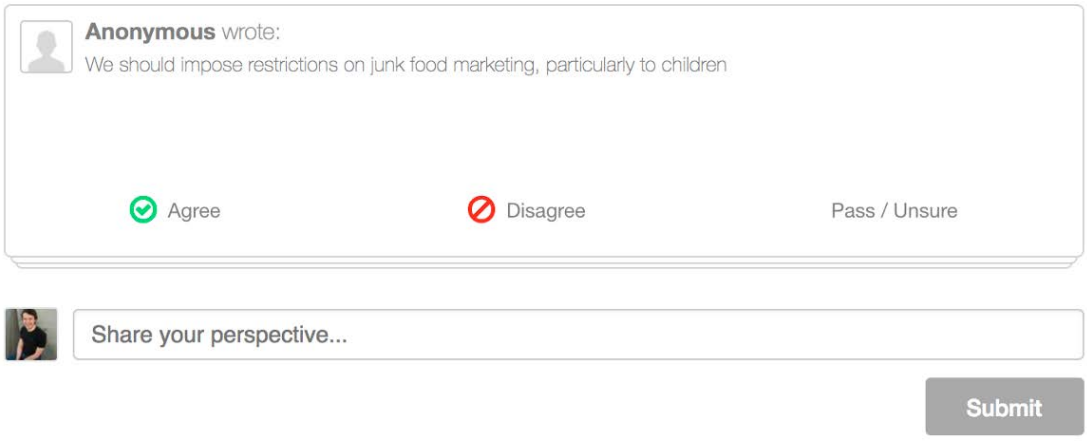
The developers further state the aims of ensuring people feel safe, listened to, that people may participate at any time in the life cycle of the conversation, that they have a sense of what others felt and minority opinions are preserved and

represented (Pol.is 2017). In allowing structured responses (agree, disagree, pass) and no direct replies it is claimed that problems of trolling and other negative behaviour are addressed. The visual representation aims to ensure that participants can see all voices represented as well as any points of consensus, particularly amongst otherwise disparate groups. In this sense, it is claimed the problems of echo chambers and filter bubbles are addressed through these choices around visual representation (Pol.is 2017). In order for Pol.is to be more effective in representing the different views of a collective group it encourages participants to respond rather than submitting original comments. One of the ways it does this is by using a fuzzy search to show users other comments that may be similar to the one they are typing.

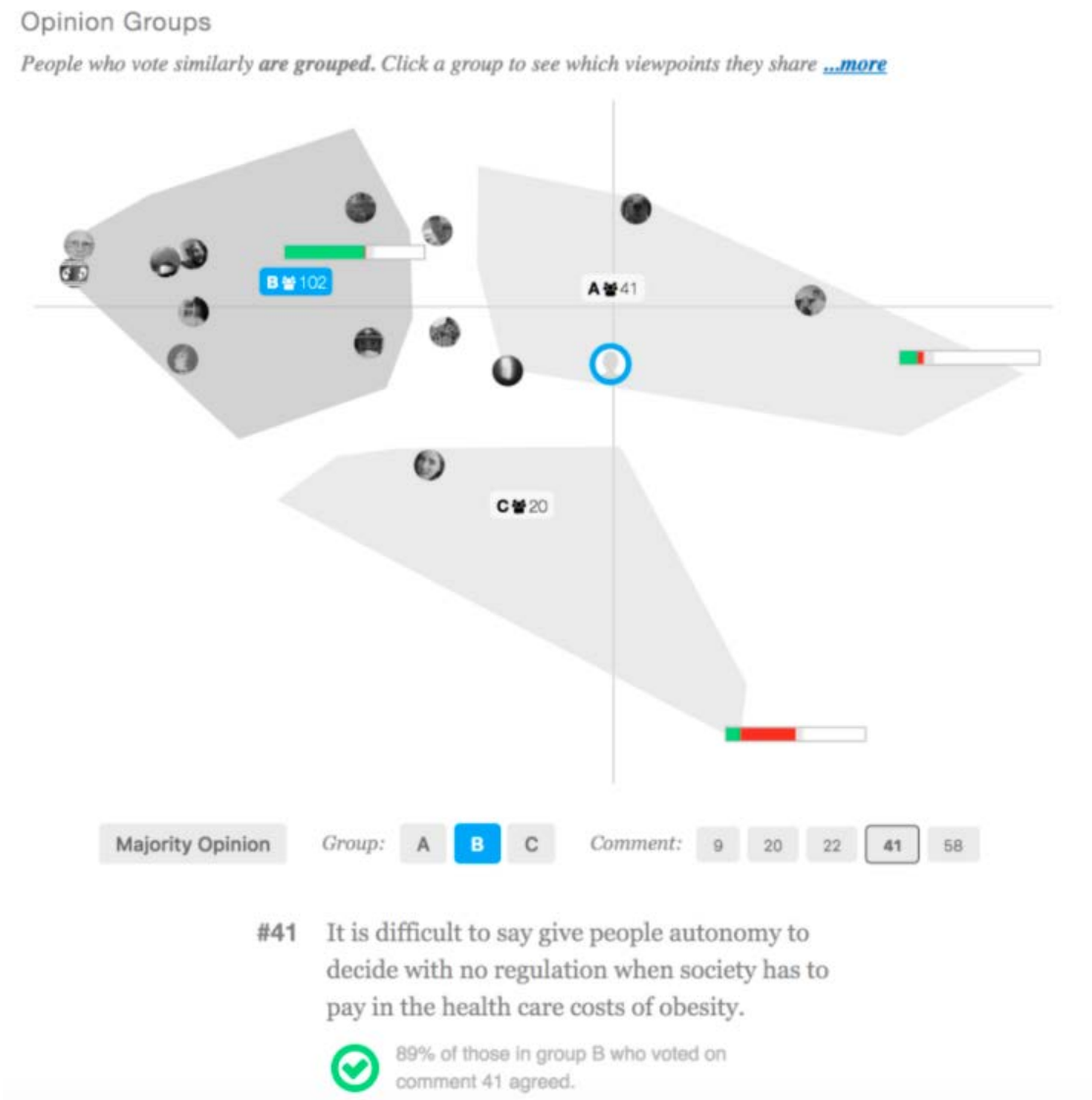
Pol.is represents an interesting example of the use of AI in online deliberation. It has been successfully applied in a number of contexts, notably in decision making in Taiwan. A number of design choices make it unusual amongst online deliberation platforms; notably the fact that the platform does not attempt to directly support the critical work of placing opinions within the context of an argument structure, and the decision not to allow direct replies to messages. The platform is notable for its unique design and its successful applications.

Images and Screenshots of the Platform

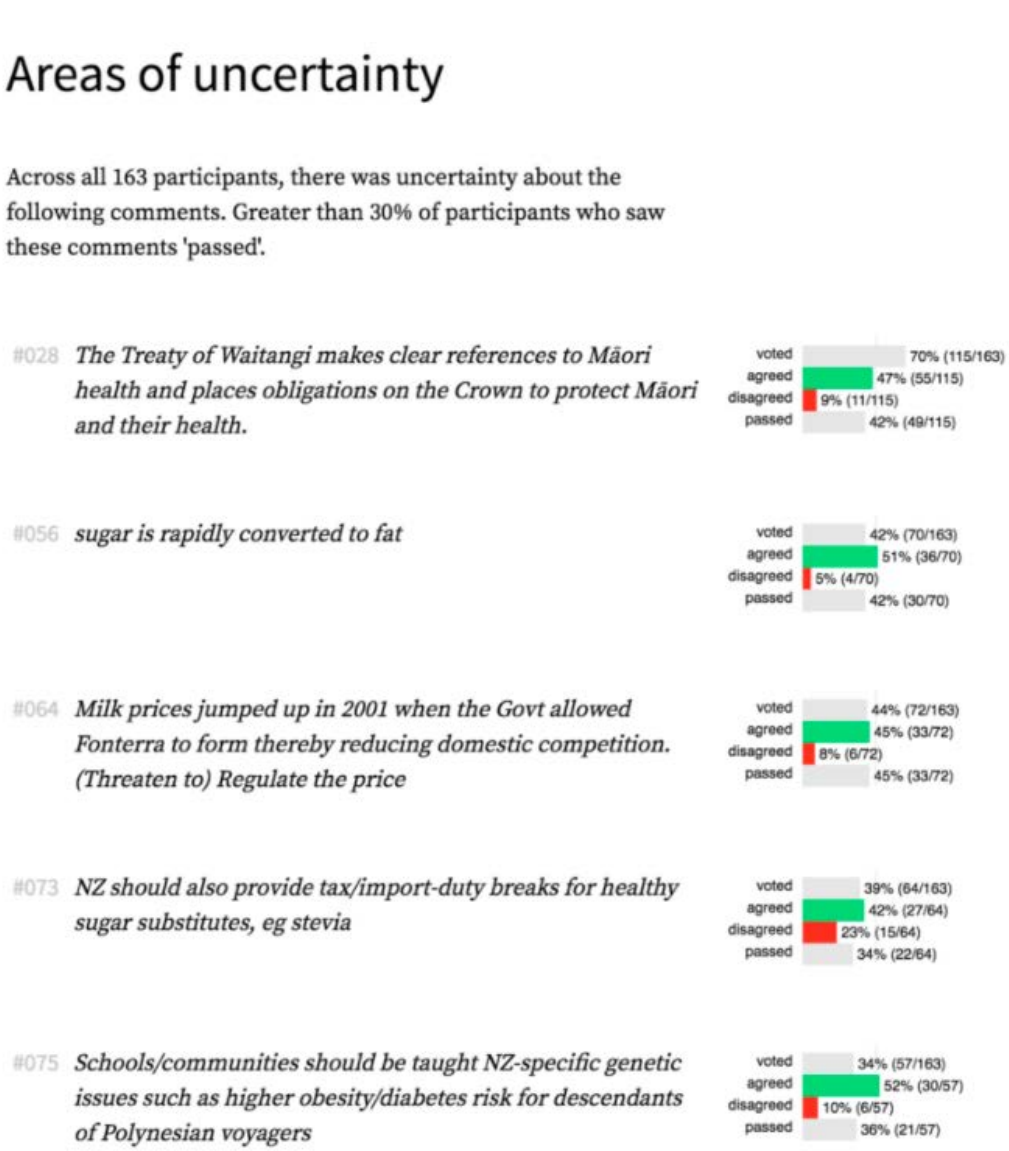
The screenshot below illustrates the visualisation provided by polis of comments and groups.



Conversation interface (Megill 2017)



Representation of opinion groups, highlighting the largest group, group B (Megill 2017)



Metadata on the group, including information on areas of uncertainty (Megil 2017)

Literature and Applications of the Platform

Pol.is has been used in a number of settings, notably in Taiwan, where the project vTaiwan used Pol.is to address particular issues such as liquor sales, crowdfunding, Uber, and Airbnb (Megill 2016, Berman 2017, Barry 2016, Tang 2016). In this case, decision making took the form of four stages. First, Pol.is was distributed through Facebook ads and networks targeting participants. Public meetings were then broadcast where scholars and officials responded to the comments emerging through Pol.is. This was followed by face to face stakeholder meetings broadcast to other participants. In the final stage, Barry (2016) describes how Pol.is was used in a binding way, with the government committing to either transform consensus into

national legislature or provide a point by point explanation of why this is not possible. These applications have been reported to be successful, for example it is claimed that the issue of online liquor sales had been in deadlock for five or six years, but through vTaiwan and the use of Polis a decision had been reached in three to five months. As of February 2018, 26 cases have been discussed through vTaiwan, 80% have led to decisive action from the government (vTaiwan 2018). Tang (2016) describes how the case concerning Uber and Taxi services resulted in the administration pledging to ratify all Pol.is consensus items into new regulation. As an indication of the success of the process, Taiwan's premier is quoted as saying "all substantial national issues should go through a vTaiwan-like process" (Barry 2016).

Rbutr

Background, Objectives and Design

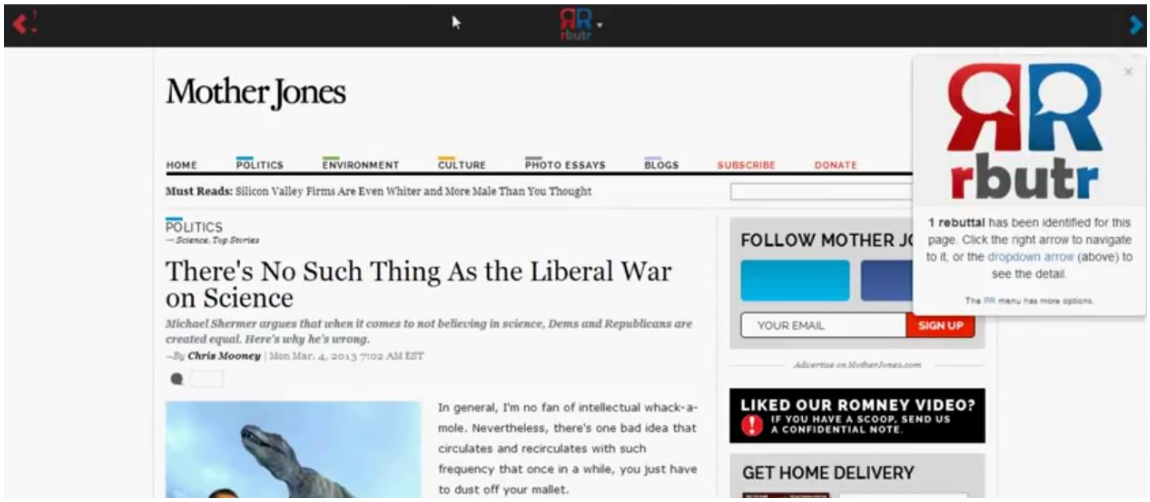
Rbutr "is a community-driven app which connects webpages together on the basis that one page argues against the other" (Rbutr 2017). It utilises crowdsourcing to identify rebuttals and critical responses to a given web page or article. It was initially developed as a plug-in alerting users to rebuttals of arguments. There is an additional frame option to view rebuttals, and an accompanying website offering further functions. The developers of Rbutr describe its aims as being to promote critical thinking for future generations, tackling the problem of filter bubbles and ensuring that "misinformation is corrected, scams are exposed... and context is provided to a claim that allows readers access to the full story" (Rbutr 2017).

Users of Rbutr can use the plug-in to submit rebuttals. Users are able to link one page to another page that contains a rebuttal of the first. Users are also able to add relevant tags. Rbutr also utilises social media, for example it identifies where an article has been linked to by Twitter users and allows for an automatic response alerting that user to rebuttals of that article. A given article can have a number of rebuttals linked to it, these rebuttals can be ranked by users in the hope that people will be directed to what is considered to be the best example of a rebuttal of a given article.

The Rbutr website states that the project is run by a small team with very little funding. It received seed funding and support from the Start Up Chile Programme, the developers made Rbutr open source and non-profit and are currently engaged in fundraising with educational organisations, fact checking organisations and publishing platforms as well as looking for volunteers and donors (Rbutr 2017). Rbutr is a good example of an annotation approach to argument representation and online deliberation. It aims to address a specific set of challenges in online deliberation, the filter bubble and polarisation of debate, and aims to foster critical thinking and engagement with alternative viewpoints.

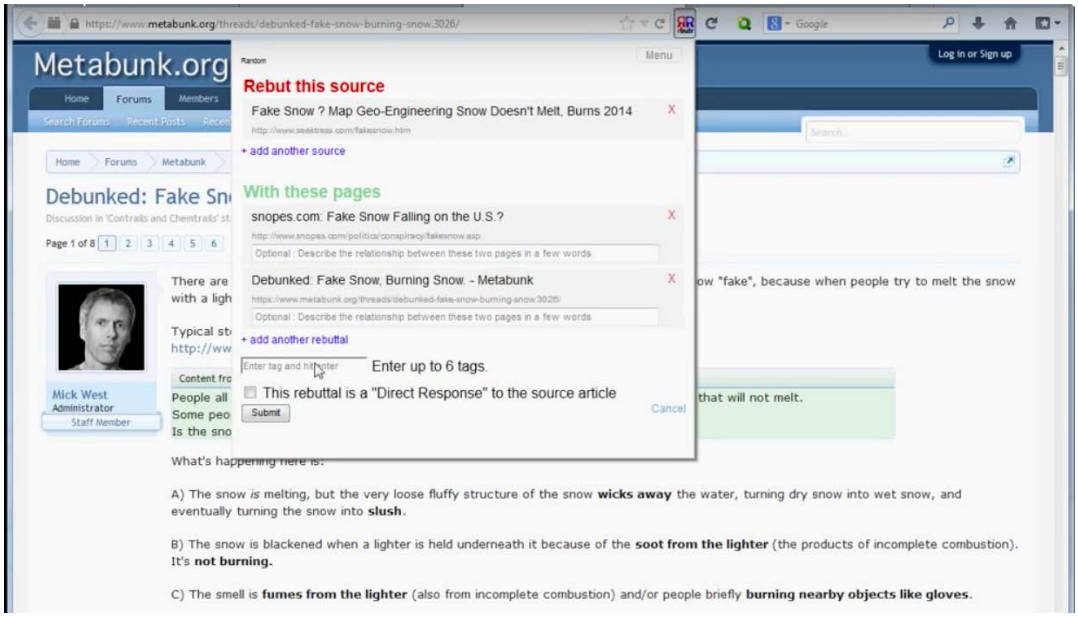
Images and Screenshots of the Platform

The screenshots below illustrate Rbutr's design.

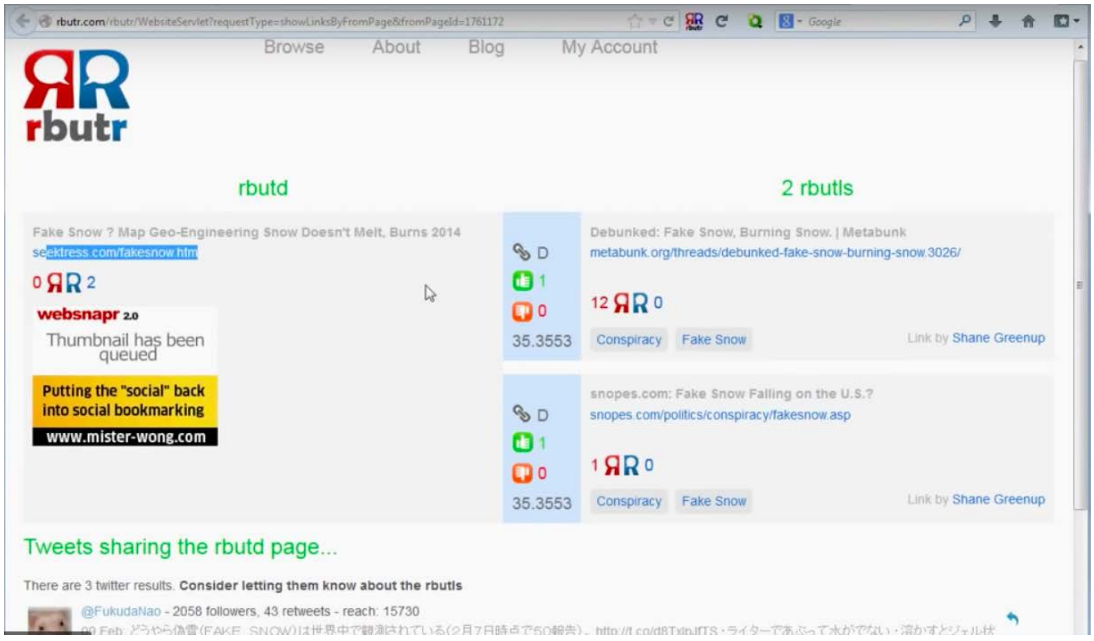


Displaying how Rbutr appears when visiting a website[23]

[23] https://www.youtube.com/watch?v=V9qi3vaLKyU



Interface for adding rebuttals[24]



Displaying Rbutr's website, displaying the rebutted article, 2 rebuttals, and details of tweets sharing the rebutted article[25]

Literature and Applications of the Platform

There is currently no literature on the use of Rbutr, however a study into its use in an educational context is being undertaken currently (Rbutr 2017b). The developer,

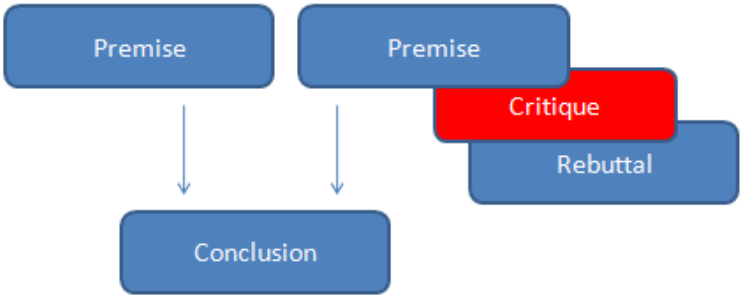
[24] http://www.rbutr.com
[25] http://www.rbutr.com

Shane Greenup, describes how Rbutr has reached a peak of 20,000 users and has been surprisingly robust. It has not experienced any problems with spam and every rebuttal has been appropriate.

Truthmapping

Background, Objectives and Design of the Platform

Truth Mapping is a website that allows people to construct argument maps. The developers describe the design of Truthmapping as an attempt to resolve the problem of "noise", which is associated with forums organised by time. The problem of "noise" is attributed to a number of factors: Digression from the topic, the "soapbox problem" and participants speaking past one another. The "soapbox problem", it is argued, is a result of participants being incentivised to be the last person to talk or the most vocal. It is argued that this is a problem in forums organised by time where a person is most likely to be heard if their comment is listed first or if they make the comment repeatedly. Similarly, when participants digress or speak past one another they produce information that is redundant and detracts from the information more relevant to the discussion (Truthmapping 2017a). Truthmapping is an attempt to resolve these issues through the use of argument visualisation. This approach to argument mapping was created by the developers of Truthmapping and is not grounded in a specific theoretical account of argument. The ontology of the argument maps consists of conclusions supported by premises; these premises can then be critiqued and those critiques rebutted. This is illustrated below.

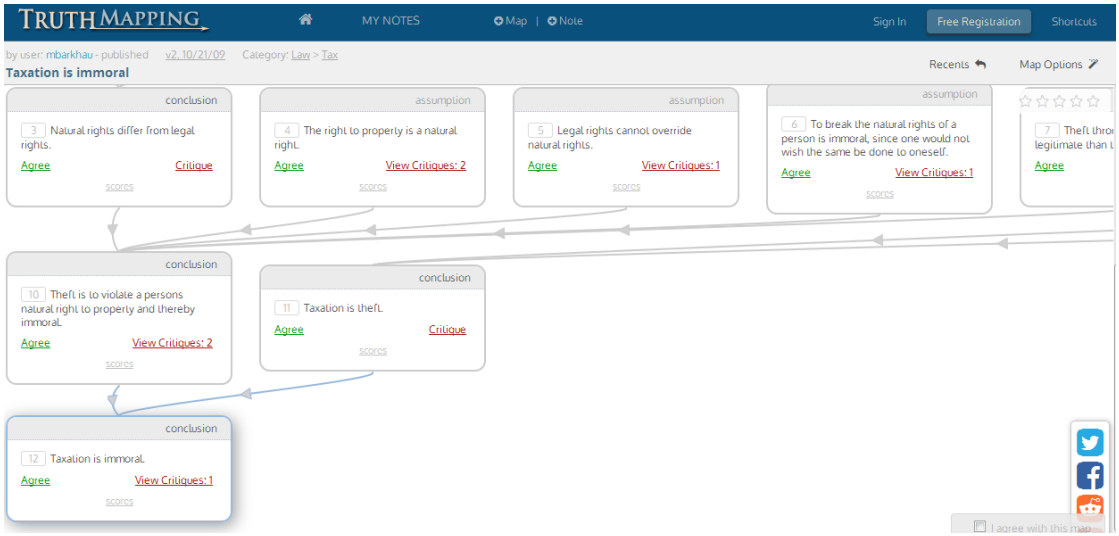


Truthmapping 2017

Only one rebuttal can be added to a critique. These elements can be edited; the final draft being visible to users, while the previous drafts are archived. This process is intended to ensure that the best examples of the critiques and rebuttals are preserved. It is claimed this mechanism removes the incentive of the "soapbox problem" and discourages digression (Truthmapping 2017a). Truthmapping is a good example of argument mapping techniques being used for general public discussion and political debate, the attempt to limit rebuttals through an editing process also represents an interesting approach to the issue of information management that is not found in most other argument mapping tools.

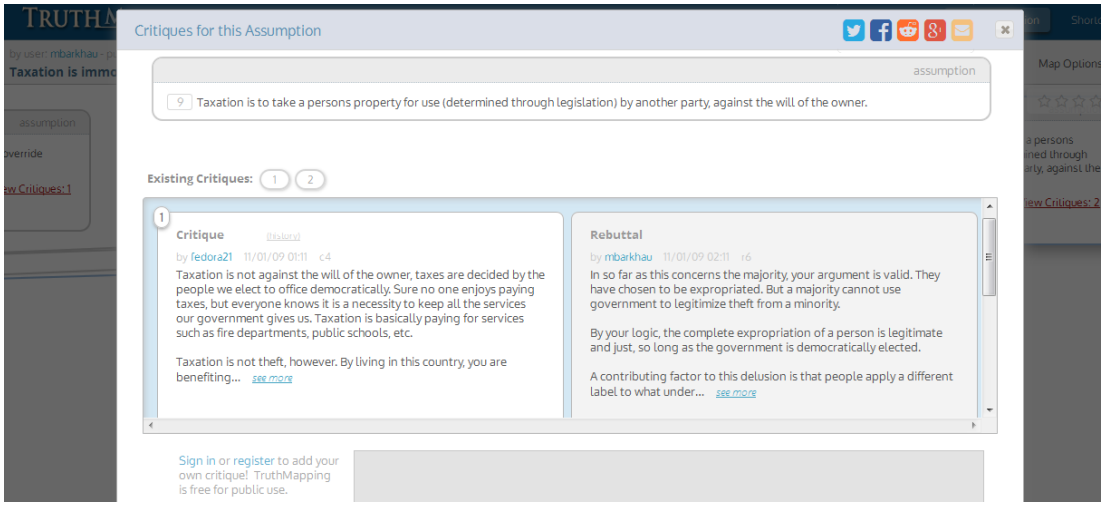
Images and Screenshots of the Platform

The screenshots below illustrate the design and aesthetics of Truthmapping.



Displaying general view of argument map[26]

[26] https://www.truthmapping.com/map/806/#s5361



Displaying a user clicking on individual arguments within the map to view further details[27]

Literature and Applications of the Platform

A literature search found no details on applications or studies of Truthmapping, beyond the material available on the Truthmapping site. There is a publicly available version of Truthmapping which limits the number of maps one can publish, in addition there are subscription plans for small groups and larger groups aimed at non-profit and educational organisations with additional features (Truthmapping 2017b). The publicly available version of Truthmapping has been running for over 10 years and continues to have regular visitors and published maps. To date the most popular categories of topic concern Philosophy (89 maps), Politics (73 maps) and Social Issues (59 maps).

Conclusion

This chapter has provided an account of the methodological approach taken to the study of design and structure in online deliberation platforms. The chapter has argued for an exploratory approach, selecting a small number of platforms and tools to explore the issue in greater depth. The chapter has provided an overview of current approaches to online deliberation found in practice. It has outlined the criteria guiding the selection of particular cases for further study. The chapter has

[27] https://www.truthmapping.com/map/806/#t5363-c5484

outlined how these exemplary cases will be used to explore the challenges of online deliberation identified in Chapter One and the role of design and structure. The analysis of these platforms will draw on multiple sources of information, including existing literature on the platform and interviews with the developers and those involved in the application of the platform. The chapter has identified twelve platforms and tools for further study; the final section introduced each of these case studies, outlining the design principles and objectives of the platform, providing illustrations of the presentation of information and aesthetics of the platform, and details on literature and applications of the platform.

Chapter 5: Analysis of Online Deliberation Platforms

Introduction

The previous chapter outlined the methodological approach to an empirical study into experimental online deliberation platforms. Twelve platforms were identified as exemplary cases for further analysis. The characteristics of these platforms have been interrogated using a variety of data, including primary experience, existing literature and interviews with developers and individuals involved in applying the platform in practice. This chapter presents the findings from this study. The discussion is divided into four sections, with each section addressing a theme identified in Chapter One: Participant engagement, participant behaviour and citizen capacity, information representation and management, and feasibility and scale. The design choices of the platforms will be discussed in relation to the challenges, issues and questions identified within each theme. The experiences and perspectives of the interviews will be used in particular to reflect on the challenges of online deliberation and the future directions for the field.

Participant Engagement

This section addresses the challenge of attracting and sustaining participation. The section considers the following questions:

- How can design reduce barriers to entry to ensure the platform is easy to learn and easy to use?
- How can a platform be designed to be appealing or fun to use?
- What is the relationship between online deliberation platforms and broader structural challenges of citizen engagement?

Easy to Learn and Easy to Use

An important issue in encouraging participant engagement is reducing barriers to entry and ensuring the platform is as easy to learn and use as possible. This is a particular challenge for developers of experimental platforms. Many of these

platforms introduce unfamiliar or potentially complex design features, such as argument visualisations. Such design features are intended to address particular challenges in deliberation or serve to organise information, yet such features can place barriers to entry and can inhibit debate causing discussions to feel unnatural or restrictive (Delborne 2010, Loukis and Wimmer 2010, Scheuer et al 2010). The developers of the platforms often discussed the importance of providing a balance between structure and simplicity, for example Travis Kriplean (ConsiderIt) observes "whenever you add structure, you add barriers and it becomes burdensome and you get less participation."

The barriers to entry presented by a platform can be understood in terms of the demands made of participants. A system can place demands on participants through the cognitive effort involved in learning or using the system, or through the effort involved in actions performed by the participant. For example, typical actions, involving varying levels of effort, include writing or reading large amounts of text (such as long arguments), writing or reading simple statements, voting and selecting pre-determined responses. Additionally, systems may involve varying levels of cognitive effort to learn and use; for example, a platform may require participants to operate a complex argument map, identifying where a contribution should appear or what type of contribution it is. A lightly, structured forum may require little cognitive effort to learn or use, but it may demand effort in reading and writing long prose.

The platforms and tools studied incorporated various actions with the choices of design placing different emphasis on each action. Parmenides and Pol.is both placed primary emphasis on voting; for Colin Megill (Pol.is) it was important that "the primary action is not writing but voting, which is much less of a barrier to entry". When a person decides to contribute a message in Pol.is they are given prompts to ensure they are not repeating existing points. This minimises the amount of writing and reading participants have to perform. In contrast the argument mapping approaches emphasise writing, with voting and ranking of arguments a secondary action. Argument mapping approaches vary in the emphasis they place on brief

statements or lengthier arguments, often allowing space for both. Argument mapping approaches often make the most cognitive demands of users; the most extreme cases are arguably BCisive/Rationale and Debategraph which present a relatively complex range of contribution and connection types for participants to use. Developers have different views about the balance between structure and simplicity; Mark Klein (Deliberatorium) believes the IBIS system is sufficiently simple structure around which to build the platform, and indeed has found the structure does not significantly impact retention rates when studied in comparison to a less structured forum (Klein et al 2012). In Travis Kriplean's experience IBIS is not particularly learnable and so has opted for a simpler "pro/con" structure in ConsiderIt.

The literature observes that generally greater structure or effort demanded of participants produces greater barriers to entry, but allows for richer information to be collected (Hilbert 2009). Platforms such as Parmenides and Pol.is illustrate how design can make minimal demands of participants and make more efficient use of that information. In Parmenides participants are asked a series of questions, but these questions are structured to allow the system to organise these statements within an argument scheme structure. Katie Atkinson (Parmenides) described this as key to the novelty of the platform. Another aspect to the efficiency of design concerns drawing information from participants and allowing participants to draw information from the system. "Lurkers" are participants who read but contribute little if anything to discussion personally and research suggests they make up around 90% of participants on forums (Trice 2010). The developer of Truthmapping found similar results in his experimental platform from around 1000 users. Pol.is and Parmenides not only emphasise minimal activities, but the system necessitates that users vote to move through debate. This draws on knowledge from participants, who may otherwise be lurkers, to enrich debate. Truthmapping requires users to revise arguments in response to counter-arguments rather than producing further arguments, this aims to increase efficiency, minimising demands placed on other participants reading long exchanges.

Interviewees did not generally report problems with participants learning how to use platforms, though the developers of Deliberatorium and BCisive/Ratonale discussed the advantages of training in the use of argument maps. Studies into Debategaph found mixed responses. Tambouris et al (2011) trialled the platform with experts, three of whom found the interface "rather easy", while two found it "rather difficult". This was attributed to the time-consuming process of understanding the functionality of argument visualisations (Tambouris et al 2011:78-79). A small trial of Debategraph revealed some students found navigation difficult and unintuitive (Crosley-Frolickk 2017). Many platforms (ConsiderIt, Truthmapping, Deliberatorium, Cohere/Evidence Hub, BCisive/Rationale) included a tutorial video that introduced the platforms and guided participants on how to use the platform. One interviewee criticised typical tutorial videos but highlighted the ConsiderIt tutorial as particularly successful for its interactive nature akin to a videogame tutorial. This tutorial eased the transition from learning about the system to using it, by allowing participants to use a training version of the system that didn't impact on an actual debate and gradually increased in complexity.

Sustaining Engagement: The Use of Gamification, Incentives and Aesthetics

The platforms Pol.is, ConsiderIt and @Stake use techniques of gamification in their systems. @Stake is the most explicit example of this, taking the form of a role-playing card game. The game design assigns points to participants for achieving objectives assigned to them in their role. The literature on collective intelligence and gamification highlights (Hasan 2017) the need to align points meaningfully with the values of participants. Participants of @Stake could be assumed to hold value civic engagement, reaching decisions that address the needs of their community, and in that sense the gamification process appears well designed. Eric Gordon (@Stake developer) also discussed the importance of setting clear goals in the game. Research suggests @Stake produces promising results for citizen capacity (Gordon et al 2016). An eLab (2017a) report highlighted issues with the explicit use of game dynamics in a civic context; it notes a few participants object to playing a game, especially in cases where they had arranged child care of negotiated other obligations. This highlights

tensions between perceptions of seriousness and play and the concept of the citizen as gamer.

In the case of Pol.is and ConsiderIt, interviewees described the greater opportunity for interacting with the data as a form of gamification. Both Pol.is and ConsiderIt allowed users to interact with the data through levels of support for a particular position, utilising a visualisation of clusters of support. ConsiderIt allows users to explore levels of support based on demographic information, while both platforms allow users to explore points of shared opinion amongst participants and the breakdown of support for different ideas. Colin Megill (Pol.is) claims that in this sense it is "gamified… people can see how the conversation has evolved, who they agree with". This approach facilitates the experience of autonomy and exploration, discussed in the gamification literature (Nicholson 2012, Hasan 2017), allowing users to explore information about the debate. A number of systems utilise a point system, allowing participants to award points to other participants, arguments and argument maps and displaying league tables. This often serves a practical function, surfacing the most persuasive arguments (for example Rbutr uses a ranking system to organise the order of appearance of rebuttals) as well as potentially incentivising participants. Klein (2011) found that one of the main motivations for participation in social computing systems is the idea of having positive impact on a community one cares about ("being a hero" Klein (2011)), and in this sense awarding points could be seen as an example of gamification drawing on that intrinsic motivation.

The developer of Deliberatorium notes that in his experience the most important incentive in relation to participation concerns whether the deliberation process is connected to a real-world decision. This is in keeping with other interviewees' experiences and further findings in the literature (Coleman and Moss 2012). Eric Gordon observed, in keeping with general findings (Bigham et al 2012) that monetary incentive may increase levels of participation, and may help recruit some otherwise hard to reach groups, but as an extrinsic motivation it is less effective at producing higher quality or sustaining engagement. In practice, very few platforms provided monetary incentives so there was limited opportunity to explore this issue. Climate

CoLab awards cash prizes to proposals judged the best in a contest, this takes the form of funding for a proposal and opportunities to meet with those responsible for policy implementation (Malone et al 2017), in contrast to rewards for participating or submitting proposals. Whether a platform is able to offer monetary incentives, funding, or lead to effective change in the real world depends very much on the context of application. This is arguably a matter of the resources of the platform and strategies of use, rather than design per se, and it is perfectly possible for platforms discussed here to employ such strategies.

A number of factors should be highlighted in consideration of the aesthetic qualities of platforms. Resourcing and sustainability of platforms was a fundamental issue that impacted the number of people involved and the time and resources they could dedicate to platform development, including developing the capacity to listen to and respond to user feedback around design. The expertise and priorities of those involved tended to be more technical, leading to a focus on elements such as the functionality of the platform in contrast to aesthetics. In some cases, the platforms available to the public were at an early stage of development and as such less attention had been paid to aesthetics. Those platforms that incorporated gamification tended to demonstrate greater attention to the feel and look of the platform; for example, @stake uses bright colours in the design of its cards to give it the appearance of game, while ConsiderIt and Pol.is purposefully adopt a more minimalist style comparable to the aesthetics of social networking sites. Notably, ConsiderIt provides the option of customising the look and feel of the platform to groups paying to use the service. The challenge of aesthetics experienced on these platforms is in many ways best understood as part of the broader challenges with resourcing and sustainability, and the limited capacity of developers, both in terms of time and expertise to prioritise strategies of recruitment and aesthetics.

Structural Challenges of Participant Engagement

When discussing the issue of participant engagement many interviewees highlighted the broader challenges facing platforms and tools aimed at encouraging citizen engagement. The thought that these platforms and tools offer a service of minority

interest. Their view echoes critiques of deliberative capacity found in Hibbing and Thesis-Morse (2002) and Rosenberg (2005). The majority of the public are not aware of the platforms, and if they were, would either not be willing or capable of engaging in the kind of critical argumentation expected by these platforms. The developer of Rbutr discussed this in terms of cognitive bias, while other interviewees focused on the problem in terms of culture, arguing that education systems, the government and media failed to support critical thinking and foster participation. Katie Atkinson (Parmenides) emphasised the significance of trust in encouraging participation, and argued the current political climate, characterised by polarisation and discussions of post-truth politics, was undermining this.

The concerns expressed by the interviewees highlight the limits of design and online deliberation platforms in influencing behaviour and addressing structural challenges. Chapter 3 considered the thought that while a platform may satisfy criteria for good and aesthetically pleasing design, it may still fail to engage participants. Indeed, there was a question over what an appropriate model or standard for engagement might be. Online deliberation platforms are often compared to social network sites, yet the differences in their respective aims and functions should lead us to question this comparison. It would be fair to say that the attention of many developers has been on the functionality of the platform, in contrast to recruitment strategies and contexts of application. This is significant as variations in recruitment and context of use can influence how we understand the challenge of citizen engagement. For example, it is possible to observe variations in how different platforms were used. Truthmapping was open for anyone to use and typically attracted an audience interested in debating abstract philosophical issues. We might reasonably expect this strategy to attract a small portion of the potential pool of participants, as it presumes specialist knowledge amongst the general public. In contrast, Pol.is targeted participants to discuss policy relevant to their professional experiences, for example teachers discussing education policy. This strategy involves a narrower section of the public, and draws on personal expertise. There is significant variation in these scenarios in terms of expectations of participants, how knowledge is sought and used, and the potential for representativeness or democratic authority. To clarify this

thought, platforms may host different types of debates, and this is not to argue one form of debate is preferable to another. Instead, these differences illustrate the significance of recruitment strategies and how a system draws on knowledge amongst the population to the issue of participant engagement.

A final issue highlighted through the discussions with the interviewees is the use of existing social networks as an alternative approach to the challenge of participation. The developer of Pol.is discussed the use of Facebook advertisements to target particular groups they were looking to survey, as a way of drawing people onto the platform. Rbutr could be linked to Twitter, allowing users to share rebuttals of articles being linked through that site. Other interviewees, such as the developer of Parmenides discussed the potential of using Twitter to pull arguments about a topic and using the platform to make sense of different arguments and connect opposing points of view. In this sense, social networks could be used to draw users into a platform (Pol.is), to supplement and indirectly promote a platform (Rbutr), or instead use information taken from those sites to generate an argument map or feedback about a topic without users directly using the platform (discussed by the developer of Parmenides).

Participant Behaviour and Citizen Capacity

This section addresses the challenges relating to participant behaviour and citizen capacity. Issues for the design of platforms include:

- How the design supports citizen capacity, including qualities such as critical thinking?
- How the design encourages positive behaviour and engagement with opposing views?
- How the platform discourages trolling and other negative behaviour?

Support Citizen Capacity and Critical Thinking

Different approaches to supporting critical thinking and deliberation can be identified amongst the design choices. The most common approach is the argument map; argument mapping approaches such as BCisive/Rationale, Deliberatorium,

Debategraph and Truthmapping support participants by providing a framework that visually represent key ideas and arguments, and the structure and relationship between these ideas and arguments. This form of support also makes demands on participants, assuming they are willing and able to use the argument map structure comfortably. In contrast, the dialogue technique of Parmenides does not make the same demands of skill and cognitive effort, providing the structure for participants and supporting capacity indirectly. The approaches of argument maps and Parmenides could be said to address issues with cognitive bias, fallacies and heuristics (as understood by Walton (2010), Maynes (2015)), since they require the participant to engage in slow thinking and visual representations of the argument. In Parmenides, participants explicitly confront different potential problems with a claim. Pol.is and Rbutr present contrasting ideas but do not break the arguments involved down or directly support participants in doing this. @Stake offers a very different perspective and approach to this issue: The game rewards points for participants who have been persuasive, but the design focus is on developing skills such as empathy (Gordon et al 2016) rather than abstract argumentation.

Evidence that argument visualisation tools support citizen capacity and critical thinking is mixed. Empirical work conducted by Van Gelder (2003) (involved in early versions of BCisive/Rationale) observes that diagrams can be more comprehensible than prose. Buckingham Schum et al (1997) note the burden of cognitive demands in creating diagrams. Easterday (2009) found test results for critical thinking were significantly better for students using maps compared to text based argument mapping tools. In contrast Carr's (2003) study showed argument diagramming was not necessarily better than traditional learning methods. BCisive/Rationale have been the most extensively studied platforms in this respect, informing the design and approach of the tools (Lengbyer 2014, Drummond 2006 in van Gelder 2007). Tested in educational settings, they have produced positive results on critical thinking (Twadry 2004) and the understanding of material (Kunsch et al 2014). Research into @Stake suggested the game may encourage participants to feel more comfortable speaking publicly, empathising with others and allow them to better retain information about other people's ideas (Gordon et al 2016). An important

qualification when considering these results is the limitations of empirical analysis; Scheuer et al (2010) notes general issues with testing methods, highlighting the relevance of confounding variables and factors such as individual differences, the context and application of the argumentation process. Many studies are small scale and operationalise the criteria of evaluation differently.

A further issue to consider in understanding the impact of platforms and design on citizen capacity is how the platforms understand and construct the notion of the participant/citizen. This connects with the context of the platforms' application. The theoretical discussion of the informal logic and collective intelligence literature identified how the deliberative process could be understood in relation to other more specific conceptualisations of communication; for example, Walton's dialogue types, deliberation, persuasion, information and inquiry, relate to elements of the deliberative process. The platforms and tools reviewed can be understood as placing different levels of emphasis on each type of activity through the design and application of the platform. For example, we might say that @Stake understands the citizen as a gamer, the design of the game mechanics place emphasis on the features of the persuasion dialogue, following Walton's terminology, in terms of the roles of players. Parmenides functions somewhat like a survey, the citizen is consulted and treated as a source of knowledge, in a process that emphasises the information dialogue. Argument visualisation approaches arguably emphasise deliberation or persuasion dialogues, where the citizen is understood as a participant concerned with ideas and arguments in a given framework, deliberation is understood as proposals for action and issues to resolve, with participants expected to engage in abstract reasoning. In this sense, the design choices place participants in a specific role, the interface presents participants with information and choices relevant to that role, which can direct and also limit the participant's behaviour. The following sections will return to these themes in the context of the specific challenges of polarisation and negative and disrespectful behaviour.

Encouraging Positive Engagement with Opposing Views

A key challenge for online communication concerns polarisation (Sunstein 2001). Research suggests that voluntary selective participation in debates, and to a lesser extent algorithmic personalisation (the filter bubble), reduces the diversity of information individuals are exposed to and produces polarisation (Chan and Fu 2017, Black 2011, Trice 2010). Sunstein (2001) argues polarisation can cause entrenchment of one's views, reduced empathy towards those outside of the group, viewing opponents as irrational, insincere or even ill-intentioned. Research has observed a general concern with citizens' capacity to distinguish between what is uncivil and what is disagreement (Kenski et al 2017). In this sense polarisation may exacerbate an existing issue in deliberation, and diminish a person's capacity to reflect critically on their own beliefs and engage respectfully with others.

The platforms are designed to ensure participants are exposed to alternative points of view. The argument mapping approaches of Deliberatorium, Raitonale/BCisive, Debategraph and Truthmapping, and the pro/con list of ConsiderIt all display arguments for and against a proposal within one visualisation. The function of Rbutr is to connect one view with an opposing view. Parmenides also suggests alternative positions in relation to a given policy position. Notably the representation of a view is typically provided by and controlled by people who hold the view, addressing the issue of misrepresentation. Furthermore, an absence of alternative points of view, for example caused by self-selection, would be immediately obvious in an argument map or pro/con list representation (although multiple, nuanced ways of disagreeing may not be present or even excluded).

The challenges of polarisation exist at a broader level than the individual platform. Colin Megill (Pol.is) observes that participants bring baggage with them to the platform. The nature of political debate outside of the platform, through the media participants consume, will set the expectations of the participants and influence their behaviour, beliefs and attitudes. Therefore, while the design choices may expose participants to alternative viewpoints we may consider how design encourages positive forms of engagement and the tensions between the conception of political

engagement produced by other media, and the conception of political engagement the platform encourages or is designed for.

The platforms direct participants towards a greater focus on argument and the specific content of claims, for example through organising information and structuring space for participants to contribute in terms of an argument framework. Travis Kriplean (ConsiderIt) stressed that his platform focuses attention on the specifics of the proposal and arguments, thus avoiding attitudes and behaviours associated with polarisation, and drawing participants away from "knee-jerk responses based on ideological commitments" towards a more focused, perhaps even technocratic, attitude towards proposals. Pol.is and ConsiderIt visualise clusters of support which can address the distorting influence of polarisation on perceptions of opponents; this design provides a clear, accurate representation of the distribution of support, highlighting points of consensus and shared beliefs amongst political opponents. @Stake is specifically designed to encourage empathy in deliberation through the use of a role playing card game. This approach is quite unusual and it may be difficult to implement or sustain in the contexts many other platforms are operating in (i.e outside of arranged events or specific debates).

Research into the platforms provides promising findings in relation to this issue. Freelon et al (2012) measured engagement using ConsiderIt in a number of ways; they found 45% of users who authored more than one point, made points on both sides of the argument. 53% of users agreed to points on both sides of an argument, and 70% of users selected to expand information detailing opposing viewpoints. The authors note that the participants comprised a self-selected non-random group, and there is a lack of comparative data. Nevertheless, the results demonstrate considerable engagement with opposing sides of arguments. A further study of ConsiderIt by Kriplean (2012) found 41.4% of participants supported both a pro and con point, 46.3% of respondents changed their view on a point, and 30% moderated their stance, with 13.3% switching position. Spada found Deliberatoirum produced the opposite effects of polarisation, moderating people's stances, though he suggests this may be the result of "elite deliberation" (by which he meant individuals

from academic/political backgrounds such that one might reasonably expect them to be disposed towards deliberation), highlighting issues with the evidence base. Studies into @Stake found the game increased participant's perceptions of efficacy and empathy (elab 2017a, Gordon et al 2016). David Price (Debategraph) described positive experiences with an application of his platform on a discussion on the crisis in Gaza with the Independent newspaper; he described how for many participants they were encouraged by the experience to develop arguments as constructively as possible, building on ideas in the maps. The transparency of the design and its ability to capture and openly represent different ideas also proved resilient to those not interested in constructive debate and seeking to game the process. The interviewees said they experienced very few problems of polarisation or disrespectful behaviour, acknowledging that this may be due to the design and intention of the platform and the participants who select to participate on such platforms.

Discouraging Negative Behaviour and the Problem of Trolling

The problem of trolling, flaming and other negative behaviour online is well recognised in the online deliberation literature (Manin and Lev-On 2009, Davies 2011), as well as receiving broader attention (For example, see Cho and Acquisti 2013, Buckels et al 2014). This behaviour has been characterised as angry, hostile or profane communication (Graf et al 2017). A participant is described as trolling if they use the forum to attack other speakers or express controversial arguments, with the intention of disrupting the conversation or upsetting others in contrast to contributing sincerely to debate (Price and Capella 2002). Interviewees, such as Travis Kriplean (ConsiderIt), observed that while trolling may be easy to define it is much more problematic to successfully identify within a platform. Establishing the intentions of participants is difficult, furthermore responding to perceived trolling through censorship or exclusion is likely to generate controversy, leaving the platform and moderators open to accusations of undemocratic behaviour. There is limited research into the motivation of trolls. Existing research has identified themes of boredom, attention seeking, revenge and sadism as motivators (Buckels et al 2014). The interviewees offered further perspectives, a common view being that while some people may be motivated to disrupt debate, other behaviour that may

be perceived as trolling may be better understood as frustration with the system of deliberation. If participants do not feel their voice is being heard, they may resort to more cynical or disruptive behaviour.

Developers reported few or no problems with trolling. Design choices often limit the ways participants can communicate, restricting the opportunity and incentive for negative comments and trolling. The most extreme example of limiting communication is found in Parmenides and Pol.is. In Parmenides participants do not directly interact, and are only exposed to moderated, alternative solutions proposed by others. Colin Megill (Pol.is) describes how the system does not allow direct replies, effectively removing the problem of trolling. In both cases, the attention of participants is directed by the platform, they respond to statements presented to them, therefore participants cannot draw attention towards their behaviour. Although more personal interaction is allowed in argument mapping approaches, the designs of the system focus the conversation on the argument and levels of support rather than the individual authors. The developers of Deliberatorium and Truthmapping argued that the visual representation of argument maps make personal attacks more apparently irrelevant and incongruous. The designs of the platforms such as Pol.is, ConsiderIt and argument map approaches, are considered helpful, in the sense that they ensure alternative viewpoints are represented and participants are more likely to feel listened to.

An important qualification with respect to findings on participant behaviour on these platforms is that in many cases the participants are not representative of the general population, being either self-selecting (Klein et al 2012, Freelon et al 2012) or recruited from a pool that might be expected to display greater willingness or capacity (Gurkan et al 2010). Comparing experimental platforms with online communication on other sites, Eric Gordon (@Stake) observes

> [an important difference lies in the] intentionality of the tool itself, tools have values, clear intentionality and purpose… Facebook is more like a Swiss Army knife… constantly negotiating who their audience is…. [for] tools with

> a much more defined (and localised) audience, the dialogue is more focused, deliberate and intentional… participants are not thinking "how will this play with friends who are not interested in this?" so some of the problems with flaming and trolling are removed.

In this sense, since the platforms are designed to support critical thinking and engagement with opposing views, they are likely to attract individuals who are actively seeking to engage in this sort of debate. The interviewees also discussed further issues relating to this matter; the developer of Deliberatorium described how the topics discussed to date on his platform have been of a technocratic nature, thus not attracting more heated or ideologically driven exchanges that more controversial subjects might introduce.

Since the interviewees experienced very few issues with participant behaviour, many interpreted the question in terms of the potential for their systems to be hacked, gamed or manipulated by participants. Shane Greenup (Rbutr) observes this is a particular concern for platforms and tools applied to support real world decision making, where the incentives for astro-turfing and manipulation are greater. Colin Megill (Pol.is) described how the system was vulnerable to astro-turfing and ways of responding to such challenges. For example, (1) a situation in which many users voted indiscriminately (e.g agreed to everything) in order to distort and disrupt the system; (2) A situation in which one person tries to post many messages to dominate the process and control what information people view. Situation (1) is addressed through identifying suspicious voting patterns or behaviour, such as presenting users with three positions they would be unlikely to consistently agree with to help alert moderators. Situation (2) is addressed by weighting the system to place prolific posters to the back of the queue, ensuring other people have a voice. Shane Greenup (Rbutr) described how one individual was over zealous and contributed over 10 000 rebuttals; these were not only often of a poor quality (film reviews that took opposite views on a film for example), but more significantly appeared on popular pages (such as Google and Facebook) meaning that every time a person used these sites they would get an alert which was likely unwanted. This was seen as a minor technical

issue that could be addressed by modifying how often users were alerted to rebuttals they had already seen. Mark Klein (Deliberatorium) described how it would be possible for people to wilfully misuse argument maps, however this had not happened in his experience and he was only aware of one example of it happening elsewhere. In this example conspiracy theorists were unhappy their arguments had not been accepted and were then seeking to sabotage the map. Many of the interviewees did not feel that the challenges of participant behaviour or manipulation presented a problem in their current experience; Jack Paulus (Truthmapping) suggested that it would be a good problem to have, highlighting again the primacy of the issue of engagement and persuading people to participate in the first place.

Information Representation and Management

Deliberation involves a range of tasks and can be understood and represented in various ways; this presents epistemological and normative challenges concerning the representation and management of deliberation. Coleman and Moss (2012) discuss ontological politics in the context of online deliberation research, and this term may also be applied to practitioners, given the role design plays in what realities are recognised and what actions are allowed on the platform. The aims of the platform also determine the demands and challenges encountered in relation to design. For example, a platform aiming to represent sides of an argument clearly requires design to address problems of information overload and noise. A platform seeking to represent an argument and support decision making, would make additional demands of design, such as the need to ensure any verification process or voting mechanism used was fair, secure and transparent.

The fields of informal logic and collective intelligence break down the process of decision making in various ways that suggest potential approaches to structuring information. Some of the platforms represent applications of these approaches, for example; the development of argument visualisation techniques (Atkinson 2006, De Liddo and Buckingham-Shum 2010a) (for example BCisive, Rationale and

Truthmapping), the Issue Based Information System (for example, used by Deliberatorium), the development of computational models of argumentation and defeasible artificial intelligence logics based on argumentation schemes (Gordon et al 2007, Atkinson and Bench-Capon 2007, Walton and Godden 2007) (for example, used by Parmenides).

Questions for the design of platforms include:

- How the debate is framed and represented? What features of deliberation are being represented and which excluded?
- How do the choices of information representation and management deal with the potential problems of noise and information overload?
- To what extent does the system manage decision making, including filtering debate, editing, verification and other critical work involved in deliberation?

Framing the Debate and Making Sense of Deliberation

The online deliberation literature highlights that many typical forms of online communication were not designed to support deliberation (Davies 2009). It is claimed that debate is typically represented in ways that make it difficult for participants to make sense of the state of debate or the feelings of the group, and the common platforms are not designed to help the group discover areas of consensus or reach a decision (Davies 2009, Black 2011). The design of online deliberation platforms establishes how the debate will be framed and what aspects of debate will be recognised and visually represented. Platforms vary greatly with respect to how they understand debate and the design choices they make in representing that information. Design may capture a number of different features of debate; for example, the type of information it contains (for example, factual or value based judgements), and the relationship it has to other ideas or arguments in a debate. These types of information are typical in argument map representation. The platform may also represent social information about the debate; the scale and intensity of support for positions, and who supports them. Platforms such as Pol.is and ConsiderIt provide visual representation of this information. It is possible to

identify broad design approaches; argument mapping (Debategraph, Deliberatorium, Truthmapping and BCisive/Rationale), pro/con lists (ConsiderIt), support clustering (Pol.is, ConsiderIt), annotation (Rbutr is a development of this appraoch), dialogue (Parmenides). However, these categories do not fully capture the diversity within these approaches in relation to techniques to manage and represent information and how users may interact with the platform.

Presenting debate as a proposal or question and allowing space for arguments for and against the proposal is a common approach. This raises significant issues concerning how the topic of debate is defined, who defines it and how well the system can accommodate contested understandings of the topic. For example, an argument map detailing arguments for and against a policy does not necessarily allow space for participants to propose alternative solutions or contest assumptions implicit in the proposal, such as values inherent in the framing or the priority placed on the proposal. The framing may also place unhelpful restrictions on what is relevant to debate. Focusing debate on a central question helps organise information and may make it more accessible to users. It is an open question whether the benefits of this focus outweigh the costs of framing debate (i.e potentially imposing assumptions or excluding views).

Parmenides organises information around a central proposal but represents information as a dialogue rather than a map. The system follows the structure of an argument scheme, asking questions of participants that correlate to critical questions. Implicit in argument scheme theory is the assumption that there is a limited number of ways an argument can be attacked or challenged. The system allows users to indicate whether they agree or disagree with the proposal, challenge assumptions implicit in the proposal and propose alternative solutions. Parmenides thus overcomes the issue of framing and it is possible that an argument map could include elements that allow users to contribute more abstract level challenges to a proposal, however in most cases developers have deliberately chosen simpler designs while acknowledging they may be restrictive. Debategraph offers a solution to an aspect of the problem of framing. The system re-orientates the map as users

select to view information, allowing maps to flow into one another. The advantage this has over static argument maps is its capacity to depict the interrelationship between different debates and ideas. Shane Greenup (Rbutr) argued that while annotation is much too fine, Rbutr operates more like a hammer that does not easily distinguish between subtle ways of disagreeing with a statement. Although ConsiderIt allows for the indication of priorities amongst proposals, Travis Kriplean noted that the structure is not universal and it does confine, and felt the current version is like a first pass at this issue. Kriplean also recognised the utility of the approach for focusing discussion. Mark Klein (Deliberatorium) found that, providing the central question had been worded carefully most people used the platform successfully and did not take issue with the framing of debate.

The most common elements of debate identified and visually represented by platforms are the relationship different ideas have to an argument. The specific ontology applied varies. Some were rooted in specific theory, for example Deliberatorium (IBIS), and Parmenides (argument schemes). While Jack Paulus (Truthmapping) and David Price (Debategraph) described the precise ontology and functioning of the map as a more organic and on-going process. The simplest approaches identified ideas, arguments for and arguments against (ConsiderIt and Deliberatorium). More complex approaches can be found in BCisive/Rationale and Debategraph. BCisive/Rationale also allows participants to indicate further detail about the content such as whether it is a question, evidence and type of evidence (statistical, testimony, report etc) and the developer has further plans to identify probabilistic claims in argument. Currently participants are free to use these categories however they chose, the system is not established to ensure participants use categories correctly, cite appropriate evidence or calculate probability for example. Debategraph builds on the IBIS ontology with two further layers of connections; the first layer performs tasks such as grouping arguments or clarifying the relationship between ideas (for example, an action, a decision, a decision at risk of delay). A further layer, described as “cross links”, allows participants to add information about the map itself and link to other maps (for example connecting ideas that contradict or are equivalent to each other, or connecting an idea with

another map). In addition to these structural features, Debategraph provides space for further details and information on a selected idea. This allows space for further discussion, links, and other media such as videos and graphs to support a greater understanding of the topic.

The choices of ontology of different platforms reflect a similar balance between complexity and simplicity. Relative to other platforms Debategraph is ambitious in the complexity it aims to represent. Despite this Bullin and Price (2015) observe that Debategraph might seem reductionist, organising existing debates and research into key points on an argument map. They continue to argue that this is something that one would do naturally and Debategraph allows collaborative construction and a shared visualisation of this map. David Price (Debategraph) argues that public policy is increasingly complex, and Debategraph and similar platforms offer the potential to support the management and navigation of this complexity. Research suggests the complexity of the platform has presented challenges for students (Crossley-Frolick 2017) and some policy experts (Tambouris et al 2011). Although the platform has been used successfully for deliberation (Debategraph 2017), Capehorn (in Bullin and Price 2015) argues it may be more suitable for collecting data and research on an issue and presenting it clearly rather than directly supporting argumentation. Travis Kriplean (ConsiderIt) and Mark Klein (Deliberatoirum) described how they deliberately selected less complex ontologies to reduce barriers to entry and provide a focus for deliberation.

In addition to representing how ideas contribute to the structure of an argument, some platforms visually represented social aspect of deliberation. This includes levels and intensity of support, and levels of support across different demographics. A simple approach to this is allowing participants to vote up messages, and this could be further visually represented in an argument map by adjusting the argument's size or proximity to the centre of the map. Pol.is and ConsiderIt represented participants in clusters of support for various positions, also allowing the data on support to be broken down by demographic information. The developer of Pol.is described his intention to allow users to indicate the importance they placed on different

statements or different sources of information; this would allow participants to better understand different priorities amongst participants and the significance they place on different sources of information or claims, leading to a greater understanding for the reasons for disagreements. This social information provides clear detail on consensus and representations of support, it is helpful in a critical sense for debate since who is participating and how, is relevant to our understanding of claims in an argument and the dynamics and legitimacy of debate. This information may also replicate social elements of face to face communication, for example the capacity to judge the feelings of the group through body language.

While information about the group may be present in some designs, social information at the level of individual participants is much more limited. The presentation of debate emphasises levels of support for ideas in contrast to individually authored arguments, in some cases direct communication between individual participants is not possible (Parmenides and Pol.is). As discussed earlier, conceiving debate as interaction with arguments rather than with other individuals avoids problems with ad-hominem attacks and other negative behaviour. Nevertheless, information about participants can have critical relevance to the argument, excluding this information limits our capacity to judge the sincerity or potential ulterior motives behind claims, and check power dynamics amongst participants. There are further potential consequences on the experience of deliberation, with literature highlighting the importance of social presence online. Graf et al (2017) discuss social presence theory in the field of human computer interaction, this is loosely defined as the sense of being with another (Biocca et al 2003 in Graf et al 2017). Increasing social presence is often treated as a design goal, in the case of online deliberation platforms this appears to be in tension with other aims and design choices.

It may be helpful to draw a contrast between three approaches; Parmenides, Pol.is and the argument map approaches (for example, Truthmapping and Deliberatorium). Parmenides guides the participant through a series of critical questions, scrutinising their beliefs. The system produces a visualisation summarising

how their commitments relate to an argument scheme. Pol.is records the sentiments of participants producing a visualisation of the commitments of the group. In this sense Pol.is could be understood as showing us "this is what everyone thinks," while Parmenides aims to ask "why do you think this?". Parmenides offers a visual representation of an individual's subjective commitments, but it does not represent a shared understanding of those commitments. In contrast, Pol.is displays a shared understanding of commitments but does not place those beliefs into an argument structure or hold them to account (through critical questions or counter arguments). The argument map approach could be understood as an attempt to combine the representation of shared understanding of debate, with the scrutiny and accountability of Parmenides. An argument map is collaboratively constructed, with ideas connected to counterarguments. Since the shared understanding of arguments is contested and dynamic by nature this presents potential problems for information overload and noise, as will be addressed in the following section.

A final consideration is the extent to which design choices are sensitive to aspects of emotion and forms of argument that fall outside of more conservative conceptualisations of deliberation, such as story-telling. On this topic, Paolo Spada (Deliberatorium) commented:

> Deliberatorium killed story-telling, and women participated much less, I can't prove it statistically, but that was my gut feeling... my feeling is that groups with less of an internal sense of political efficacy have a harder time in platforms, in a forum there is no way to make a mistake... Deliberatorium might be difficult for people who don't have formal schooling, or who are not used to the process of deliberation.

It should be noted that Deliberatorium created a separate chat room allowing space for thoughts and comments that would not fit within the map. In this sense there was an awareness of the limitations of design choices presented by argument maps. Nevertheless, this solution involves separating two elements of deliberation, and there remain questions over whether one form of communication is being unfairly

favoured within this process, or how to reconcile the views developed in these different areas. Although Paolo Spada's comments are based on his experience with a specific platform, they illustrate a broader issue with argument representation on these platforms. It is argued that the platforms reviewed almost universally limit the opportunities to communicate emotion and story-telling within their chosen architectures. Notably Pol.is provides opportunities for emotional contributions, yet the limited characters restrict storytelling.

Design choices such as the use of media lean forms of communication exclude typical channels for conveying emotion. The representation of debate frequently seeks to divorce the argument from individual authors, and furthermore require that arguments be dissected and expressed within the framework of a particular ontology (for example argument prose might be divided into separate elements such as evidence, claims, ideas). These decisions place further constraints on the kind of communication possible on these platforms, which has particular implications for the place of emotion and story-telling. It becomes unclear what kind of emotion can be represented within these constraints.

We can identify these design choices as imposing an assumption about how deliberation ought to be. We might imagine a range of possible consequences of these design choices, for example the structural constraints may serve to effectively exclude or deter particular people, exclude certain views, alternatively in some cases they may not exclude people but rather elicit a change in the way people behaved or expressed certain views or even cause people to critically reflect or change their views. The constraints placed on deliberation may not be a bad thing, indeed all forms of democratic space will shape the engagement that it hosts. The issue is whether the design choices are justified and ensuring transparency around how constraints on communication and behaviour impact the democratic quality of the process and the capacity for citizen empowerment.

We might speculate that there are practical and theoretical reasons for this approach. In the theoretical literature of informal logic and deliberative theory, we

observed a division between more inclusive and more restrictive conceptualisations of argument, furthermore the challenge of incorporating broader conceptualisations of argument (including emotion, story-telling and different modes of logic) into an evaluative framework remain unresolved. This tension in the theoretical literature is being played out in practice. Platform developers often appealed to scientific inquiry and philosophical discussion as a model for deliberation, in that sense they are committed to a more conservative conceptualisation of argument. Finally, as will be discussed later in more depth, if story-telling and emotion are necessarily grounded in the expression of an individual experience, it is not clear how to represent these elements at scale in the ways that these platforms have represented argument. In this sense, the design choices could be justified by appealing to the idea they are necessary to achieve scale and develop abstract reasoning skills. Nevertheless, there is a need to consider whose voices are being excluded or inhibited by this approach, and ways in these elements can be incorporated within a given decision making process.

Information Overload and Noise

The most commonly discussed challenge associated with representation and management of information is information overload and noise. Deliberatorium and Truthmapping are introduced as platforms to address this specific problem (Deliberatorium 2017, Truthmappping 2017). Noise is understood as superfluous information hinders effective comprehension of the debate. Information overload occurs when information becomes disorganised or excessive to the point it prevents participants drawing effective meaning from it. Jack Paulus (Truthmapping) outlined the widely-held view that lightly structured forums encounter problems of information overload and noise because they organise information only by the time it is submitted. Participants may introduce tangents of little relevance to the topic. Participants may have a misunderstanding and the following exchange may be relevant to their own understanding but of little significance for others. Participants may repeat points and it is argued they are incentivised to do so under a time organised system. The most visible ideas are the most recent and most repeated and there is no further representation of ideas or support; therefore, participants may

repeat points to ensure they are heard or dominate discussion and this also creates a potentially misleading indication of levels of support for a position.

Mark Klein (Deliberatorium) describes how the argument mapping approach allows arguments to be clearly visible and fairly represented regardless of the time they are submitted. In this sense, the argument map ensures participants contributions have impact and reduces the motivation and benefit of repeating points (avoiding the soap box problem). The argument map structure encourages participants to clarify the relationship between their ideas and existing arguments, encouraging concisely expressed relevant information, while irrelevant information and fallacious reasoning, such as ad hominem attacks, are more easily identifiable. As discussed, argument maps often use mechanics such as votes on arguments to indicate support more effectively and allow for discussions to appear outside of the main view of the map.

The argument mapping approach remains vulnerable to the problem of information overload and noise. Any given representation of a debate will be subject to contestation and change. Argument maps allow space for arguments to be rebutted, challenged or supported through further arguments or evidence, often with no clear limit on the extension of these claims. The contributions may be poorly expressed, they may be unclear, repeat existing arguments or be better expressed as sub arguments. Scheuer et al (2010) identified that depending on the topic, number of participants and available discussion time argument maps can become cluttered and hard to read. A natural way of understanding how this issue would be addressed is through the introduction of a filtering process, allowing decisions to be made about arguments and information presented in the map. This could be performed by moderators (as used by Deliberatorium), by the participants themselves or through a decision-making system. Each option generates further issues addressed in the following section.

Interviewees reported that problems of noise and information overload were not experienced with argument maps. This could be due to a number of factors. The

structure of the argument map, while still vulnerable to information overload, sufficiently reduces noise to prevent it in most cases. Participants using these platforms have been sufficiently motivated and skilled in using the maps to navigate these problems, which is a likely factor given the role of selection bias in most applications of the platform (Gurkan et al 2010, Klein et al 2012, Freelon et al 2012, Kriplean 2012). Following Walton et al's (2008) discussion of argument schemes, we might assume there are a limited number of ways of attacking a proposal. Participants using maps focused on single proposals may reach a natural limit in regards to primary arguments. Other techniques were used by maps to further limit noise. Deliberatorium used moderators to ensure clarity, and also featured a chat function for further debate outside the formal map. Truthmapping required users to edit their messages in response to counter-arguments rather than allow the proliferation of messages.

Colin Megill (Pol.is) presents a different way of understanding the problem of information overload and noise, which relates directly to the issue of scale. He argues the problem lies not with temporal organisation, but with connecting information together in the form of direct responses and replies. He argues "as soon as one person is responding to a specific message one loses scale", since that reply can only become fully meaningful in the context of that message and conversation. A person must crunch through all this text to make sense of the individual message. In making this argument Megill is contrasting his platform to the design approach common in time organised forums, however the argument could be extended to argument mapping approaches since these approaches involve direct connections between arguments and counterarguments, potentially producing trails of text. The argument in favour of argument maps is that they offer sufficient structure, as discussed above, to avoid the problem of information overload, and through making these connections they offer a layer of structure and a level of critical accountability to the expression of ideas. In contrast, Pol.is' approach addresses problems of framing, scaling and information overload more neatly, but arguably this comes at a cost of directly providing that layer of critical engagement and accountability. Applications of Pol.is have managed this by introducing critical engagement and decision making

at other stages, using Pol.is to support this process. Parmenides could be understood as illustrating a potential approach to introducing structure to a system like Pol.is without the use of argument maps; there are similarities in the interface of the systems, as both Pol.is and Parmenides present users with statements. Pol.is uses statements that are random and contributed by participants, Parmenides uses statements that are structured and authored by the developers. If Pol.is was able to categorise statements like Parmenides, it could enable the responses of participants to be placed within an argument scheme.

Filtering Debate and Making Decisions

This section discusses approaches to performing evaluative work; for example, verifying information, filtering or editing arguments, identifying good, bad or redundant arguments or allowing decisions to be made. Travis Kriplean (ConsiderIt) described the process of filtering as the grand challenge:

> It's hard to structure dialogue over time, to know where the group is and move from one phase to another, while still summarising the debate. Suppose someone adds a con point, and the author thinks "that's a great point I need to revise what I wrote". People have already responded to the original and their response may no longer apply necessarily, so how do you create a virtuous circle? How do you create a collaborative rather than proliferating conversation… such that instead of piling on messages you have improved edited messages that require less attention? I'd say that's the grand challenge, not just in online deliberation but more generally.

This would appear to be an unresolved challenge. Platforms and tools seek to provide a filtering mechanism through changing the visibility of arguments. Rbutr allows rebuttals of articles to be rated and ranked, determining how near to the top they appeared on the list of rebuttals. ConsiderIt uses a similar method in its pro/con list (Freelon et al 2012). Truthmapping requires users to edit their arguments in response to counter argument, the older versions of the argument are still accessible, however

the most refined version is the one that is immediately visible in the map. In this sense, they remain individually authored rather than collaboratively created.

Many of the interviewees described how they explicitly avoided such evaluative work. Shane Greenup (Rbutr) argued that the purpose of his platform is to support critical thinking and present alternative viewpoints to enable individuals to make a judgement rather than to determine what the best arguments are per se. Jack Paulus (Truthmapping) explained "(the) goal of Truthmapping is to present best arguments and ideas, it is up to participants to decide whether they are convincing or not." Colin Megill (Pol.is) said that they are not "trying to get people into a productive fight about facts and help them validate facts… rather try to help people listen to one another and understand how they value information relative to one another's ideas". In that sense, he described how he favoured adding a further qualitative layer to enable users to indicate how they valued information, without seeking to verify that information.

One potential reason for the reluctance to support more evaluative or critical work is that it presents much greater challenges in ensuring that the process is done in a way that is secure, transparent and accountable, with the potential that participants disengage if they do not see sufficient evidence that the critical work is being managed fairly. Colin Megill (Pol.is) discussed this issue in the context of the role of machine learning; he argues that the critical work needs to be performed by the participants themselves, the platform can tell you how people voted, the percentage of support for different positions, but it cannot presume to tell people how much consensus is sufficient consensus. The moment developers design systems that assume critical work, participants will question it and lose trust in the process. Atkinson (2006) discusses rational disagreement and the sense in which fiercely contested issues may not be resolved with participants having to agree to disagree. She notes Searle's argument that rational agents are likely to have different and inconsistent values, each of which may be rationally acceptable. Atkinson applied Paremenides to the real-life debate on the Iraq War, noting that actions taken depended on an agent's preference orderings of values. These issues highlight the

sense in which debate is typically characterised by the presence of multiple claims with various evaluative criteria (for example, deductive, defeasible, and probabilistic claims), involving participants with different preference orderings (value pluralism), and debate is initiated under different contexts with different goals (for example different time-scales for reaching decisions, different expectations regarding consensus). Given these conditions it is possible that an "off-the-shelf" system for conflict resolution may be unrealistic, undesirable, and unlikely to succeed in application.

In many applications of the platforms the evaluative work takes place outside of the platform on a case by case basis. Notable examples include the application of Pol.is in vTaiwan (Berman 2017, Barry 2016, Tang 2016). vTaiwan uses a four phase online-offline process that incorporates a number of different tools (Barry 2016). Berman (2017) describes how Pol.is has been used in a binding way in vTaiwan, with the government agreeing to implement consensus points surfaced by Pol.is or give a point by point explanation of why it is not feasible. As of February 2018, 26 cases have been discussed, 80% of which have led to decisive action from the government (vTaiwan 2018). In the vTaiwan process Pol.is is used in the first phase, distributed through Facebook ads and stakeholder networks, as a way of surveying large groups of people and surfacing consensus (Barry 2016). Kriplean et al (2014) describe an application of ConsiderIt in which librarians were employed to verify claims made on the platform at the request of users. The report explored the experiences of users and librarians, generally finding positive experiences even amongst those who had claims challenges. The study concluded that crowd sourcing systems can benefit from re-introducing professionals and institutions that have been traditionally omitted. It recommended that since some librarians felt they were overstepping their professional practice, this issue could be mitigated by categorising the process as evaluating the consistency with reputable sources, rather than evaluating facts. Climate CoLab involves contests in which the evaluative work is performed by contest judges, who are recognised as international experts in the field of climate change (Climate CoLab 2017). The Deliberatorium was used in the deliberative process

concerning electoral reform, in the application it was used alongside the "Doparie" (an inter-party deliberative referendum mechanism) (Klein et al 2012).

Feasibility and Scale

The challenge of feasibility and scale concerns the sustainability of an online deliberation platform; including how platforms are resourced and the demands and expectations that are placed on staff, moderators and participants. In addition to this we may consider broader considerations of feasibility; such as the extent to which large scale deliberation is realistic or desirable, and what kinds of communication and coordination can be achieved at scale. The interviews with the developers of online deliberation platforms highlighted other more specific issues in relation to the question of scale; the use of machine learning and artificial intelligence, as well as the limits of citizens' attention are issues that both require us to consider how to maintain transparency, accountability and democratic legitimacy when seeking to use technology to support large scale deliberation and engagement. This section will consider how the design of platforms can help address these challenges and what the experiences of the platforms and tools may tell us about realising feasibility and scale.

Resourcing and Sustaining Online Deliberation

The issue of resourcing and sustaining a platform was often highlighted by interviewees as a key issue and challenge. This challenge relates to the broader debate concerning monetisation online, including the use of personal information and the protection of privacy (Tene and Polonetsky 2013, Koopman 2008); the use of sponsorship and advertisements, which may compromise the trust participants have in the neutrality of the site; and the expectation that services may be used for free (Tene and Polonetsky 2013, Anderson 2009). These issues are particularly pertinent to platforms that intend to provide spaces for political deliberation and decision making, in which the neutrality of that space and the need to ensure accountability and transparency are vital to the purposes and success of the platform.

Shane Greenup (Rbutr) claimed “our biggest limitation is we don’t have money or paths of monetising (Rbutr)”. Both Greenup and Jack Paulus (Truthmapping) described how they were not able to work full time on their projects and this had affected their capacity to make intended developments on the platform. Resourcing has also been described as limiting research and evaluations performed on the platforms (eLab 2017a). Eric Gordon (@Stake) described his experiences and perception of the issue of funding in general. He argued that finding sustainable funding and business models was a major issue, there had previously been more funding, but he observed a shift in the landscape; a push towards scalability and a move away from funding the building of tools towards developing-out existing tools or funding a suite of tools that connect in some way. He also observed that the funding world had moved more towards metrics. In this respect, the field suffered from a mixed bag of evaluative designs, practitioners he argued (including himself) had perhaps focused too heavily on developing a tool or process, without developing evaluative designs that could push research along and provide a basis for funding decisions.

The experiences of the platforms suggest resourcing is a major issue, and highlights the need to reflect on questions about the political economy of the web and resourcing of public spaces (For example, see Fuchs 2017, Fuchs 2014). There is limited scope for design to address these fundamental challenges in resourcing. Nevertheless, the experiences of the platforms provide insight into the ways such services have been marketed and monetised. Atkinson (Parmenides) describes how current demand for the platform has been within private organisations and the field of law. Rationale and BCisive use the same code but are promoted for different purposes: educational (Rationale) and supporting legal reasoning and decision making in organisations (BCisive). The education-orientated Rationale has been more successful and the focus has shifted to the promotion of this platform to support students in essay writing and critical thinking. Timo ter Berg (Rationale) suggested that argument mapping approaches generally slowed down the process of decision making limiting the contexts in which it is used. The thought is that in an educational

setting a power relation exists between teacher and student which can enable the teacher to require students go through the argument mapping process in a way that might be considered too slow or dismissed in private organisations where different power dynamics and priorities operate. Debategraph (Crossely-Frolick 2017), Deliberatorium (Gurkan et al 2011), ConsiderIt, @Stake and Truthmapping have also been applied or promoted in an educational setting, though their primary application remains supporting public debate.

Platforms have been used to support public deliberation in different ways, suggesting different strengths of different design approaches and platforms. The more complex argument mapping approach of Debategraph, which allows nuanced connections between different ideas and supports rich additional information such as graphs, videos and other media, has been described as most appropriate as a tool for organising research; collecting and organising thematic connections between existing research and providing a clear visual representation and interface to navigate current knowledge on a topic (Capehorn in Bullen and Price (2015)). In contrast, Pol.is has been used as a way to surface consensus amongst large groups of people; this can be used by different groups in different ways, for example such a tool can be used by governments or it can be used by self-organised groups, for example protest movements such as Occupy. Pol.is have experienced success with their strategy, notably in the application in vTaiwan, which has led to 26 cases discussed, with 80% of cases leading to binding decision (vTaiwan 2017). Colin Megill (Pol.is) described the platform in terms of a brand that appealed to government and protest groups, allowing governments to survey and, importantly, represent opinions and potentially conduct policy analysis, and allowing movements to make sense of the sentiments amongst the group and use this to make decisions based on consensus. eLab (2017a) describes @Stake functioning as an ice breaker, that allows for the generation of ideas in a safe environment. An intended aim of Parmenides is to provide an alternative approach to consulting and surveying the public, which allows more nuanced information and reflection. The last two systems require more substantial preparation beforehand relative to other platforms, for example the card game details and arguments need to be prepared in a way that is less flexible than

other systems. These examples illustrate the various ways in which the platforms may be applied and resourced, and the sense in which these applications may differ from the intended aims of the developers.

Large Scale Deliberation and the Demands of the Platform

The promise of online deliberation has been often understood as a promise for large scale deliberation. Some interviewees expressed concerns with how realistic and desirable large scale deliberation is in practice. Eric Gordon (@stake) described how he was cautious about the promise of large scale, efficient deliberation and the possibility of technology being used to create a smooth process of decision making. He warned against the idea of solutionism, criticising the desire for a silver bullet technology that will scale and solve everybody's problems and deliver a smooth, cheap, quick solution to political problems.

> I don't believe democracy is ever smooth and efficient, and one of the defining features of democracy is its meaningful inefficiency. It needs to operate at a level of inefficiency for it to be effective, so I'm hesitant to think about scale with that in mind. The thought of making the Facebook for community planning is scary stuff (Eric Gordon)

Eric Gordon argued instead for technology to focus on supporting organisation of more local initiatives. Travis Kriplean (ConsiderIt) describes how he felt he needed to keep in check his own thoughts on the issue of scale, and argued there were limitations, claiming we have limited attention and there will always be a need to coordinate our efforts, such that there will always be small teams and individuals focusing their efforts in particular areas. David Price (Debategraph) also raised the issue of attention and expertise as a limit on scale, a challenge that will be discussed in the following section.

In contrast to these concerns many interviewees took a more positive view of large scale deliberation. David Price (Debategraph) felt that there are increased expectations and demands on policy makers to navigate increasingly complex and

interrelated issues, of which no one could be expected to be an expert. In light of this he suggested ICT and artificial intelligence has a greater, perhaps even necessary role, to support policy makers in making sense of such issues and organising information. Developers also felt they had addressed many of the technical demands associated with large scale deliberation. As discussed earlier, experiences with noise or negative behaviour from participants has been limited, presenting little demand on moderators or staff. Shane Greenup (Rbutr) and Jack Paulus (Truthmapping) described their platform as self-sustaining, having low running costs and making few demands on staff, with Jack Paulus claiming no moderation was required. Mark Klein (Deliberatorium) found few demands on moderators, and discussed the potential use of crowd moderation, estimating from experience that 1% of the crowd needs to be moderators. Colin Megill (Pol.is) discussed the potential of crowd moderation, specifically in the context of the existence of different groups. He criticised current approaches for involving the policing of groups rather than allowing groups to police themselves. He argued that if systems were able to allow groups to create their own significance but represent these groups in the same space this would allow the opportunity for groups to humanise each other, while still fairly representing difference. On the broader subject of scale, Colin Megill described Pol.is system's removal of replies as crucial to achieving scale. Replies, he argued, create communication that is necessarily small scale; "Pol.is works as well with 60 000 people as it does with 20 people, in the sense that the process and amount of work required of participants is the same".

The challenge of scaling up has been interpreted as the need to develop methods of visual representation capable of coherently conveying the sentiments of large groups of people. In practice, this is achieved by reducing the tasks involved in deliberation (notably decision making), and abstracting arguments from further elements of deliberation, notably excluding elements that connect arguments to the context of utterances of individuals.

A significant element to the challenge of scaling up deliberation is providing means of making decisions and performing evaluative or critical work on existing discussion.

Travis Kriplean describes this as the grand challenge of “creating a collaborative rather than proliferating conversation... not just in online deliberation but more generally”. Online deliberation platforms often purposefully avoid this aspect of deliberation, in most cases deferring it to offline spaces specific to a given application.

Furthermore platforms and tools achieve scale by focusing on a particular understanding of deliberation and limiting the communication possible on the platform. Argument mapping approaches focus on the exchange of arguments, limiting interaction between individual authors. Parmenides and Pol.is effectively remove the capacity for participants to reply and directly interact. These choices attempt to make sense of information produced by large groups of people by isolating information considered relevant to deliberation and decision making and restricting other forms of communication. Korzybski’s (1994:58) phrase “the map is not the territory” feels pertinent to this discussion, as it is helpful to consider how the restricted, argument centric communication supported by these platforms relates to our broader understanding and practice of deliberation.

A point raised by Traivs Kriplean (ConsiderIt) highlights the issue. He discussed research findings that people are more likely to change their opinions through exposure and meaningful relationships with others rather than through abstract reasoning. He described technology that connects individuals with different perspectives to support better understanding and empathy across differences, and suggested that fostering these kind of interactions may be an alternative approach. The approach that Travis describes may not constitute deliberation itself, but it nevertheless serves to illustrate the sense in which large-scale, argument focused platforms are moving away from particular kinds of interaction that may have a more significant role in deliberation than is necessarily acknowledged.

In the theoretical literature deliberation is often discussed in terms of abstract argumentation (Dryzek 2010). This is most apparent in discussions of universal pragmatics, argument schemes and dialogue types. In this respect practice of

argument mapping mirrors trends found in theory. Nevertheless, it is possible to identify ideas discussed in theory that assume direct communication between individuals. Discussions of reason giving and accountability (Gutmann and Thompson 1996, Chambers 2003), the role of story-telling (Dryzek 2002), respectfulness and empathy are conceptualised on the understanding that participants are experiencing direct interactions with others, and listening to expressions of situated knowledge and experiences. In collective intelligence and informal logic theoretical discussions also highlight the significance of interaction between individuals. For example, collective intelligence literature highlights emotional intelligence as a key condition for collective intelligence, the manifestation of this behaviour being understood in terms that assume face to face communication; such as the capacity to recognise emotions through non-verbal cues.

It should be noted that a clear consensus on the definition of deliberation does not exist (Coleman and Moss 2012), and current conceptualisations have been critiqued as incomplete, leaving a number of questions of definition unanswered (Curato 2012). This argument is less concerned with establishing whether online deliberation platforms constitute a true conception of deliberation, but rather to recognise that current design approaches achieve scale at the cost of excluding practices and experiences previously assumed to be present in deliberation. To clarify, the experience of participants relating to and empathising with other individuals, and encountering arguments, preferences and needs as expressed by individuals, rather than arguments in a more abstract sense. It is not clear how these features of deliberation could be recreated at scale, and it may be that this conception of deliberation is necessarily small scale. In qualification of this point, it could be argued that the platforms support a form of knowledge coordination that achieves similar positive outcomes to small scale deliberation (increased efficacy, understanding), or indeed achieves things that cannot be achieved at a small scale (surfacing consensus and coordinative actions of large groups). Furthermore, deliberation as direct interaction is vulnerable to many problems that can inhibit a deliberative process which these platforms have avoided (as discussed in the section on behaviour and citizen capacity). In this sense, Korzybski's (1994:58) complete phrase is helpful, "a

map is not the territory it represents, but, if correct, it has a similar structure to the territory which accounts for its usefulness".

Institutions, Attention and Artificial Intelligence

Interviews with the developers highlighted three specific issues relating to how we maintain transparency, accountability and democratic legitimacy when seeking to use technology to implement large scale deliberation and engagement. These issues relate to the willingness and capacity of institutions involved in large scale deliberation, the use of machine learning and artificial intelligence, and the limits of citizens' attention.

A number of developers raised issues with institutions and the structural context in which large scale deliberation platforms operate. Eric Gordon (@Stake) described:

> The lack of capacity of organisations to effectively feedback information to people and act on it… governments are surprisingly ineffective in taking information and meaningfully responding to it… every system I've been a part of runs into these problems, you can create a system that clearly surfaces ideas, but you're still working with an organisation that is incapable for various reasons of responding meaningfully, which does more harm than good… if cities are bad at listening to 10 people why should we expect them to be better at listening to 10 000 voices?

Travis Kriplean (ConsiderIt) identified a similar "feedback loop problem". He argued that there is a major challenge in an organisation's capacity to reflect and synthesise information, to provide feedback to citizens that meet their expectations and makes participants feel that they have been listened to. This issue can be understood as a concern with organisations' capacity to listen and use the technology effectively, which in turn influences public trust and willingness to engage with government.

Interviewees also highlighted specific issues generated by complex technology (such as machine learning) and the democratic norms of institutions implementing large scale deliberation. Paolo Spada (involved in testing Deliberatorium) describes the challenge of co-optation and transparency:

> Computer science is 99% silent about it…(for example) what if the government is implementing a technology because it wants to influence it?… when you scale things up the problem of checks and balances emerges… the more complexity you introduce, whether through machine learning, opaque algorithms or complex voting systems, the less capacity citizens have to keep the platform in check and the less empowering it is.

David Price (Debategraph) and Colin Megill (Pol.is) identify machine learning as a promising future direction of the field that presents both opportunities and challenges in terms of democratic accountability and transparency. Artificial intelligence has received some, albeit limited, attention in existing literature on online deliberation, for example Stromer-Galley et al (2009) discuss its potential use in moderation to minimise the demands placed on staff running online deliberation platforms. The platforms covered in this study integrate the use of artificial intelligence as an agent in dialogue, for example learning arguments and generating arguments for other participants to respond to (for example, Ova/Arvina). The developer of Parmenides discussed natural language processing and attempts to gather information on sentiments expressed in relation to an argument. For example, while it is possible to search social networks such as Twitter for key words to determine the popularity of a topic, there have been more recent efforts to analyse those comments to determine people's sentiments about the topic. The developer of Parmenides and Rbutr noted that this was an emerging issue and area, with existing applications being fairly modest in ambition. Colin Megill, whose system Pol.is uses machine learning, discussed this issue and the implications for democracy in more detail.

Megill makes a distinction between the human side (the control humans have over technology) and the technology side (the control computers have and black box technology).

On the human side, he notes that "new technologies exist within existing political power structures, giving new information to old power structures still encounters the problem of power structures…. Giving all opinions to an autocratic regime is not participation and we (developers/public) have to make sure the government have norms around what is done with the information and how it is used…" Reflecting on the technology side, he talked more broadly about the use of artificial intelligence in public life, including how technology can be used to track students' reading and direct teaching. He describes how people naturally want to understand why they are doing things. Referencing Shyam Sankar's (Sankar 2012) discussion on human computer cooperation, he discussed the need to allow humans to do what they are good at (critical work) while allowing machines to do what they are good at (calculating and making sense of large amounts of data). Colin Megill describes the limits on machine work and the work of the Pol.is platform, stating:

> The machines cannot become involved in determining what is good, what is enough consensus, because you are then excluding humans from the critical work. If we do that, then humans will want to know what the percentage was, they will want to go one level down and will be upset about that. In Pol.is we give percentages and pie charts, but we are agnostic about how they are used.
>
> Colin Megill 2016

Large scale deliberation encounters challenges pertaining to the institutional settings and technologies involved. Developers also discussed the arguably more fundamental challenge of absolute limits on the attention of citizens, and how this can be managed in a democratic system. As already mentioned, Travis Kriplean (ConsiderIt) argued that ambitions concerning large scale deliberation needed to be kept in check, as there will always be a need for some specialisation or distribution

of labour. David Price (Debategraph) referenced Beth Noveck in arguing that expertise is distributed throughout society, and we "could not expect all participants to participate in all debates with the same intensity". Price highlights a number of issues at play: For example, the degree to which a person is genuinely motivated to be thinking about topics in contrast to a passing curiosity. "Most of us, most of the time", he argues, "do not want to be confronted with the complexity of issues and do not have the time to go into depth". A further aspect to the challenge is capacity. He suggests the scale and complexity of challenges in public policy exceed the capability of any one person to grasp and presents further challenges for democracy.

Deliberative democratic theory can be understood as emerging in part as a response to perceived problems with elitist conceptions of democracy and technocratic understandings of political problems (Dryzek 2010). The emphasis of the theory is on increasing participation, scrutiny over decisions and inclusion.

> As political decisions are characteristically imposed on all, it seems reasonable to seek, as an essential condition for legitimacy, the deliberation of all… or the right of all to participate (Manin 1987:352)

> What makes deliberative democracy democratic is an expansive definition of who is included… (and) an inclusive answer to the question of who has the right (and effective opportunity) to deliberate. (Gutmann and Thompson 2004:9)

As such there is an understandable sensitivity towards placing (or accepting) limits on participation. The thought is that selective or distributed participation may be the result of unequal power relations, or may produce unequal power relations which undermine democratic legitimacy. We might refer to this as socially constructed limits on attention and participation. In practice, we also encounter absolute limits on individual attention that produce inequalities in participation. It is not clear how we design deliberative processes that manage these limitations in a way that allows sufficient scrutiny of decisions, or indeed how we evaluate practice to distinguish between inevitable unequal participation and problematic inequalities. The

literature on collective intelligence is more positive in its engagement with the issue of attention. Wegner (1987) discusses group memory and the division of labour, while Ocasio (2011) discusses the principles of attention in groups. These discussions are primarily applied within the context of private organisations, and qualities discussed such as credibility, trust and coordination present very different challenges in the context of public debate. It is likely that the challenge presented by limits on attention and expertise, and the division of tasks, is not something that can be easily answered convincingly at an abstract level. The question is perhaps rather how in practice we can manage this issue or reduce the scale of the problem.

The way platforms encounter and manage problems with attention would depend on specific choices concerning the application of the platform, recruitment methods and the nature of the discussion. Colin Megill (Pol.is) discussed positively selecting particular groups with expertise in particular areas, for example recruiting teachers to discuss education policy. Such an approach would have to account for the selection criteria (for example why other relevant groups were not targeted, such as parents, students, teaching assistants, researchers in the field), but this approach avoids passive unequal participation, and in explicitly recruiting participants it is more transparent. An alternative approach discussed in collective intelligence literature is the notion of proxy democracy, in which participants entrust their vote to someone they trust to be an expert in a given area (Malone and Klein 2007). Such a proposal may seem incredibly vulnerable to abuse and failures in accountability. It could be argued that the proposal is simply making a process that operates de facto in the public sphere more explicit and transparent. In this sense there is greater awareness, traceability and control of the process for participants. Debategraph has been described as useful for mapping out different ideas, information and resources in relation to policy (Capehorn in Bullen and Price (2015); in this sense, it attempts to make learning about a topic based on the efforts of others more efficient and thus improve transparency.

The challenges outlined concerning institutions, artificial intelligence and attention may be better understood as issues for the future development of this field. The scale

of these issues and how they may be managed in practice are not fully evident. In contrast to other areas of online communication such as social networking sites or news sources, applications of online deliberation platforms have been relatively small scale and experimental, there is limited scope or incentive for governments or powerful interest groups to seek to manipulate the process. Similarly, challenges concerning attention will be more apparent if applications become more prominent, and immediate challenges of participant engagement and resourcing are addressed. Many developers recognised that the use of machine learning and artificial intelligence was at an early stage of development, for example Shane Greenup (Rbutr) characterised it as limited. Developers involved in the use of such technology were sensitive to issues of accountability and transparency, and sought to avoid its use in critical work.

Conclusion

This chapter has considered the findings from the exploration of exemplary case studies of online deliberation platforms. Participant engagement is arguably the most immediate challenge for experimental online deliberation platforms. Fundamental structural challenges concerning citizen engagement place limits on what individual platforms or design choices may achieve in engaging participants. The discussion highlights the need to consider strategies in applying platforms and recruiting participants. It identifies a number of design issues that can influence the success of the platform. An important factor is reducing barriers to entry, by minimising the effort required to learn and use the platform. Pol.is and Parmenides are notable for their design which makes a minimal activity (voting) the primary action and also makes it necessary to progress. This decision reduced barriers to entry and also engaged potential lurkers, making more efficient use of participation. ConsiderIt, Pol.is and @stake have made use of gamification to sustain engagement and reduce barriers to entry. The aesthetics of sites such as Pol.is, ConsiderIt and Debategraph resemble those of contemporary commercial sites, such as social networks. As a broader observation, the platforms typically operate in a context of very limited resources, and the expertise and priorities of developers tends to focus

on the functionality of the platforms in contrast to the issues of aesthetics and strategies of recruitment. Consequently, these elements of the problem of participant engagement are neglected.

The experiences of the interviewees suggested that specific issues relating to participant behaviour and information management experienced in lightly structured forums were not experienced on specially designed platforms. This included trolling, disrespectful behaviour, noise, and information overload. Although design features can be seen as addressing these challenges it is important to acknowledge limitations of the evidence base; the participants on the platforms reviewed can be expected to display greater willingness and capacity to engage in critical reflection and deliberation due to self-selection and recruitment methods in applications (Klein et al 2012, Freelon et al 2012, Gurkan et al 2010). Therefore, the participants were less likely to test the capacity of the platform to manage negative behaviour, or expose challenges in the user interface. In this sense, the influence of design choices can be understood not only in terms of the direct impact they have on behaviour, but also the influence they have indirectly in determining who participates and how they view their participation.

Political culture outside of the platform will play a significant role in citizen capacity, participants' expectations and influencing their behaviour, attitudes and beliefs. Platforms address the challenge of polarisation through providing clear visual representations of all points of view, typically authored by representatives of this view; this ensures participants are exposed to alternative viewpoints and enable participants to feel listened to. The argument mapping approaches of Truthmapping, Debategraph, Deliberatorium, and ConsiderIt focus discussion on the argument and specific claims, limiting the opportunity and incentive for negative behaviour and trolling. Platforms such as Parmenides and Pol.is limit communication between participants in a more extreme way, by not allowing replies to participants; the developer of Pol.is describes this approach as removing the problem of trolling completely.

The platforms vary in respect to what information is recognised, how it is organised, how it is visually represented and how participants can interact with it. Design choices seek to manage the need for simplicity (to reduce barriers to entry) with the need to avoid reductionism or restricting debate. This issue is illustrated by the decision to focus debate on a single proposal, as is common for most platforms. This has the advantage of focusing debate but encounters the risk of excluding certain perspectives that conceptualise the issue differently. The most common challenge in online deliberation is noise and information overload. A common approach to this issue is argument mapping which presents a shared understanding of debate. This process also limits the capacity for people to communicate emotion or engage in story telling or other forms of communication that fall outside of a given ontology of abstract argument. This approach effectively imposes a narrow conception of argumentation and in doing so may exclude perspectives on a given issue in ways that may disproportionately affect marginalised groups (Young 1996). Due to the dynamic and contested nature of deliberation, an argument map remains vulnerable to problems of noise, nevertheless in practice this approach appears to provide a sufficient level of structure to avoid information overload. The platforms avoid performing critical work such as filtering, verification and decision making, that would overcome problems of noise and allow for collaborative rather than proliferating debate. Developers describe how they explicitly avoid performing critical work, and in applications this often took place outside of the platform (Tang 2016, Kriplean et al 2012).

Current design approaches achieve scale through restricting and structuring communication. The discussion highlights elements of communication particular to direct interaction that are lost through this process, suggesting that some features of our understanding of deliberation may be necessarily small scale. An important element of deliberation, specifically evaluative work and decision making, is also purposefully avoided by most platforms. In this sense, scale is achieved by reducing the tasks expected of deliberation. This highlights an immediate challenge for the feasibility of online deliberation, and further future directions and challenges for the

field. The most immediate issue, alongside participant engagement, encountered by experimental online deliberation platforms is resourcing and sustainability. The platforms and tools have been marketed in various ways and have been applied in educational, policy making, and policy evaluation settings, as better alternatives to comment sections, consultations and surveys and as a way of coordinating collective action and making decisions. They have been aimed at a variety of different types of groups: the general public, private organisations, governments, protest movements, and political parties.

The analysis of the platforms highlights future developments and challenges for the field, in particular the need to reflect on the democratic norms of institutions and the existing power structures that platforms operate in, particularly if the use of ICT in governance and decision making becomes more prominent. Furthermore, while ICT may facilitate greater access to information and opportunities for collective action, individual attention remains scarce. There is a need to think about how any future democratic processes will ensure accountability and transparency in view of natural limits on attention. Artificial intelligence is understood to be a promising approach in helping to make sense of large amounts of information and is observed to have an increasingly significant role in this field. However the development of artificial intelligence also carries risks, with developers noting the need to ensure critical work is not removed from citizens, and as technology becomes more complex the need to ensure transparency and accountability.

Conclusion

Online communication and ICT play an increasing role in politics and the public sphere. Research in the field of online deliberation has highlighted a range of challenges experienced in current forms of online communication and concluded that the open internet is not conducive to deliberation (Davies and Chandler 2011). Advocates of online deliberation have indicated the potential of design to address these challenges, and a range of innovative platforms and tools have been generated seeking to support large scale deliberation (Pingree 2009). These innovative developments have been neglected in the wider research into online deliberation; furthermore in many cases the platforms have emerged from disciplines and perspectives distinct from deliberative theory and political science. This thesis has sought to address this gap in the research. It has provided an analysis of the theoretical perspectives informing developments in online deliberation, notably informal logic and collective intelligence. The thesis has provided an exploratory empirical study that has sought to capture the experiences of the most innovative and successful examples of online deliberation platforms. The thesis has explored the insights these platforms provide into the potential of design to overcome existing challenges and promote meaningful online deliberation.

A review of existing research into online deliberation in the first chapter identified four thematic challenges: participant engagement, participant behaviour and citizen capacity, information representation and management, and feasibility and scale. These challenges formed the framework for the exploration of experimental online deliberation platforms. Experimental online deliberation platforms and tools are heavily influenced by theoretical contributions from the fields of informal logic and collective intelligence. Chapters 2 and 3 explored the relationship between the conceptualisations of decision making found in these theories and deliberative democratic theory, as well as their relative strengths and weaknesses in approaching online deliberation. The chapters considered how these contrasting perspectives may provide insight to advance our understanding of deliberative democracy and the challenges of online deliberation. The empirical component of the study in Chapters

4 and 5 analysed exemplary case studies. These cases represent notable examples of experimental online deliberation platforms which have demonstrated a capacity or potential to address challenges of online deliberation and support democratic processes through novel design choices.

These concluding remarks offer a summary of the findings from the theoretical discussion and empirical analysis. It will first outline how informal logic and collective intelligence may contribute to our understanding of deliberative democracy. We will then turn to a discussion of what the experiences of the platforms suggest about the democratic potential of technology and the role of design in addressing the challenges of online deliberation. This discussion will outline areas where the platforms successfully address issues, trade-offs in design, areas where there is limited engagement or deliberate avoidance of particular issues, and instances where the challenges are beyond the control of individual platforms or design choices. The thesis will end with reflections on the limitations of the study and findings and consider future directions for the field of online deliberation.

Findings on theories of Informal Logic and Collective Intelligence

Informal Logic and deliberative democratic theory share many common areas of interest and, broadly speaking, both aim to foster the force of the better argument in real world decision making. Rooted in political science and critical theory, deliberative theory can be understood as pursuing this issue with a focus on power, and the subtle ways in which power influences and distorts how we interpret, evaluate and conduct deliberative processes. The approach of informal logic offers an alternative perspective and point of focus, exploring in greater depth the possibility of identifying the structure and illative force of natural language arguments. Kock (2007:240) observes that the "two schools have almost no cognizance of each other". Curato (2012:8) argues that theories developed in informal logic may address gaps in deliberative theory, notably addressing unfinished questions such as "What is an argument?", "What are the standards for reasonableness?", "What moves in deliberation distort communication?".

Chapter 2 provides a review and discussion of informal logic and highlights a number of theories that help us address Curato's questions. Concerning "What moves in deliberation distort communication?", the analysis highlighted Walton's (2008) discussion of dialogue types as a potentially useful framework. Breakdowns in communication may be helpfully understood as fallacious shifts in dialogue types, the result of speakers adopting roles or moves in a dialogue that are unhelpful in achieving the intended aims of that dialogue. The argumentation schemes that have been particularly influential on online deliberation, provide a particular way of interpreting and answering the questions "what is an argument?" and "what are the standards of reasonableness?". Argumentation schemes elaborate rules concerning the structure of an argument, and provide critical questions associated with moves in a dialogue that constitute reasonable challenges to an argument or claim. Both informal logic and deliberative democracy are characterised by diversity, contestation and a fundamental anxiety in relation to how one approaches the interpretation and evaluation of arguments. A question emerging from the informal logic literature concerns how we should understand the purpose of the project, specifically what force or authority any method of interpreting and evaluating arguments should seek to achieve in real world decision making. Chapter 2 highlighted the dangers of a monological or foundationalist approach to argument interpretation and evaluation. It argued instead that a pragmatic approach would be more helpful. In this sense, we should ask whether a method or tool was experienced as helpful by participants engaged in argument, or whether it brought about democratic outcomes. In this respect, informal logic introduces conceptual tools, notably argumentation schemes and dialogue types, that provide a useful framework for both researchers and those engaged in argumentation in identifying potential avenues of contestation, and legitimate and illegitimate moves in dialogue.

Chapter 2 reflected on how deliberative democracy may advance understandings of issues in informal logic. It was identified that informal logic theories often isolate arguments from their context, and there is less attention paid to the role of power relations between speakers and the influence of such factors on the process and

outcomes of argumentation. Informal logic may benefit from the approaches of critical theory and deliberative theory in developing explanations of fallacies, errors in judgement and failures in argumentation processes. For example, accounts of power inequalities between speakers may provide a helpful explanation for why certain heuristics develop and cognitive cues operate in the way that they do, or why certain shifts in dialogue types and moves in dialogue happen or fail to happen.

Chapter 3 reviewed and analysed collective intelligence and related fields in computer science and information sciences that seek to understand and support collaborative behaviour and decision making. While this field is broader in scope than deliberative theory, it highlights ways in which the concept of deliberation is under-defined and ambiguous. Collective intelligence provides a range of taxonomies for categorising group behaviour, identifying relevant variables in group performance and contexts of collective action. Chapter 3 discussed how approaches such as Mcgrath's (1984) categories of group tasks and Galbraith's (2007) star system model, allow us to elaborate on the range of practical and epistemological tasks involved in a given deliberative process. These categories allow us to identify elements of decision making in a more systematic way, providing for a more nuanced exploration of variables impacting democratic quality and the efficiency of the process. Furthermore, the literature provides and connects these elements to tools and techniques for supporting decision making and overcoming barriers that distort collective action. This includes techniques for overcoming systematic bias, group think and cognitive bias as well as voting mechanism and methods for supporting decision making, crowd sourcing and cooperative work.

A limitation is that many of the situations in which issues of collective intelligence have been studied vary significantly from the context of the public sphere and democratic deliberative processes. In many cases researchers focus on collective behaviour in the context of private organisations, hierarchically structured systems or smaller groups, often in cases where there is an easily recognisable correct solution to a problem. In such cases, we may expect greater levels of homogeneity, shared interests and values, and more limited demands in ensuring transparency and

accountability. For example, as will be discussed later, the issue of limitations on individual attention is an important issue in the collective intelligence literature and is deeply relevant to the challenges of deliberative democracy and large scale online deliberation. While the collective intelligence literature provides a way of thinking about these issues, research is based on examples in organisations that differ significantly from the context of deliberative decision making.

Findings from the Empirical Study of Online Deliberation Platforms

The empirical analysis considered how effectively the design choices of platforms address the thematic challenges discussed in the theoretical chapters. The platforms were successful in addressing some of the issues, particularly relating to challenges of participant behaviour, information overload and noise. In other areas, the platforms were partially successful or solutions to the issues involved trade-offs, notably in relation to challenges of participant behaviour, engagement and scale. In other areas, it was possible to identify issues that the platforms either deliberately chose not to address (decision making), or, for various reasons, there was limited engagement (gamification and the aesthetics of design). In further areas, the issues could be said to be beyond the control of individual platforms and design choices, particularly challenges concerning participant engagement, elements of participant behaviour and capacity, and the issue of resourcing and sustaining platforms. Finally, the empirical study identified a set of emerging issues, that had not necessarily impacted online deliberation at this stage but could be anticipated as potentially significant. These relate to navigating issues of public attention and the application of artificial intelligence and machine learning.

The platforms were particularly effective at addressing issues involving the challenges of participant behaviour and citizen capacity and information representation and management. Issues typically experienced in online communication connected with these challenges, such as trolling, disrespectful behaviour, failure to engage with opponents' viewpoints, noise and information overload were not experienced on these platforms. This could be attributed in part

to a selection bias resulting from the intentionality of the platforms, self-selection amongst participants and/or the context of application and recruitment. The participants engaged in these platforms could be expected to exhibit more positive behaviour and respectful engagement with opponents, and present less challenges regarding the management of behaviour and organisation of information on the platforms. Nevertheless, the platforms use design and structure in novel ways to eliminate or greatly reduce the potential of these challenges to effect debate.

The issues of trolling, noise and information overload were addressed through design choices that controlled and restricted the features of communication available to participants and how they were able to interact with each other. In many cases the design presented users with a representation of debate that isolated abstract arguments and claims from other elements. Participation typically involved responding directly to claims and ideas, with limited or no opportunity to reply directly to individuals. The representations ensured that all positions expressed remained visible. A common example of this approach can be found in the argument map. The argument map does not eliminate the possibility of noise, however it was found to provide a layer of structure that minimised incentives for repetition, disrespectful behaviour and tolling. The argument map ensures all viewpoints are visible and hides peripheral discussions, therefore ensuring participants are exposed to alternative viewpoints and reducing the problem of noise. Since participants are able to see their opinion represented, they are more likely to feel their voices are being heard in debate, and this further reduces the incentive for repetition or disrespectful behaviour. The design of argument maps focus on argument claims abstracted from the notion of individual authorship. It is argued this encourages focused discussion and reduces the incentive and opportunity for disrespectful behaviour and trolling.

The platforms Pol.is and Parmenides are notable for effectively eliminating these challenges. Their designs differ from the argument mapping approach, Pol.is providing a representation of the groups sentiments, while Parmenides provides a representation of an individual's position on an argument. Significantly both

platforms remove the capacity for participants to directly reply to one another, thus ensuring participants are not able to troll or be disrespectful. Furthermore, Parmenides organises interaction around a dialogue based on argumentation schemes and a limited number of critical questions. This system places a definite limit on the amount of information readers are presented in debate and how they can contribute.

As will be discussed later, the capacity for platforms and design choices to address issues relating to participant engagement is limited. Developers sought to ensure the platforms are easy to learn and use by minimising barriers to entry. This involves minimising the effort required of users to learn and use the system. Parmenides and Pol.is are again notable in this respect for using designs that place minimal demands on users, but are also able to draw rich information from that input and improve the efficiency of the system. The primary action of participants using these systems is voting. Therefore, they were able to efficiently gather information from participants who may otherwise have been lurkers and less likely to contribute the same information through more demanding processes (such as writing). The systems are able to process this simple input in such a way as to provide comparatively complex and rich knowledge about group support (Pol.is) or a detailed breakdown of individual support (Parmenides) regarding an argument or debate.

The issue of achieving large scale deliberation is the basis for much of the enthusiasm for online deliberation. The platforms reviewed in this study have demonstrated that while it is possible to support large scale communication and coordination of knowledge, it is less clear that this should be described as deliberation, or indeed whether large scale deliberation is realistic or desirable. The current design approaches of platforms allow large groups of people to contribute ideas and arguments and organise those contributions to make sense of group sentiments and placing those arguments in relation to a structure. This often entails controlling and limiting communication between participants and isolating specific information, such as argument claims, at the expense of others elements of communication. It has been argued that some characteristics we typically associate with deliberation can be

attributed to the specific nature of face to face communication between participants, and would appear to be necessarily small scale. The capacity to communicate emotion or engage in story-telling is particularly constrained by the approach these platforms adopted to achieving scale. In response one may nevertheless argue that the platforms demonstrate how ICT and online communication may be applied to perform valuable work in supporting the public sphere and decision making, as well as achieving democratic goods associated with deliberation such as increased inclusivity, empathy, shared understanding and citizen capacity and efficacy. While developers recognised the democratic potential of these platforms, they also identified important qualifications and considerations relating to large scale deliberation. David Price (Detbategraph) and Travis Kriplean (ConsiderIt) noted that natural limits on individual attention necessitate divisions of labour and coordination between groups specialising in areas of decision making. Eric Gordon (@Stake) discussed how democratic processes necessarily involve inefficiencies, suggesting that the promise of a smooth large scale deliberation may be misplaced, and that such processes will either encounter such inefficiencies or avoid them at the expense of democratic legitimacy.

Certain issues identified as challenges of online deliberation were either deliberately avoided or were not explored in great detail by the platforms. The developers of the platforms explicitly avoided performing critical work, such as evaluating arguments, the verification of facts or decision making on the platform. Performing critical work would place greater demands on the system, the decision-making process would be required to be transparent, accountable and applied appropriately in different decision making contexts. Developers discussed the importance of ensuring platforms were as simple as possible and it is not clear how such tasks could be achieved while satisfying the need for simplicity and democratic legitimacy. Travis Kriplean (ConsiderIt) discussed this issue in terms of the notion of a collaborative rather than proliferating dialogue. He suggests that this is a central and as yet unresolved challenge for online deliberation. In this sense, scale is achieved through reducing the tasks and richness of deliberation performed within the platform. Significantly this involves the exclusion of decision making, emotion and story-telling.

There was less opportunity to explore the issues related to the aesthetics of the platforms and the potential of gamification. A major issue for many platforms is limited resources, with some platforms at an early stage of development. In this context the expertise and priorities of those involved tend to relate to technical elements of design in contrast to aesthetics. This issue can be understood as an element of a broader challenge around sustainability and resourcing. The lack of expertise and capacity to address issues of strategies of recruitment and aesthetics feed into this challenge. Few of the platforms utilised gamification techniques to a significant degree. Pol.is and ConsiderIt were discussed in terms of gamification, however this extended principally to the opportunities provided for the users to interact with the data and the attention paid to the aesthetics and experience of the platform. @Stake was the only platform to explicitly utilise a game dynamic, and arguably the nature of @Stake's approach illustrates why this process has not been developed in other platforms. @Stake illustrated an approach to gamification that required an organising group to prepare a given topic for the format of the game, as such the game could not be easily transferred from one topic of debate to another. In contrast, online deliberation platforms will typically seek to minimise structure to enable a flexible system that may be applied across topics and avoid the risk of imposing assumptions or frameworks on debate.

A number of issues were identified as beyond the control of individual platforms and design choices, specifically citizen engagement, aspects of participant behaviour and capacity, and the resourcing of platforms. The analysis highlighted the sense in which the platforms and participants operate within existing power structures and political culture. Fundamental challenges related to citizen engagement will impact levels of participation in platforms supporting political discussion and engagement. Socio-economic differences and political culture influence who participates and how they participate, shaping citizen capacity and expectations about others and the nature of political debate. A common view amongst developers is that they were offering a service which appealed to a niche audience, that few people were willing or capable of engaging in the kind of political debate or deliberation they were advocating.

Platforms may support political deliberation, they may use design choices that ensure participants are exposed to alternative views and support participants in thinking about argument structure, however they also encounter structural and cultural challenges attributable to social and economic forces that influence who participates and how, and design is arguably more limited in its capacity to influence these factors.

A related issue concerns the sustainability and resourcing of platforms. Spaces for public deliberation evoke concern with the democratic legitimacy of the forum in which discussion takes place. Hence, the interests of those who control and sustain a platform will be relevant to the trust of participants and the democratic legitimacy of the process. This places limitations on channels for resourcing such as advertising, the sharing of data, and the political role of any organisations involved in the running of the platform. Further significant factors impacting this issue concern the willingness and capacity of governments and political agents to support and invest in democratic spaces, and citizens to engage in those spaces.

Interviewees suggested participant engagement and resourcing were two of the key challenges facing current experimental online deliberation platforms. These experiences echo Papacharissi's (2002) comments about the potential of the virtual public sphere, and the problems in seeking to create something online that may never have existed offline. The analysis acknowledged the limitations of individual platforms and design choices in addressing fundamental challenges impacting citizen engagement and resourcing and sustaining platforms. The experiences of the platforms highlight the importance of considering how these technologies are marketed and applied within a democratic system, and strategies for recruitment of participants. The platforms reviewed have demonstrated the capacity of technology to connect individuals, collect and coordinate knowledge and make sense of large amounts of data, to support a richer understanding of the interests and values of large groups of people. Though platforms have been applied successfully to support democratic processes including public discussion, research, the organisation of

political movements, and policy making (Tang 2016, Freelon et al 2012, Klein et al 2012), the uptake of these platforms has been mixed.

Finally, the discussion of the empirical findings considered emerging issues and potential future directions for the field of online deliberation. It was observed that political agents, such as governments, social movements and the public, had not invested a significant amount of formal political power in the use of technology to support democratic processes. Interviewees anticipated that as the role of technology in decision making increased, there would be greater incentives for groups to interfere with the platforms and manipulate or distort the results. In this sense, the interviewees anticipated that the capacity of online deliberation platforms to ensure transparency and democratic legitimacy would be tested more than is currently the case. While ICT and online communication facilitates greater access to information and potential for coordinating knowledge and action, the capacity of an individual's attention remains scarce. Therefore, any application of technology aimed at supporting large scale deliberation would need to manage social constructed and absolute limits on individual attention.

Artificial intelligence, machine learning and natural language processing were identified as emerging and promising areas of development for online deliberation. Interviewees anticipated that such technologies would allow policy makers to managing the increasing complexity and epistemological challenges of policy making and evaluation. It was acknowledged that these developments were in their infancy, yet they were seen as providing novel opportunities for processing and deriving meaning from large amounts of information. It was felt that these technologies presented challenges for democracy though, with the increased complexity of technology and opaqueness of the information presented being potentially disempowering for participants. Colin Megil (Pol.is) discussed the need to ensure technology supported humans in performing critical work, rather than performing that critical work itself. A major consideration is how this distinction can be sustained.

Limitations of the Study

This section focuses on the limitations of the empirical study, and gaps in knowledge in theory and practice. The methodological approach of the empirical study outlined in Chapter 4 identified a number of limitations. The study adopted an exploratory case study approach that limits the generalisability of the findings. It was felt this was appropriate given the lack of existing research in the area, the diversity of design approaches the study aimed to explore, and the challenges in addressing confounding variables. The study does not therefore seek to draw a strong causal relationship between a platform's design choices and specific outcomes and experiences.

The study focuses on what it identifies as exemplary cases of online deliberation platforms. These are cases that are relatively mature and successful, demonstrating evidence of existing research and applications or high levels of participation. These platforms typically provide more information and material to allow for in depth exploration of the challenges of online deliberation. Nevertheless, this focus neglects the experience of less successful platforms and platforms that are no longer active. The study would have potentially benefited from insights into the experiences of less successful platforms, particularly those platforms that used similar design choices or even presented advantages in design over more successful platforms. Research into unsuccessful platforms often encounters a number of challenges: the platforms are often taken down, there is limited material available about these platforms and finding contact details for those involved in the development of these platforms is often difficult. Ryan and Spada (2017) observe a broader failure to examine failures in democratic innovation in the literature, their discussion highlights potential biases encouraging positive interpretations of findings and highlights issues such as a lack of clear criteria to systematically explore success or failure.

This thesis draws on a number of different data sources: direct experience of using the platform, an analysis of existing literature on the platform and interviews with those involved in the development or application of the platform. The study relied heavily on the experience and reporting of developers of the platforms. These

interviews were able to provide unique insights into the motivation of the development of the platform, experiences across the lifespan of the platform, and a better understanding of the issues concerning resourcing and sustaining the platform. Existing literature on the platforms is often produced by individuals who are already involved in the platforms or part of the development team. For example, much of the research on ConsiderIt credits the developer and interviewee in this study Travis Kriplean as an author (Kriplean et al 2012, Freelon et al 2012, Kripelan et al 2011a, Kriplean et al 2014). As Coleman and Moss (2012) note in reference to this field, studies conducted by researchers already involved in the platform are likely to be more positive in their interpretations of results and conclusions than independent researchers. Indeed, this study found that independent research or voices were often more critical (Crossley-Frolick 2017), or presented views about the best use or application of a platform that differed from the aims of developers (Bullen and Price 2015). It is therefore important to recognise that the study was informed by information produced by research often involving developers, and interviews with those developers. The study may have benefited from more diverse perspectives, for example individuals involved in applying the platform but not directly involved in its development and participants contributing or visiting the platform. This may have provided greater insight into the experience and motivations of participants, addressing issues such as motivations for participant engagement, useful information on the experience of the design and aesthetic choices, and learning and usability issues. In many cases information about participants and opportunities for contacting participants is very limited on the platforms, not least because of data protection concerns.

In addition to broad limitations with the study, it is also helpful to note areas of theoretical discussion that had limited applications in practice. Chapters 2 and 3 provided a theoretical discussion of informal logic and collective intelligence. It considered the potential insights these theories provides for ambiguities in deliberative theory and approaches to addressing the challenges of online deliberation. The cases selected provided an opportunity to explore how some of these ideas had been applied in practice and issues that had arisen through this

experience. The case studies provided examples of practical applications of a range of theoretical approaches and techniques, including crowd sourcing (e.g, Rbutr, ConsiderIt, Pol.is), gamification (@Stake), argumentation schemes (Parmenides), IBIS (Deliberatorium). But there are elements of these theories that have had more limited application in practice and may, in some cases, be in tension with current approaches.

The informal logic literature discusses efforts to broaden our understanding of argument and, by extension, deliberation. This includes Blair's (2012) discussion of non-verbal arguments, Gilbert's (1997, 2004) notion of modes of logic and the relationship between emotion and logic, Walton et al's (2008) concept of dialogue types. Current practice in online deliberation has arguably moved away from the broader understanding of argument advocated by Blair (2012) and Gilbert (2004). In focusing on computational models of argument, online deliberation platforms have moved towards a much narrower understanding of argument. The discussion of dialogue types revealed ambiguities in our understanding of deliberation. The thought is that deliberation shifts between different dialogue types at different stages, each with distinct objectives, roles for speakers and moves involved. There were no explicit applications of the theory of dialogue types amongst the platforms reviewed. In practice, platforms could be said to focus on specific aims relating to different dialogue types – for example, information gathering (Debategraph), deliberation (Parmenides) and persuasion (@Stake) – rather than supporting the various types of dialogue within one platform. Similarly, the collective intelligence literature highlights the sense in which deliberation shifts between different types of tasks and group settings, but in practice these distinctions were not explicitly addressed within the designs of platforms. Furthermore, the various decision making techniques and voting mechanisms discussed in the collective intelligence literature were not used in the design of the platforms.

The empirical analysis has highlighted practical considerations that may have prevented these theoretical developments being adopted. A key concern for developers was simplicity and minimising barriers to entry. The broader

understandings of argumentation and deliberation introduces greater potential complexity. Many developers deliberately avoided performing critical evaluative work on the platforms. This was due to the additional design challenges presented in ensuring the process would be both simple, flexible to different decision making situations and also transparent and accountable. Indeed, the developers' discussion of their experiences relating to the resourcing and marketing of the platforms, as well as current applications, suggests a move towards focused services, specifically making sense of large amounts of information with a focus on information relevant to abstract arguments. A broader understanding of argument may not be relevant to the intentions of such platforms, and may distract or overcomplicate such services. Furthermore, rather than platforms performing multiple types of work that capture different aspects of deliberation, there was a move towards specific services that could be applied appropriately to different decision making contexts alongside other tools and external processes.

Developments in the Literature and Future Directions for the Study of Online Deliberation Platforms

The experiences of the developers of online deliberation platforms highlighted the need for further exploration of the context in which these platforms operate. Specifically, how public spaces should be resourced and sustained, the mechanisms of coordinating and utilising knowledge distributed across the public, and the role and position of these platforms within the broader democratic system, including their relationship to the public sphere and empowered space. These concerns touch on discussions in the democratic literature that have emerged during the development of this thesis, notably Fuchs' discussions of the political economy of the web (Fuchs 2014, 2017), the epistemic turn in deliberative democracy (Landemore 2017a, Estlund 2008), and the systemic turn in deliberative democracy (Mansbridge et al 2012, Owen and Smith 2015).

Fuchs (2017) explores the political economy of the web. Contemporary media online is driven by commercial forces and he argues there is a "tabloid logic of the internet"

that has contributed to a media of superficial, high-speed spectacles that erode the public sphere and political debate (Fuchs 2017: 45-46). In response Fuchs advocates a public service media, for example a BBCTube alternative to YouTube, that could support a social space for slow, non-commercial media in the public interest. To illustrate what has been lost in current online media, Fuchs uses the example of After Dark, a programme that hosted open-ended, uncensored, engaging live debates, something which stands in contrast to the fast pace of current media. Fuchs argues further that social space and time need to be organised, managed and moderated in an intelligent way to ensure debate is engaging.

A defining point of contrast between earlier media (of which After Dark was a part) and modern media, is that modern media is fragmented and tends to resist centralised, shared experiences. I would suggest this is at least as significant for the prospects of deepening democracy online as the claims that modern media is driven by commercial forces, a tabloid logic, or focuses on entertainment. The cultural significance and achievement of a programme such as After Dark was due in part to the limited content available. Modern equivalents of After Dark's slow media, open-ended, uncensored discussion exist (for example message boards and forums), but they exist as enclaves with little impact outside of the people directly involved in the debate. Facebook and YouTube may dominate the medium through which the public access content, but in its current manifestation, this does not mean the same thing, or afford the same opportunities for shared cultural experiences as other media such as the BBC enjoyed prior to the proliferation of alternative media sources and popular use of the internet. Therefore, while communication technology has presented novel ways for individuals to interact and coordinate knowledge, the fragmented nature of modern media also presents barriers for the opportunities of democratic engagement. This presents an additional challenge for organising space for public deliberation online that would appear to be distinct from issues of design or funding. In this sense, there is a need to think not only about how public spaces are funded, but what expectations we might have for the role of such a forum in the public sphere, or as a means of informing and legitimising empowered space.

Coleman (2017) explores the democratic potential of ICT and online communication, reflecting on a crisis of representation and the capability building that technology could support to deepen democracy. In response to various factors including developments in technology and communication, the traditional role of the professional politician, as a cognitive and geographical bridge between citizens and decision making, is perceived as increasingly unsustainable democratic compromise and insufficient to meet contemporary expectations. Political institutions are perceived as remote, unintelligible, self-serving and decision makers are accused of failing to listen to or engage with the public on a more than tokenistic level.

Coleman (2017) argues for a civic organisation to coordinate government and other online consultations. He argues for need to build civic capabilities in four areas, and incorporate these within the application of technology in citizen engagement. These areas are: (1) making sense of the political world; (2) being open to argumentative exchange; (3) being recognised as someone who counts; (4) being able to make a difference. The arguments of Fuchs and Coleman suggest a central role for governments or civic organisations in steering civic engagement, and outline principles on which to base and evaluate the implementation of such a process. The thesis has observed the challenge of the willingness and capacity of traditional democratic institutions to invest in online civic engagement. It has also observed the capacity of communication technology to facilitate behaviour that threatens or inhibits democracy, including governments and political parties acting in bad faith, utilising technology to enable surveillance or destabilise or distort democratic processes. Increased involvement or power on the part of civic organisations in the public's use of technology may be unrealistic or undesirable, it certainly involves risks. Further research may explore the question of how we might harness the democratic potential of the internet and navigate potential challenges, and how to move towards the more positive relationship between institutions, citizens and technology outlined by Fuchs and Coleman.

The epistemic turn in deliberative theory focuses on social epistemology and explores empirical work with the aim of making the epistemic case for deliberative

democracy (Landemore 2017a). The themes emerging from the experiences of developers of online deliberation platforms are relevant to these developments. The platforms themselves illustrate novel ways in which one may draw on and coordinate the knowledge of large groups of people. Nevertheless, perceptions of the public's capacity to contribute to informed policy making and faith in the epistemic case for deliberative democracy varied amongst interviewees. On the one hand, there were perceptions that the public is uninformed and biased in their engagement with political issues, and unwilling or incapable of participating in abstract argumentation. On the other hand, many developers displayed radical ambitions with regards to the democratic potential of technology to surface meaning and knowledge from the public, and the capacity of citizens to contribute to decision making (indeed these ambitions appeared to exceed the current willingness and capacity of traditional democratic institutions).

By way of reconciling these attitudes towards public engagement and participation in decision making, and the utility of these platforms, we might argue that much depends on how well the public are recruited and engaged in the decision-making process. The collective intelligence research explores different decision making situations and the conditions relevant to realising collective intelligence in different decision making contexts (in contrast to producing worse decisions as a result of systematic bias for example). Similarly, Landemore (2017b) discusses different mechanisms for realising epistemologically optimal outcomes. She discusses research that highlights conditions under which cognitive diversity outperforms epistemic competence, and demonstrations of the virtues of public engagement over reliance on experts. A future area of research into online deliberation platforms may consider the epistemic virtues of different applications of platforms, to develop a better understanding of how these technologies might be best applied to draw out expertise and knowledge on policy issues. For example, how platforms might employ targeting to elicit knowledge from hard to reach groups and improve cognitive diversity, or how to draw on expertise dispersed across the public and different stakeholders to inform decisions and evaluate policy. Indeed, the more targeted

approach may help address some of the factors contributing to the problem of willingness and capacity on the part of the state and citizens.

The systemic turn in deliberative democracy, for example discussed by Mansbridge et al (2012) and Owen and Smith (2015), emphasises the need to move from focusing on individual deliberative processes or institutions, to examining their interaction in the democratic system as a whole. It is argued a systemic approach allows us to think about deliberative democracy in large scale societal terms (Mansbridge et al 2012). Expanding the scale of analysis beyond the individual site allows for a deeper understanding of the democratic impact of a forum. A forum exhibiting ideal deliberative qualities may nevertheless be insufficient to legitimate decisions (Owen and Smith 2015), its impact on the system may indeed be negative if its failure within the system results in citizen disengagement. Conversely forums which fail to meet standards such as equality or inclusion when taken in isolation may have a positive impact on the democratic system as a whole, for example they may serve to introduce greater cognitive diversity (Mansbridge et al 2012). In this sense, the traditional approach to evaluating deliberative forums is insufficient for systemic analysis. But Mansbridge et al (2015:19) recognise methodological challenges in a systems perspective on deliberative democracy.

> A systemic analysis must be able to make judgments and must have the analytic tools to do so. Without criteria to evaluate when non-deliberative, weakly deliberative, or even anti-deliberative behaviour nevertheless enhances the deliberative system, one risks falling into the blind spot of old style functionalism: everything can be seen as, in one way or another, contributing to the system.

This thesis has focused on individual platforms and design features, evaluating the quality of deliberation at the scale of individual sites. This approach has been limited in its capacity to consider the relationship of these platforms to the democratic system. The limitations of this approach were particularly apparent in light of the emerging issues on the limits of individuals' attention, institutional capacity and

machine learning which have implications for democratic accountability and transparency in large scale deliberation. A future area for research into experimental platforms could explore the relationship between these platforms and the democratic system in which they operate. This could well include consideration of the political economy of the web. Furthermore, the expanded scale of analysis would allow further consideration of the relationship between the use of technology to support deliberative forums of different types, whether online or offline, and the use of technology to coordinate knowledge in non-deliberative or weakly deliberative ways (for example passive crowd sourcing, and the more abstract coordination of knowledge and argumentation facilitated by experimental platforms). Adopting a systemic perspective would allow further insight into the deliberative and epistemic value of online deliberation platforms within a given system, and their capacity to support democratic capabilities, however there would be a need to address the methodological ambiguities of the approach highlighted by Owen and Smith (2015) and Spada and Ryan (2017:774). It is clear that the future of democracy will be tied at least in part to developments in technology – as such the research agenda on how online deliberation can be supported will be ever more prescient.

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Appendices

Appendix A: Interview Schedule

Platform	Developer	User
@stake	1	
BCsivive/Rationale	1	
ConsiderIt	1	
Debategraph	1	
Deliberatorium	1	1
Parmenides	1	
Pol.is	1	
Rbutr	1	
Truthmapping	1	
Digital Tools and Participatory Budgeting in Scotland (various)		1

Appendix B: Interview Questions

1. Could you talk me through your experience with online deliberation platforms, the projects and tools you have been involved with and the kind of issues that you have been looking to address through these tools?

2. One challenge that has been identified in the literature on online deliberation has been participant engagement. I wondered if you could describe your experiences in relation to this issue, for example have you experienced challenges in encouraging broad and diverse participation.

3. In development of this thought, I wondered if you could talk me through your approach to ensuring the platform is designed to be easy to use, easy to learn and fun to use.

    a. Have you used any incentives? What were the consequences of these?
    b. What role is there for design or structure to support engagement? Is there anything you would like to do or develop to support greater participation?

4. A further challenge concerns participant behaviour and capacity, problems with polarisation, trolling, disrespectfulness and the willingness or capacity to engage in reasoned argument in online communication. Could you talk me through your views on these issues, how they may have effected your platform, or how you think the platform has or may address these challenges.

5. A further challenge I would like to discuss is that of information representation and management. This issue concerns how one ensures all voices are fairly represented and heard in large scale discussions, as well as the need ensure the discussion is easy for participants to follow. Could you talk me through your experiences with these issues?

    a. What choices have you made with regard the representation of information to help avoid problems of repetition, noise and information overload?
    b. If you use a form of structure/filtering on discussion how do you ensure it is not reductive and that it remains transparent and accountable,
        i. to what extent might it exclude potential perspectives,
        ii. how much of a problem do you feel this is?

6. A further issue I would like to discuss relates to feasibility and scale, as one of the promises of online deliberation has involved the prospect of large scale debate. I wondered if you could describe for me what demands are placed on staff, moderators, and users of your platform?
    a. Are there any challenges you have experienced or anticipate in relation to increasing the scale of participation on your platform?

7. What do you feel are the main challenges facing online deliberation platfroms?

    a. Are there any issues that have not been discussed so far that you feel are important?

8. Are there any further developments you are intending to make with your platform that address these or other challenges?

    a. How do you see the future development for online deliberation?

9. Are you aware of any other platforms that support online deliberation in innovative ways/address the challenges discussed?