

Social Movements as Information Ecologies: Exploring the Coevolution of Multiple Internet Technologies for Activism

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This article applies the information ecology framework to explore Aula C, the headquarters of an Italian student collective that is part of the Anomalous Wave movement. It draws on a multimodal ethnography that includes participant observation and 17 semistructured interviews. Findings highlight the interrelationships among actors, practices, and technologies that constitute a system characterized by diversity, in which members of radical tech groups act as keystone species. By pointing out the coexistence and coevolution of activists and their tools, this article tries to overcome theorizations that do not consider the whole media environment with which activists interact. The newest application, it is shown, may in fact not be the most used technology for activism.

Introduction: The Anomalous Wave Movement

In 2008, Maria Stella Gelmini, the education minister in Italy's Berlusconi government, issued a controversial decree on state education that was later transformed into the provisional Law 133. The law aimed to cut state funds and to pressure schools and universities to rely on private money. As Caruso, Giorgi, Mattoni, and Piazza (2010) suggested, the first signs of discontent emerged in July 2008, when the organized components of the student movement² began to mobilize at the national level. At the same time, precarious school employees—researchers and teachers affected by the cuts—also started mobilizing. By October 2008, the movement had reached its peak and become known as the Onda Anomala (Anomalous Wave) or simply L'Onda (the Wave).

From its inception, the Wave stood out as a generational movement defined by the participation of high school and university students as well as young activists and precarious workers protesting

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² In particular, the *collettivi studenteschi* (student collectives), groups linked in some cases to extraparliamentary political parties such as Partito Della Rifondazione Comunista, and in other cases to the political realities of social centers.

economic instability and uncertain futures (Mattoni, 2009). It had much in common with the French protests young workers led against the *contrat première embauche* (first employment contract) in 2006. The Wave introduced the innovative slogan "Noi la Vostra Crisi non la Paghiamo" (We won't pay for your crisis), which became something of a battle cry for those subjected to existential precariousness and increasing uncertainty about the future. The movement's peak in late 2008 and early 2009 was marked by mass demonstrations at the national level.

The chief actors in the movement have been students, but other components mobilized alongside them: technical and administrative workers who were extremely concerned about budget cuts, and precarious researchers acting autonomously at a less conflictive level. Other actors, such as elementary school teachers and children's parents, also contributed to the mobilization. The Retescuole network, created in 2005, became a particular point of reference during the protests.

Mobilization of the Wave has been strongly characterized by the local dimension (Della Porta, 2010). Its traits vary, not only from city to city but from university to university and even college to college, as was also the case for the 1968 student movement with its strong relations to several local realities (Agosti, Passerini, & Tranfaglia, 1991). The strength and peculiarity of the local aspect, together with the movement's rampant fragmentation into different collectives, networks, and social movement organizations, are some of the issues that complicate the study of this movement. Forms of mobilization had a prevalent local character, often fragmented but rich and various.

The protests touched Italy's most important cities (Rome, Turin, Milan, Bologna, Pisa, Palermo, Catania, Florence, Trieste) as well as various other cities where the support for the movement was less intense in previous contentions. National meetings took place in Rome on November 14–16, 2008, and November 20, 2009; in Turin on May 18–19, 2009; and in Catanzaro on October 9–10, 2009. The importance of "conquering" the city was central in the Wave protests. As Negri pointed out (2009), the main task of the movement consisted in penetrating the city and winning over its productive articulations by simultaneously casting the production of knowledge as a function of the production of freedom.

The movement adopted a broad repertoire of actions, convening rallies, assemblies, and blockades and spreading its message through traditional means such as flyers, banners, and information tables. Unauthorized demonstrations were a forceful presence, creating "wild" blocks of urban traffic in line with the French struggles of 2006. Flash mob actions and spontaneous blitz demonstrations (the so-called *manifs sauvages*) in front of the Ministry of Economy and Finance in Rome and inside job recruitment centers aimed to reveal the state authority's role in the handling of the university crisis by showing that funding cuts were not an extraordinary measure but constituted a fundamental and permanent element of contemporary production.

Moreover, the movement occupied theaters and cinemas to reclaim indirect income by demanding free tickets to give students the chance to enjoy collective cultural production in the face of the dismantling of funding for arts and culture. One of the Wave's most original practices was the organization of *lezioni in piazza*, in which intellectuals, professors, and actors were invited to give public open-air

lectures on various topics. The lecturers also included precarious researchers and groups of students practicing a conscious process of self-education (*autoformazione*) (Bernardi & Ghelfi, 2010).

The Wave did not succeed in blocking the Gelmini reform, and whereas in general its aims were ultimately defeated (Caruso et al., 2010), the movement left a deep impression on the Italian protest environment by revitalizing old student collectives at the local level, creating new ones, and building networks of communication and action between different political actors (Barassi & Treré, 2012).

Caruso et al. (2010) have shown Wave activists' reliance on "traditional" mailing lists and commercial and autonomous platforms to connect people and networks of people, combining blogs, websites, Web radio, social networks (especially websites such as Facebook), Web TV, and so on in a variable and complex sociotechnical geometry. But although the role of these platforms has been pivotal in building relations and exchanging proposals, information, and documents among Wave protesters, face-to-face interactions, meetings, and assemblies defined the Anomalous Wave as a strongly offline-oriented movement. In addition, the case of the Wave can position digital media within a broader discussion on the role and modalities of knowledge production and reception. Inside the movement, discussion frequently turns to issues related to open source and open access (Giorgi & Caruso, 2009), and radical tech collectives have merged their activities in complex ways with the flow of the movement's protest.

Caruso et al. (2010), however, devote little attention to Wave activists' use of media and in particular of digital technologies. Indeed, empirical investigation of these student activists' use of digital technologies is consistently lacking to date. The aim of this article is twofold. First, by exploring how students who were part of the Anomalous Wave movement have made use of digital technologies, I provide empirical data and concrete findings to address the need for further research on Wave activists. Second, I do this by applying an information ecology framework that tries to overcome what I call the one-medium bias: the tendency in studies on movements and media to privilege analysis of one technology or platform over others.

Whereas the Italian press portrayed this movement as heavily based on social network platforms, in particular Facebook,³ (Ant., 2008; Larizza, 2008;) the hypothesis guiding this article is that during their activities, the student activists mixed multiple technologies (both old and new) and privileged platforms other than social media. I will show that different digital tools were used and combined, and that one of them—the mailing list—played a more important role that has still not been properly assessed.

The findings of this research also contribute to the ongoing discussions and theorizations about recent uprisings (the Arab Spring, Spanish Indignados, and Occupy Wall Street) and the role played by new media, providing useful theoretical and methodological tools for the exploration of the coexistence and coevolution of multiple technologies (Barassi & Treré, 2012; Mattoni, 2012; Nielsen, 2009).

³ See, e.g., http://www.corriere.it/cronache/08_ottobre_27/protesta_scuola_gelmini_gruppi_ed04982-a40f-11dd-b65a-00144f02aabc.shtml and <http://nova.ilsole24ore.com/nova24ora/2008/10/wsdswfsf.html>

The structure of the article is as follows. First, I review the literature on digital media and movements, highlighting the issue of the one-medium bias and focusing on what I define as recent "holistic" approaches that try to overcome it. Second, I introduce the conceptual framework and the adopted methodology. Third, I present and discuss the findings of my investigation. Finally, I summarize the main contributions of the article and reflect on how future research should develop.

Literature Review: Social Movements, Digital Media, and the One-Medium Bias

The dimension of communication is inextricably linked to social movements' actions and practices. The role of communication in networking, building collective identities, mobilizing, and protesting is at the heart of collective action (Castells, 2007, 2009, 2012; Loader, 2008; Tilly & Wood, 2009). Publications on movements, ICTs, and digital activism have flourished in recent years (Bennett, 2003; Castells, 2007, 2009, 2012; Della Porta and Mosca, 2005; Diani, 2000; Joyce, 2010; Lievrouw, 2011; Loader, 2008), and the attention once focused on mainstream media is now shared with mobile devices and the Internet. Some media and movements scholars (Carroll & Hackett, 2006; Downing, 2008; Huesca, 2001; Lasén & Martínez de Albéniz, 2011; Tambini, 1999) have argued that traditional social movement studies have either devoted little attention to the media aspect or considered the technological mediations employed during mobilizations instrumentally, conceiving of media as simple tools that movements use to pursue their predefined goals, not as political agents per se.

Critics of the instrumental view of communication in social movement studies have recently matched other strands of criticism (Mattoni, 2012; McCurdy, 2011; Padovani, 2010). According to these scholars, the most visible manifestation of the instrumental view is that social movement literature has typically addressed the communication strategies of movements separately, focusing on the use of single technologies and thus neglecting the whole media spectrum with which activists and social movements interact. I call this persistence in privileging the analysis of one medium or platform over the others the one-medium bias.

The main consequence of the one-medium bias for the study of online activism is that it can reduce the complexity of the Internet to just one of its comprising technologies, or to certain particular "portions" of this complex environment. For instance, some have focused on websites (Della and Mosca, 2005; Stein, 2009; Van Aelst and Walgrave, 2004) or mailing lists (Kavada, 2009, 2010; Wall, 2007), and others on bulletin boards (Nip, 2004) and online groups (Ayres, 1999; Fung, 2002). More recently, attention has shifted to the use of blogs (Cammaerts, 2008; Kahn and Kellner, 2004) and social networking platforms such as Facebook (Farinosi & Treré, 2010; Harlow, 2012), Twitter (Ferrerías Rodríguez, 2011; Torres Nabel, 2010), or both (Maireder & Schwarzenegger, 2012). However, restricting the focus to only one of the many online technological manifestations of social movements risks overlooking important aspects such as the role and evolution of different platforms within a movement and the connections among multiple technologies, actors, and their practices. Meikle (2002 p. 12) acknowledged this problem in his analysis of media activism, stating that when talking about "the Internet," people usually do not take into account the differences and relations among applications. The author underlines that early discussions about the Internet's political potential mainly concerned e-mail and other text-based applications, for example Usenet.

Media and movements researchers have thus started to develop new models and approaches for studying movements and communication. Although perspectives may differ, I define these approaches as "holistic" because they all try to take into account the whole array of communication technologies with which activists interact during protest and mobilization. For example, Bimber, Flanagin and Stohl (2005) have reconceptualized collective action as a "phenomenon of boundary crossing between private and public domains" (p. 365) arguing that all collective action is communicative and that social movements occupy a "collective action space" defined by participants' mode of interaction and mode of engagement. In this collective action space, multiple strategies, relationships, and technologies can be adapted depending on the situation.

Similarly, Coopman's (2009) "pervasive communication environment" model incorporates multiple media at the local and international level and assembles them into an integrated communications infrastructure where old and new media (television, landline phone, cellular phone, online technologies, etc.) coexist and interact.

In her research on the emerging communication tactics that citizen committees and movements in L'Aquila, Italy, used during the G8 summit in 2009, Padovani (2010) refers to "360-degree communication tactics" in addressing interpersonal communication, relationships with mainstream media, and citizens' use of ICTs and looks at how these three levels of communication merge with each other. She thereby tries to develop a more holistic representation of activists' tactics and avoids treating each as a discrete, isolated, entity.

Other scholars (Barassi, 2009; Barassi & Treré, 2012; McCurdy, 2011; Mattoni, 2012) draw on the concept of "media practice," with particular reference to the work of Couldry (2004). Influenced by Martín-Barbero's groundbreaking work on the concept of "mediations" (1987), Couldry stressed the need to move beyond functionalist approaches within media studies and argued that researchers should start to analyze media as practice. This means taking into account not only "what people do" with the media, but also the sets of beliefs, ideologies, and understandings whereby practices are ordered.

In her work on the mobilizations of precarious workers in Italy, Mattoni (2012) introduces the concepts of "activists' media practices" and "repertoire of communication," underlining that in everyday practice activists do not use one medium at a time but use media (both analog and digital in different combinations) simultaneously, blending, crossing, and remixing them. In the same vein, McCurdy (2011) investigates the 2005 Gleneagles G8 Summit and focuses on a specific "autonomous" activist network known as Dissent!. McCurdy's framework draws on the concept of mediation, which views media as an ongoing and reflexive process actualized by analyzing activists' media-oriented practices, which cross different online and offline media and multiple online technologies and platforms.

Other scholars have not adopted an explicit media practice approach based on Couldry's theorization, yet have introduced valuable concepts to explore the array of complex interactions among multiple technologies by which activists interact. Media scholar Costanza-Chock (2011, 2012) has developed two useful concepts centered on the dimension of practice. In his PhD dissertation, he focused

on the Los Angeles immigrant rights movement to analyze its *transmedia mobilization*, a process that “involves engaging the social base of the movement in participatory media making practices across multiple platforms” (2011, p. 113). More recently, in his analysis of the Occupy movement, Costanza Chock speaks more broadly of media cultures, defined as “the set of tools, skills, social practices and norms that movement participants deploy to create, circulate, curate and amplify movement media across all available platforms” (2012, p. 1). He includes the dimension of practice—looking at what media platforms, tools, and skills are most used—as a fundamental element of the exploration of media cultures.

Manuel Castells also considers the whole media scenario within which activists develop their resistance tactics: He has pointed out the possibilities mass-self communication offers for building counterpower networks made up of a huge variety of digital and analog platforms (2009), and also convincingly shown the complex convergence and relationships among the Al Jazeera television news network, mobile devices, and social media in the course of the Arab revolutions (2012).

These works show the recent literature’s tendency to urgently approach collective action and social movement action in relation to media as a whole. Considering only part of the technological scenario obscures important aspects of understanding a specific social movement’s activity and thus collective action dynamics. Nevertheless, there is an important aspect that other scholars have not sufficiently elaborated or stressed: locality. Movements, as Castells reminds us, “still root themselves in their local contexts and in physical interactions” (2007, p. 250). One of the main strengths of the information ecology framework developed by Nardi and O’Day (1999) is its ability to grasp and explore actors’ actions with technologies in their local settings: Each technology is located within a complex network of relationships, and “only people who are immersed in a particular information ecology can provide a local habitation and a name to new technologies” (p. 55).

In the next section, I will show how the concept of information ecology developed by Nardi and O’Day (1999) can provide an original framework to overcome both the instrumental view of communication in social movement theories and the one-medium bias by exploring interrelationships among people, practices, and technologies within a student collective engaging in the Anomalous Wave movement.

Conceptual Framework and Methodology

Nardi and O’Day’s concept of information ecology is a potent attempt to look beyond the boundaries of the metaphors that traditionally describe the media (as tools, texts, system) to include the network of relationships, values, and motivations involved in technology use. The two authors define information ecology as “a system of people, practices, values, and technologies in a particular local environment. In information ecologies, the spotlight is not on technology, but on human activities that are served by technology” (1999, p. 49).

In their understanding, a library, a hospital, a copy shop, a bank, or any one of multiple other settings constitutes an information ecology. The aim of this conceptualization is, on the one hand, to

travel beyond the instrumental view of the tool metaphor, which relies on the image of a single person interacting with technology, and on the other hand to capture a notion of locality that is missing from the system view of communication. The concept is thus able to grasp the interrelations among tools, people, and their practices. In this article, I apply this concept in examining one part of the Anomalous Wave student movement: Aula C (Hall C), the self-managed headquarters of the Permanent Assembly of the Anomalous Wave Movement collective, located in the Italian city of Bologna. I study Aula C as an information ecology, and through this metaphor I highlight how current literature on movements, activism, and the media can benefit from applying this framework to overcome the limitations of the one-medium bias.

It is important to note that overall, the project I undertook on the Wave movement applied a holistic framework that looked at social movement media beyond the Internet, taking into account interactions with radio stations, TV outlets, and journalists. In this article, however, I focus my attention on practices developed around and within online environments for two reasons. First, in-depth exploration and description of a wide array of multiple practices in so many media outlets is unfeasible in the space allotted to an academic article. Second, exploration of the interaction among multiple Internet technologies is enough to fulfill the main purpose of this article: pointing out the coexistence and coevolution of activists and their technologies and demonstrating the utility of approaches to social movement media research beyond the "latest and greatest tool."

To investigate the practices of the Anomalous Wave students, I used a combination of qualitative methods with a unique ability to search for deeper understandings of participants' lived experiences and practices (Illingworth, 2006). The rich, descriptive, contextually situated data I collected using multiple qualitative methods allowed me to seek understandings of human experience and also emphasize the possibility of new and unanticipated findings (Silverman, 2004). The research was initially framed as a case study. I do not conceptualize a case study as a method per se or as the study of a single instance of some empirical phenomenon. Rather, I use Snow and Trom's (2002) definition of a case study as a "research strategy that seeks to generate richly detailed, thick, and holistic elaborations and understandings of instances or variants of bounded social phenomena through the triangulation of multiple methods that include but are not limited to qualitative procedures" (pp. 151-152).

The University of Bologna was chosen because of this city's prominent role in the Wave's struggles. Indeed, Bologna and its university have had a leading part in Italian student mobilizations ever since the cycle of 1968 protests (Tarrow & Maddaloni, 1990). It reached its peak of importance in the youth movement of 1977, when Bologna became an arena for riots pitting students on the extraparliamentary left against police, which led to the killing of student Francesco Lorusso. This tragedy spawned urban guerrillas at the local level and triggered a spiral of violence nationally. Furthermore, in September 1977 Bologna hosted the three-day Conference Against Repression (Convegno contro la repressione), where thousands of people gathered in several areas of town to discuss the future of the movement. Bologna continued to play a pivotal role in the early 1990s with the "Pantera movement" against the Ruberti reform, and in 2004 and 2005 during the mobilizations against the Moratti reform. The robust substratum of rebellious spirit and the various practices of resistance that have always animated

the city help explain the University of Bologna's continuing centrality for contemporary student collectives and social movements.

Within this case study framework, I then deployed a "multimodal ethnography" (Dicks, Soyinka, & Coffey, 2006), combining physical and digital ethnography to obtain rich ethnographic material and provide an "overflowing description" (Sade-Beck, 2004). During fieldwork I carried out five months of participant observation (October 2008 to February 2009) at the Faculty of Political Science of the University of Bologna following the students of the Permanent Assembly of the Anomalous Wave Movement collective. I participated at their meetings in the Hercolani building, located in Strada Maggiore 45 in Bologna, and in a huge array of activities conducted in Aula C, the self-managed headquarters where they debate, organize, and coordinate their actions, as well as relax and reflect.

When it was relevant to the aims of the research, I also explored mailing lists' messages, Skype conversations, blog posts and comments, and Facebook statuses, and viewed YouTube videos and Flickr pictures, considering them as part of the students' social world.

Additionally, I carried out 17 individual semistructured interviews (two persons were interviewed twice, so the interviewees numbered 15) with the actors of the collective. My research involved "active interviewing," a technique developed by Holstein and Gubrium (1995) that uses broad questions to give agency to research participants. Such a technique, based on a conception of reality as an ongoing, interpretative accomplishment, is in line with seeing the relationships between activists and technologies as a transforming and dynamic complex. It gave respondents the option to address a wide range of meanings by telling stories and narratives in response to broad questions such as "How would you describe your use of this technology?" or "How would you define your relationship to this Internet platform?" This allowed me to work with social movement actors in the co-creation of "the environment of the communication phenomenon from the perspective of the participant" (Atkinson, 2010, p. xiv). One final group interview with a sample of the Bologna collective allowed for better comparisons and longitudinal collation of their reflections on the protest.

The notes generated by the multimodal ethnography and the transcriptions from the interviews were all thematically analyzed following Flick's (1998, pp. 187–192) method of thematic coding. Texts were approached in a continuous dialogue with the conceptual framework and the aim of the research.

Findings: Aula C as an Information Ecology

According to Nardi and O'Day (1999), an information ecology incorporates five aspects: It is a *system* (1) that exhibits *diversity* (2), where different parts *coevolve* (3) and several *keystone species* (4) are necessary; it also possesses a sense of *locality* (5). In the first section of the findings I analyze the Aula C as a system (1) with diversity (2) in which keystone species are present (4). I then consider the coevolution (3) within this environment, showing the different manifestations of this aspect. In the concluding section, I reassess the importance of locality (5).

System, Diversity, and Keystone Species

Aula C and the Permanent Assembly of the Anomalous Wave Movement collective constitute a system with strong interrelationships and dependencies among its different parts. First, Aula C is a system composed of different actors such as students of political science, students and activists from other faculties, and "occasional" activists and hackers. At the heart of Aula C are the actors of the Permanent Assembly, who conduct most of the activities and decide the future of the hall. Second, it is a system composed of a variety of technologies and technological artifacts. Aula C is equipped with a computer connected to the Internet, on which reports of meetings and announcements are posted to the official blog or disseminated via different mailing lists. Three big tables are the site of different student activities: studying, smoking, eating, discussing, using their own laptops and netbooks to connect to the university wireless network. The space of Aula C is so important to the Bologna students that they created a blog (<http://aula-c.noblogs.org>) devoted to this space, where initiatives and events are posted. Recalling the importance of Aula C, Susanna,⁴ a leading member of the collective, told me:

People don't understand how much this place means to us, how much the whole university means to us. But in particular this small place of freedom, of discussion, of debate that has been a kind of headquarter for us during the days of the protest. You come here and you always find someone, some friend, to talk to, to organize something with and to get pissed with. . . . I love this spot!

Aula C is therefore regarded as a refuge, a place where "we can be ourselves and try to change things" (interview with Federico, as well as one of the main headquarters of the Bologna student protest. Nardi and O'Day (1999) have pointed out that change within ecology is systemic, because when one element is changed it affects the whole system. This was evident, for instance, when the stationary computer broke down and was temporarily replaced with a student's laptop. This change slowed down some activities (especially creating flyers and sending e-mails) because the substitute computer was not available 24 hours a day. Moreover, many students who were unfamiliar with open source programs had difficulties using the software available on the laptop. But even as the change hindered protest activities, it also allowed some activists to learn how to use open source software to create flyers and banners, increasing their technical skills.

An information ecology is also characterized by diversity: different kinds of people and different kinds of tools interacting in multiple ways. In this case, different actors collaborated, creating and appropriating what in ecological terms can be labeled as various "species" of technologies. Actors continuously merged several platforms and technologies in their daily activities. The various online technologies included mailing lists, blogs, social networking platforms (Facebook in particular), video sharing sites such as YouTube and Vimeo, and photo sharing platforms such as Flickr and Photobucket. Activists also used Skype during meetings to communicate with other Italian and sometimes international universities, and different cloud storage services such as Dropbox to save and share documents with other collectives. The mailing list—by far the most used Internet technology—

⁴ All names of activists have been changed to assure their anonymity.

represented the “communicative backbone” of the student collective, mainly owing to its advantages for internal communication (this topic and its consequences are further discussed in the final section).

Additionally, ecology is marked by the presence of keystone species, skilled people whose presence is essential to the survival of the ecology itself. In the case of Aula C and the Permanent Assembly, certain activist members of radical tech collectives such as Autistici Inventati (A/I)⁵ provided the expertise and practical skills needed to help other activists carry out their online protest practices. These collectives are usually composed of tech-savvy activists who provide support and use their skills to improve the effectiveness of online advocacy and reduce its risks. In the case of Aula C, they acted as mediators by building bridges between certain technologies and some actors. Their role was pivotal, considering that both the mailing list and the blog of the collective were hosted on the A/I platform. These mediators informed the actors of the risks and threats associated with online behaviors and solved technical problems that arose during the protests. The symbiotic relations between movement and tech groups and the infrastructural aspect of social movement media constitute an important factor deserving of further scholarly attention in the movement and media literature (Hintz & Milan, 2009).

Another keystone species consisted of more skilled activists who had taken part in previous mobilizations and protests. As the literature acknowledges, activists often travel from one social movement to another (Roth, 2000). These seasoned students helped their fellows familiarize themselves with the use of certain technologies and facilitated their activist practices by providing practical advice based on their experience.

It is important to acknowledge that problems and conflicts arose during the frequent exchanges of technical knowledge between radical techies and activists. Particularly noteworthy is the conflict between techies’ extreme cautiousness in performing any online activity and the “need-to-get-things-done attitude” (in the words of Paolo) of regular activists in the collective. As long-term activist Paolo explained to me: “Sometimes tech people are too cautious even when there’s no need to be so worried in relation to online practices. . . . This kind of behavior has slowed down our protest activities on various occasions.”

Coevolution in an Information Ecology

Another fundamental characteristic of information ecologies is coevolution: “information ecologies are filled with people who learn and adapt and create” (Nardi & O’Day, 1999, p. 53). This aspect deserves particular attention, given that interrelations and coevolution among activists and their tools is a decidedly neglected topic in studies on movements and media. Acknowledging the complexity and richness of coevolution, I cast light on specific aspects of the phenomenon by providing examples of uses of different technologies: the Aula C blog, the collective’s YouTube channel, its mailing list, and finally, the Dropbox cloud storage service. These examples are only some of the many articulations that emerged from analysis of the information ecology, but they are indeed useful to show how social and technical aspects of the environment coevolve.

⁵ See <http://www.autistici.org/en>

The Aula C blog was created before the emergence of the Anomalous Wave movement. Its posts concern events and activities of the Political Sciences collective. With the emergence of the Wave and the creation of the ScipolMOVE blog, the Aula C blog was “narcotized” for several months. As some activists told me, “because the hall was intensively lived offline, there was no need and no energy to use it online” (interview with Federico). This demonstrates that some technologies that are part of the movement’s online environment can be momentarily set aside or replaced because of changes in the practices of the actors. When protest activities started to lose their intensity in 2009, the blog slowly came out of its “lethargy period” and was used again to promote initiatives happening inside the hall. However, an observer looking at the blog only to see what activities were promoted during Wave mobilizations might conclude that the collective was inactive.

Another clear illustration of coevolution is presented by a YouTube channel created by an outside student who only participated in some meetings of Aula C in Bologna. This student autonomously set up a group on the portal to post videos he had shot during rallies and events. One of the videos generated controversy because it showed some clearly recognizable activists from the Bologna collective in a nonauthorized demonstration, raising fears of consequences from the police. In response, a few students of the collective contacted the video administrator and had the video removed from his account. This event strongly affected the students’ other online practices, and they became increasingly cautious about their presence on Facebook and the content they posted on other blogs. In general, the event marked a change in the online tactics of the collective, which was now more conscious of the risks and threats related to its online behavior. The video removal episode represented “a strong change in the technological awareness of the group” (interview with Letizia) and led them to question their digital consciousness. At the same time they redoubled their requests for more support from the radical tech groups and hackers, whose role as keystone species was confirmed and expanded. The change was thus systemic: A single event had effects on the actors, their technologies, and their related practices.

Perhaps the most interesting illustration of information ecology coevolution concerns the two phases in the use of the *nogelminispbo* mailing list. The first phase, during the months of October and November 2008, was characterized by face-to-face meetings and physical contacts, especially inside Aula C, where people gathered for discussion on a daily basis. In this phase, the messages in the list tended to be of the organizational type: setting up appointments and meetings, asking people to distribute leaflets, or just scheduling the next assembly. Many of the messages then were short, discussing pragmatic issues in an incessant back-and-forth. Students were very busy during those months; the protest was reaching its peak and there was no time for lengthy political reflections and debates. In this first phase, the mailing list was regarded as an organizational and decisional fine-tuner. Meetings were frequent, and initiatives, demonstrations, and concerts were continuously organized, so students needed a tool to provide an organizational platform for daily actions. The mailing list served this purpose well. Alessandro explained the “fine-tuner” role played by the mailing list:

Well, in the first part let’s say there were more organization-type messages, for obvious reasons, and then instead more reflexive messages on what has been done because in the meantime we also were more, let’s say that we paid more attention to the quality of things and. . . . The mailing list was in the first part a sort of decisional fine-tuner. . . .

We did not take important decisions with mail; it was more a platform for discussion and to decide simple technical questions.

In the second phase, which began in mid-December 2008, just before the Christmas holidays, messages in the list became longer, and political discussions and reflections flourished. In the words of Monica,

Clearly, because of the Christmas holidays and because when you work really hard and you spend more than two months so intensively you don't have the strength to keep on doing it all the time. . . . Well, things have slowed down a little, and the mailing list changed its nature in the sense that if first it was used for almost anything, for really basic and simple decisions, even small technical things, then it was more lived as a place for discussions on the movement, because we weren't seeing each other on a daily basis and we need to talk it like this. . . . But we couldn't read our faces, we had to write it: hey what's going on? And then you comment articles and things that before you didn't have the time to read because you were on the streets or with your folks during the assembly.

As physical contacts diminished and students wearied of long days of protests, occupations, rallies, and demonstrations, the mailing list became a place for long political discussions that students could now engage in, as they were dedicating less time to the streets. Most of these messages tried to address topics that had been raised during the "hot" days of the protest.

These two clearly definable moments in the use of the mailing list show the continuous interplay and coevolution between the offline and online dimensions. Anastacia Kavada (2009, 2010), in her analysis of mailing lists of the global justice movement, has repeatedly stressed examining the interaction between the mailing list and the offline discussions at physical meetings as the only way to grasp the whole picture and better understand the meanings actors attach to these forms of communication. Other authors have emphasized the need to understand the complex interplay between the online and the offline in social movements (Cammaerts, 2008; Farinosi & Treré, 2010; Gillan, 2009. Castells (2007, 2009) has pointed out that the space of the new social movements in the digital age simultaneously constitutes the space of flows and the space of places. Social movements continuously operate by shifting and blending the online and offline worlds, and it is precisely in this combination that they organize, mobilize, and protest.

A final illustration of coevolution is the activists' creation of a Dropbox cloud storage account to share an online hard drive holding layouts of documents (leaflets, flyers, posters, banners) that different people could easily use to create calls for action and flyers in their homes. This account was created mainly because the mailing list was overflowing with messages, revealing "a need for a separate application that could get the job done" (interview with Paolo). The Dropbox cloud storage account that met this need had several consequences on other technologies and related practices. For one, students who were unfamiliar with this kind of application had to acquire new skills and "to learn the basics of cloud computing" (interview with Ciro). The account also raised new concerns about cloud computing

practices and the risks of "having your data somewhere in the cloud, without your direct control" (interview with Sara). Meanwhile, progressively moving all messages with flyers and posters in attachments to the cloud account helped ease the mailing list's communication overload and reestablish a fluent flow of communication, allowing for more efficient organization and coordination of the collective's activities.

Conclusion: Main Contributions and Directions for Future Research

In this article, I have applied the theoretical framework of information ecologies developed by Nardi and O'Day (1999) to the study of Aula C, the self-managed headquarters of the Permanent Assembly of the Anomalous Wave Movement collective, part of the Italian Anomalous Wave student movement. By exploring activists' media practices, I have shown how studies on movements, activism, and the media can benefit from applying an information ecology framework to overcome the limitations of the one-medium bias. The information ecology framework is able to highlight the interrelationships and dependencies among people and technologies, as well as the inner diversity of the system. The article also points out the role played by keystone species, such as tech-savvy volunteers and hackers who are part of radical tech collectives. Most importantly, this framework can advance research on the coexistence of multiple technologies and the coevolution of actors, practices, and their tools. We have seen how changes, decisions, and choices related to technologies (blog, mailing list, YouTube channel, Dropbox account, etc.) affect the whole system of relationships within the ecology, pushing actors to redefine their practices, abandon online platforms momentarily, switch to other tools, acquire new skills, and interrogate their own conceptions of digital activism with an eye to risks of exposure, privacy loss, and threats posed by the authorities.

Moreover, this study contributes to the literature on mediation and social movements by grasping the sense of locality in the movement's ecology and showing the continuing importance of the local dimension in social movements' trajectories in the age of global communication. One of the chief lessons of recent uprisings is that the appropriation and occupation of physical spaces is still central to movements' activities. Enormous symbolic importance adheres to sites of struggle such as Plaza del Sol for the Spanish Indignados, Zuccotti Park for the Occupy Wall Street movement, and Tahrir Square for Egyptian revolutionaries (Alexander, 2011; Sampedro & Duarte, 2011).

Another contribution of this study is its spotlight on the urgency of recognizing activists' use of applications such as Skype or Dropbox. While it is essential to investigate the external communication of movements by analyzing Websites, blogs, Facebook accounts, and YouTube channels, it is also important to consider internal communication and other comparatively obscure applications, which can help explain dynamics of participation that cannot be understood by looking at only the more visible technological manifestations.

One of the most interesting findings of the research was that by far the most used Internet technology was the *nogelminispbo* mailing list. Whereas the Italian press repeatedly insisted that the Wave was a social media-driven movement, Facebook was mainly used as a unidirectional platform to spread content. Real debate among activists and coordination of their actions took place within the

mailing lists (Barassi & Treré, 2012). Conceived mainly as an internal tool, the Bologna mailing list was used in multiple ways and for multiple purposes: to spread information, to organize, to mobilize, to coordinate. In the words of Lucia, a member of the student collective, it was the central tool of the collective:

The *nogelminispbo* list was used for anything from "Look at this site" to "Let's meet in Verdi Square at ten," "Check out this document!" or "You have to absolutely to see this video! Or this link!" It was a continuous source of reminders of what had been done and what we still needed to do. Like when everything was over, a meeting, a rally, a lesson in the square, the mailing list was the first source of information and reflection, it was the center, the heart of our collective.

This finding reminds us that future scholars must take particular care not to fall prey to fascination with the newest online applications, which can sway the critical skills of researchers exploring networked movements' media practices. New communication technologies are always introduced into a pattern of tension created by the coexistence of old and new. Such a pattern is far richer than any single medium that becomes a focus of interest because it is novel (Marvin, 1990). Neglecting the pattern into which a new technology is inserted can lead to celebrating and overemphasizing the roles of particular Internet platforms just because of their newness or temporal appeal (Morozov, 2011). Other ethnographic studies, such as that by Nielsen (2009), have demonstrated that at present, mundane Internet tools (e.g., e-mail) can be integrated into mobilizing practices much more deeply than emerging tools (e.g., social networking sites).

As this research has shown, one of the main tasks of future studies on social movements and media will be to avoid the dangers of the one-medium bias and the trap of the attractiveness of the latest, cutting-edge applications for activism. Such applications can initially attract much attention, but may actually not be the most ingrained and effective tools in social movements' repertoires.

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