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The limits of DeCSS posting: a comparison of internet posting of DVD circumvention devices in the European Union and China

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Abstract.

This study explored differences in DeCSS posting between EU member nations, the PRC, Hong Kong, and Macau. DeCSS is a software program that circumvents DVD copy and access protection systems. The study investigated the number of websites in each nation that posted DeCSS. The study also examined the degree to which website authors included political speech on their websites referring to changes in copyright law brought about by World Intellectual Property Organization Treaty requirements. It also examined whether or not websites made reference to Free/Open Source software. Results found no DeCSS posting websites in the PRC, Macau, Luxembourg, Spain or Portugal; and results found few DeCSS posting websites in Hong Kong, Ireland, Italy and Greece. Results show more DeCSS posting websites in northern EU nations, especially the Netherlands, Germany, the UK and France. The paper draws on institutional theory and collective action theory to suggest explanations for the observed differences in DeCSS posting.

Keywords: DeCSS; copyright; digital rights management; anti-circumvention; EUCD; open source software; intellectual property; WIPO; protest; collective action; social informatics

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1. Introduction

The motion picture industry claims that up to 24% of internet users have downloaded an unauthorized copy of a movie from the internet, and that unauthorized movie downloading will increase globally as broadband penetration spreads [1]. Fear stemming from the difficulties of regulating copyright over the internet [2], combined with the desire to increase control over consumer use of movies released on DVDs, led movie copyright owners to develop and institute a protection architecture known as the Content Scrambling System,

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or 'CSS' [3]. While protection from large scale piracy seems uncontroversial, CSS also prevents several arguably legal uses of DVDs, such as the taking of short clips from legally purchased DVDs for use in a non-commercial classroom presentation, skipping commercials, playing DVDs produced in a different region of the world, and playing DVDs on non-licensed playback devices – for example those created by Free/Open Source (F/OS) development teams.

In the fall of 1999 a group of European hackers released a program called 'DeCSS' on the internet. DeCSS circumvents the CSS architecture protecting DVDs, thereby facilitating a variety of unauthorized uses. Before long, numerous website authors posted DeCSS. The major motion picture studios sued many DeCSS posters, including Eric Corley, the American operator of an online hacker magazine known as 2600, under the 'anti-circumvention' provisions of US copyright law. Soon DeCSS became a cause célèbre among online activists in the US and European Union (EU), and within the F/OS software community.

The anti-circumvention provisions of US and many EU member nations' laws are part of a wave of laws being promulgated around the world in order to comply with two 1996 World Intellectual Property Organization (WIPO) treaties. From intellectual property owners' perspective, these treaties create an environment conducive to investment in intellectual property (IP) by raising legal protections. The treaties require member nations to pass laws that restrict the circumvention of protection architectures such as the CSS on DVDs [4]. Many jurisdictions, including numerous EU nations, Hong Kong, the People's Republic of China (PRC), and the US have passed anti-circumvention laws in order to come into compliance with, and eventually become a party to, the WIPO treaties.

Since the beginning of the Corley case, DeCSS has become an embattled cultural icon in the larger debates surrounding anti-circumvention laws, use-rights related to protected digital materials, and the global harmonization of copyright law [5]. Copyright owners portray DeCSS and other circumvention devices as piracy tools that facilitate theft of intellectual property. But consumer, fair use, and F/OS software advocates argue that circumvention devices like DeCSS are a means by which consumers can retain rights as access and use of digital content becomes more tightly controlled.

DeCSS is widely available on the internet today. Its persistence is noteworthy because posting DeCSS is now arguably prohibited in many nations due to anti-circumvention laws. Further, numerous more user-friendly F/OS DVD players are also available for downloading, and new DVD copyright protection tools are forthcoming, making DeCSS somewhat obsolete [6].

Some have suggested that there needs to be a social movement to roll back the changes to copyright laws [7, 8]. Past research has explained the persistence of DeCSS posting by suggesting that some website authors post DeCSS in order to protest changes in copyright laws that decrease consumers' rights in relation to lawfully purchased digital works such as DVDs [9, 10]. We refer to this use of DeCSS as 'protest posting.'

Past research described DeCSS protest posting in English language websites – predominately Northern European and US in origin [9, 10]. Given that the WIPO treaties encourage copyright law changes globally, one might expect to see DeCSS protest posting in all nations that have passed, or are contemplating passing, anti-circumvention laws. But we have little data about the nature of DeCSS posting in other nations.

In order to begin examination of non-US/Northern Europe DeCSS posting, we investigated DeCSS posting in the PRC (including the Special Administrative Regions of Hong Kong and Macau, which we treated as separate jurisdictions for the purposes of our data collection and analysis) and compared it with DeCSS posting in the 15 nations in the EU prior to the EU's 2004 expansion.[1] Examining samples of websites, we sought to determine whether the website authors posted DeCSS to protest changes in national copyright laws brought on by compliance with the WIPO treaties and the potential loss of user rights.

The study results show no evidence of DeCSS protest posting in Luxembourg, Spain, Portugal, the PRC, or Macau. Further, results show only minor DeCSS posting in Hong Kong, Ireland, Italy, and Greece. But we did find strong evidence of DeCSS protest posting in the Netherlands, Germany, and the UK.

2. Theoretical views of DeCSS posting

This paper draws on two complementary theories to examine differences in DeCSS posting: institutional theory and collective action theory. Institutional theory explains social phenomena in terms of institutional forces that empower and constrain choices for individual actors [11, 12]. Institutions are defined as social structures with a high degree of resilience [12]. Institutions define social roles and identities, rules and enforcement mechanisms, and situations and strategies [13]. Society is seen as composed of a diversity of competing or cooperating institutions such as legal systems, cultural or professional norms, and shared belief

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systems. Any given individual is located within multiple and sometimes conflicting institutions [14]. Institutional theory distinguishes between *regulative institutions*, such as laws and governance systems; *normative institutions*, such as values, norms, and expectations; and *cultural-cognitive institutions*, such as shared understandings [12]. An institutional view might explain variations in DeCSS posting in terms of differences in the regulative, normative, and cultural-cognitive institutions that enable or constrain potential DeCSS posters.

Collective action theory, a complementary theory, investigates how individuals develop and sustain collaborative contentious action against power holders [15]. It emphasizes the role of *mobilizing structures* (e.g., group affiliation or social networks) in mobilizing and sustaining individuals' collective action participation. The theory also posits that successful movements use *collective action symbols* (e.g., icons, language or dress) to produce consensus, develop shared meaning and mobilize protest participants. Coordinated use of these symbols can produce *collective action frames* that communicate a uniform message designed to appeal to current cultural values and beliefs while portraying a target situation as unjust or intolerable [15]. The theory also recognizes that particular *opportunities and threats* affect the development and continuation of collective action. A collective action view might explain variations in DeCSS posting in terms of whether computer users in various geographical locations are linked to mobilizing structures that encourage action, whether the frames and symbols of the protest resonate with geographically disparate groups, and how key actor groups perceive opportunities and threats in the environment.

In examining DeCSS posting, we sought to maximize variance of piracy rates and cultural conceptions of copyright so that we could observe DeCSS posting under very different contexts. To do so, we collected data from two regions with different copyright traditions and piracy rates: the EU member nations (pre-2004), and the People's Republic of China (including the Special Administrative Regions of Hong Kong and Macau). We sought to answer three main research questions:

RQ1. How many unique websites from each nation post DeCSS?

RQ2. To what extent do DeCSS website authors include speech related to copyright, court cases involving DeCSS, or legal arguments for or against circumvention devices?

RQ3. If there are observed variations in DeCSS posting, what explains these variations?

Internet penetration data suggest that both regions have sufficient access to the internet for residents to learn about and post DeCSS. The PRC's internet host and internet user rates remain low compared to EU nations, but recent reports suggest the PRC is second only to the US in total number of internet users [16, 17].[2]

Our research questions focus on national differences in DeCSS *posting* rather than differences in DeCSS *availability*. We did so because we are interested in explaining why individuals risk the legal penalties associated with the public act of posting a DeCSS file on the internet. We are less interested in whether or why people actually download and use DeCSS.

3. DeCSS and the WIPO treaties

In 1996, the World Intellectual Property Organization held a diplomatic conference to consider the challenges to intellectual property law posed by digital technology, and in particular the internet. Among the principal concerns on WIPO's so-called 'digital agenda' was legal protection for the technological locks that copyright owners were beginning to use to prevent unauthorized use and infringement of their works. These locks were known as 'digital rights management' (DRM) technologies, or, in legal parlance, 'technological protection measures' [18, 19]. Intellectual property interests argued that the internet made widespread infringement too easy and that copyright owners' DRM needed legal protection from those who would circumvent them with, for example, a software-based 'key' [20, 21]. The WIPO treaties therefore require contracting parties to provide 'adequate legal protection . . . against circumvention of . . . technological measures' that copyright owners use to protect their works from unauthorized acts. How exactly to implement that requirement is left to individual countries as they develop their laws [25, 26]. However, there is some evidence in the *travaux préparatoires* that the drafters of the treaty intended that the provisions include not only prohibitions on unauthorized acts of circumvention but also prohibitions on so-called 'preparatory activities' that facilitate such acts – for example manufacturing, importing, or, most importantly for this paper, distributing circumvention tools [21]. Although none of the jurisdictions we studied had become a full party to the treaties, most had passed anti-circumvention provisions in anticipation of doing so.

Past research has pointed to the importance of international regulative institutional structures such as

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WIPO in facilitating and constraining the actions of member nations and their citizens [11]. In order to observe DeCSS posting possibly inspired by changes in copyright law mandated by the WIPO treaties, we selected nations that had passed, or were in the process of passing, anti-circumvention laws. In this section we review the anti-circumvention laws in nations appearing in our results.

3.1. Anti-circumvention law in the European Union

In order to comply with the WIPO Treaties the European Union passed the 'EU Copyright Directive' ('EUCD') in May 2001. The EUCD requires all EU member nations to pass anti-circumvention provisions protecting copyright owners' DRM or 'technological protection measures' [22–25].

One country (Ireland) already had anti-circumvention provisions in its laws prior to promulgation of the EUCD. The remaining EU nations were to have passed such laws by 22 December 2002 to comply with the Directive; but as of 1 January 2004, when we collected our data, only six of the 14 other EU countries had done so (Austria, Denmark, Germany, Greece, Italy and the United Kingdom). Thus, while the other EU countries might have other doctrines in their copyright law that would prohibit the distribution of DeCSS (such as, for example, secondary liability principles), only seven of the 15 EU nations had anti-circumvention provisions explicitly prohibiting the distribution of circumvention devices at the time we conducted our data collection.[3]

Of the seven EU countries that had passed legislation prior to our data collection in January 2004, four of them (Austria, Denmark, Germany and Greece) passed laws that closely track the language of the relevant EUCD provision. Thus, the laws of those four countries prohibit the:

> distribution . . . of devices, products or components or the provision of services which: (a) are promoted, advertised or marketed for the purpose of circumvention of, or (b) have only a limited commercially significant purpose or use other than to circumvent, or (c) are primarily designed, produced, adapted or performed for the purpose of enabling or facilitating the circumvention of, any effective technological measures. (EUCD Art. 6(2); Austrian Copyright Law §§ 90c(1).2, 90c(3); Denmark Consolidated Act on Copyright 2003 § 75c(2); German Copyright Act of 9 September 1965, as amended on 10 September 2003 § 95a(3); Greek Law 3057/2002 (Official Gazette) A'239/10 October 2002 Art. 66A(3))

Although the Directive permits some exceptions for those who *use* circumvention devices, it does not explicitly permit any exception for those who *distribute* them. Therefore, the laws of Austria, Denmark, Germany and Greece follow the Directive in this regard, and contain no exception to the prohibition on distributing circumvention devices. It is quite likely, therefore, that posting DeCSS on one's website would violate the laws of these countries.

The Italian implementing legislation also tracks the language of the EU Copyright Directive, but does so in a way that arguably results in a significant legal difference. Rather than creating a new provision prohibiting the distribution of circumvention devices, the Italian decree added the prohibition to a list of other types of copyright infringement. Importantly, penalties to this class of infringements are limited to cases in which the actions taken are done for non-personal uses and with a profit motive. (Italian Copyright Law Art. 171-ter (f-bis); Legislative Decree of Apr. 8, 2003, no. 68, Art. 26(2).) There does not appear to be any clear prohibition on the non-commercial distribution of circumvention devices. If the Italian law were read literally, posting DeCSS on a website – if done for non-commercial purposes – would likely be permitted. How the law will be read, however, remains an open question.

The British law also places limitations on the prohibition of distributing circumvention devices, prohibiting such distribution only if it is done 'in the course of a business,' or 'to such an extent as to affect prejudicially the copyright owner.' (United Kingdom Copyright, Designs and Patents Act 1988 § 296ZB (1)(c), (1)(d).) Thus, as with Italian law, there is a good argument that the mere posting of DeCSS would not violate the law, as long as it was not being done 'in the course of a business' and assuming studios could not present some evidence of specific harm.

The Irish law, which was promulgated prior to the Directive in 2000, differs from the specific language of the Directive. While Irish law does not prohibit the distribution of circumvention devices, it does prohibit having such a device in one's 'possession, custody or control.' (Irish Copyright and Related Rights Act, 2000 § 140(4)(a)(iv).) It is highly likely that posting DeCSS on a website would constitute 'possession, custody or control' sufficient to violate Irish law.

3.2. Anti-circumvention law in the PRC, Hong Kong, and Macau

In October 2001, the PRC revised its copyright law to comport with the WIPO Treaties [28]. In China, circumvention itself is prohibited as a form of infringement and it is therefore subject to any applicable limitations

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or exceptions that would apply to ordinary copyright infringement [29]. But there is no explicit prohibition on the distribution of circumvention devices. It is therefore unclear whether the distribution of DeCSS (i.e. by posting it on a website) would violate Chinese law [30].

In 1997, Hong Kong completely rewrote its copyright law, becoming one of the first jurisdictions in the world to incorporate an anti-circumvention provision into its law [31]. Hong Kong's law permits circumvention but prohibits the dealing with or distribution of a circumvention device where the person 'know[s] or [has] reason to believe that it will be used to make infringing copies.' [32] So, distributing or possessing a circumvention device in order to engage in activities that do not constitute copyright infringement (e.g. copying of materials in the public domain) does not violate the law. Thus, there is a good argument that the posting of DeCSS would be permitted under Hong Kong law if the website owner's only aim were to permit playing a DVD on an unauthorized player or to subvert region control coding [31].

In 1999, Macau promulgated a major revision of its copyright law, one that included a new prohibition on the 'us[ing], manufactur[ing], import[ing] or commercializ[ing]' of 'equipment designed to neutralize a technical device' used by copyright holders. One might be able to argue that the posting of DeCSS on a website without intent to profit would not be prohibited, as it would not be 'us[ing], manufactur[ing], import[ing] or commercializ[ing].' More than this, however, the law's prohibition applies only if a person is acting 'with intent to make or permit others to make unlawful copies.' (Macau Decree-Law No. 43/99/M of 16 August 1999, Art. 213.) So, as with Hong Kong law, there is a good argument that the posting of DeCSS would not violate Macau law unless the poster intended to assist in infringing copyright.

4. Normative institutions and tolerance for protest and piracy rates

Numerous other studies have illustrated how political or social organizations employ 'websites of resistance' or 'e-protest' against government or corporate actions [33, 34]. But different governments have different levels of tolerance for public protest. In addition, different societies have different traditions and norms for protest [35]. These factors may affect the level of DeCSS posting. EU nations typically have laws requiring that governments tolerate public protest. In contrast, the government of the PRC is known for its intolerance of protest, both online and off [36]. Further, the PRC is known for filtering potentially controversial internet content [37], although political activity in China continues despite censorship attempts [38].

We conducted a pretest to determine if the PRC government was blocking foreign DeCSS posting sites or had begun a campaign to eliminate DeCSS posting.[4] The tests produced no evidence of an official effort to discourage DeCSS posting. Further, shortly after data collection in April 2004, a joint China–US trade commission outlined new piracy-reduction goals for China [39]. This suggests that at the time of data collection, anti-piracy measures, such as the anti-circumvention laws, were not strongly enforced.

4.1. Piracy rates

Since DeCSS is a tool for decrypting the protection on DVDs, we suspected there might be some connection between DeCSS and DVD copyright infringement. From DeCSS's inception, the Motion Picture Association of America (MPAA) has argued that DeCSS is a piracy tool; and working from this assumption, one might expect that nations with greater piracy rates for DVDs would have more DeCSS posting websites. Looser attitudes towards intellectual property might lead to both high rates of copyright infringement and posting of infringement tools (including DeCSS). On the other hand, there might be an inverse relationship between piracy and DeCSS posting. In countries with high DVD piracy rates, people would be able to obtain cheap movies without a circumvention device, possibly reducing interest in DeCSS and removing a motivation to post it.

The relationship between DeCSS posting and piracy is likely very complex. Indeed, in our previous work on English language DeCSS posting, we found little relationship between DeCSS posting and explicit encouragement of piracy [10]. So, for the present study, our data included several nations with high DVD piracy rates in order to further explore the relationship between DVD piracy and DeCSS posting.

The United States Trade Representative's (USTR) 2004 Special 301 Report places the PRC in the '306 Monitoring' category, which includes those nations in which the US experiences significant trade losses due to piracy [40]. An International Intellectual Property Alliance (IIPA) report estimated that US companies lose 178 million dollars in motion picture revenue in the PRC, and that the PRC has a 95% piracy rate for movies [41]. Most DVD movies are also available in

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inexpensive VCD format in the PRC, and pirated versions of higher quality DVDs seem ubiquitous. Anecdotally, on a May 2004 visit to China, one of the authors found it difficult to find a legal Chinese language DVD to purchase. Macau and Hong Kong are not included in the US Trade Representative's Special 301 Report, but the IIPA recommended keeping Macau on piracy watch lists [41].

For the most part, EU members have low movie piracy rates compared to the PRC [40]. However, the IIPA lists Italy and Spain on their piracy watch lists, citing growing movie piracy rates in both nations (20% for Italy and 10% for Spain) [41]. Further, the IIPA cites a continuing problem with duplication of pre-release titles in Greece [41].

5. Cultural-cognitive institutions and conceptions of intellectual property and F/OS software usage

We also considered the possibility that differences in European and Chinese cultural traditions with regard to intellectual property and copyright might influence DeCSS posting. Although it is by no means monothematic, the continental European tradition is largely associated with authors' rights, focusing on the moral rights that inhere to the author upon creation of a copyrighted work [42, 43]. In contrast, Chinese culture is generally viewed as hostile to both the continental European authors' rights tradition and the utilitarian premise underlying Anglo-American copyright. But in recent years, China has added many IP laws in order to comply with international trade obligations and the WIPO treaties [44, 45]. Recent scholarship has questioned the conventional wisdom that China lacks a historical tradition of protection for creative works [46], but there is little doubt that there are substantial and long-standing cultural differences in attitudes towards intellectual property law.

We also considered that affiliation of website authors with the F/OS software movement might encourage DeCSS posting [9, 10]. Many have argued that DeCSS was created so that users could view legally purchased DVDs on computers using the Linux operating system because no licensed DVD players for Linux existed at the time [47], and the anti-circumvention laws outlined previously arguably have broad implications for the F/OS development community. Many fear that the laws will outlaw previously legal reverse engineering techniques intended to achieve interoperability with F/OS platforms [48–50]. Some see DeCSS, and the broader circumvention debate, as part of a move by copyright interests to exclude F/OS systems from future software and entertainment media innovations [51].

It is possible that DeCSS posting might vary based on the number of F/OS developers in a nation. F/OS is widely used across the EU and in China. Review of secondary data suggests that F/OS software use in China is behind other Asian economies – including Hong Kong – but growing rapidly [52–56]. Some argue that F/OS is an important mechanism for developing economies such as the PRC to grow [57]. Many Europeans participate in the development of F/OS software [58–61]. Further, communities within many EU member nations have used F/OS since its inception.

6. Study design and methodology

In order to obtain a sample of websites posting DeCSS in the EU and PRC, we used a search-engine-based sampling methodology [62]. We defined DeCSS posting sites as those sites that hosted a DeCSS file on the same server as the html address for the website. Our sample was drawn from the index of the Google search engine in January 2004. We used a custom search string run through the Google application programmer interface (API).

It is generally acknowledged that search-engine-based samples do not represent a random sample of all websites. Because search engines seek to index popular websites, they do not capture many unpopular sites, short-lived websites, password-protected websites, or websites that do not allow spiders. Website indexes therefore do not represent random samples from all possible websites; rather, they represent popular websites likely to be visited by average internet users [62].

The search query we entered via the API included two types of delimiters. First it specified nine key terms (variations of the DeCSS file name[5]) at least one of which had to be included on the text of the resulting web pages. The second type of delimiter was nation of origin, and we limited the search to 2003 EU member nations, China, Hong Kong and Macau.

Our sampling unit and our unit of analysis was websites posting DeCSS [63, 64]. We defined website as all web pages that appeared to be written by the primary website author or authoring organization, and that appeared under the URL prefix generated by the search result [62].

We collected data using a custom-built, open source

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software spider. The spider travelled to each of the resulting web pages, and archived a copy of all internal pages within two links. The archived pages and metadata were saved in a postgreSQL database. The search archived a total of 946 web pages.

From this set, we identified 200 unique URLs. Under this definition we counted mirror sites (sites with different URLs, but the same content) as two different websites. But if a website appeared more than once in the results because it posted DeCSS in multiple file formats (e.g. .zip and .gz), or it posted DeCSS in multiple directories on one URL prefix, we only counted the URL once.

We removed sites that no longer functioned, news stories about DeCSS which did not include the code, sites linking to DeCSS on a secondary site, and sites posting to the html style sheet remover, also named 'DeCSS', that does not circumvent the CSS on DVDs [10, 65].[6] We were left with a total of 87 unique websites that contained a functional copy of DeCSS to download or a textual form of DeCSS (i.e. written source code or binary strings). We refer to these sites as DeCSS posting sites.

After a final list of DeCSS posting websites was produced, paper copies of the websites were printed out to facilitate their translation and content analysis. Results included websites written in English, French, Spanish, German, Dutch, Danish, Italian, Swedish, Norwegian, and Chinese. The study team recruited students who were native or experienced speakers of each of the languages to translate the websites into English. Further data analysis was done from the translated copies of the websites.

In our content analysis we examined three elements of the websites:

(1) the nation of origin of the website as indicated by the Google index;
(2) the existence of 'DeCSS speech,' or text or images in which the author commented on copyright law, DeCSS-related court cases, reverse engineering, free speech related to computer code, region coding, or laws related to circumvention devices; and
(3) the existence of text or images in which the author referenced the F/OS community or F/OS software such as Linux.

7. Results

7.1. Number of unique websites returned in results

Table 1 lists the 87 DeCSS posting websites by country. Looking at the results, one can see that the PRC, Macau,

Table 1
Number of DeCSS posting websites

Nation	# websites posting DeCSS	# websites also containing DeCSS speech	# sites also referencing F/OS
Netherlands	21	10	15
Germany	20	9	13
France	13	5	5
UK	11	6	6
Sweden	6	3	3
Austria	5	3	3
Denmark	3	1	2
Belgium	2	1	0
Finland	2	1	2
Greece	1	1	0
Ireland	1	0	0
Italy	1	0	0
Hong Kong	1	1	1
Luxembourg	0	0	0
Portugal	0	0	0
Spain	0	0	0
Macau	0	0	0
PRC (* = broadened sample)	0 (14*)	0	0 (2*)
Total (not including *)	87	41	50

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Luxembourg, Portugal, and Spain produced no results. This was our most surprising finding. In addition, a number of other nations produced a very small number of results including Greece, Hong Kong, Ireland, and Italy.

Given the large number of internet users and high movie piracy rates in China, we initially suspected that the lack of DeCSS posting sites in the PRC data might stem from a bias in the Google index. In order to test for this bias, we expanded the PRC sample by running the search for the same set of nine DeCSS terms on four search engines popular within the PRC.[7] This generated 14 new websites; however none qualified as DeCSS posting sites for our analysis purposes. Several EU member nations produced a large number of results including the Netherlands, Germany, France, and the UK.

7.2. Number of websites containing DeCSS speech

Table 1 also summarizes the number of DeCSS posting sites that contained DeCSS speech. Less than half the websites we found contained DeCSS speech. Because our results for some nations produced no DeCSS posting sites, we could conduct no further analysis for these nations. But because we especially wished to compare DeCSS posting in the EU and the PRC, we broadened our PRC sample further to include the non-functional DeCSS sites from both the original search and the second (Chinese search engine) search. While this decision limits the comparisons we can make between PRC and EU posting, it was necessary given the lack of PRC websites that fit our initial criteria. We refer to this sample of four sites from the original sample and 10 sites from the Chinese search engines as the 'broadened sample.' But we found that none of these broadened sample sites contained DeCSS speech either. The one Hong Kong DeCSS posting site did contain DeCSS speech.

In those EU nations with DeCSS posting sites, typically slightly less than half of the sites contained DeCSS speech. Of those sites that did, several mentioned the EU Copyright Directive and a few sites even mentioned the names of national level anti-circumvention laws.

7.3. DeCSS posting and references to F/OS

Table 1 also lists the number of DeCSS posting websites that referred to F/OS software or the F/OS software community. More than half the sites we found made reference to F/OS. Using the broadened PRC sample of PRC sites, we found two sites that made reference to F/OS software. The first site consisted of a list of popular software (including cracks), and included a link to Linux resources on another website. The second site included an advertisement for Linux training. The Hong Kong DeCSS posting site also referred to F/OS.

Within the EU, Germany, the Netherlands, and the UK contained references to F/OS. France also contained many F/OS sites. Further, in nations with only a few DeCSS posting sites, the majority of those sites contained references to F/OS (e.g. Austria, Denmark, Finland, Sweden).

8. Theoretical explanations for the observed variance in DeCSS posting

We were surprised by the lack of DeCSS posting sites in many nations in our results. For example, while we had suspected that we might find fewer DeCSS posting sites in nations with high rates of DVD piracy, we did not expect to find no functional sites. We were particularly surprised by the lack of DeCSS posting in the EU nations of Luxembourg, Spain and Portugal, and the small numbers generated for other nations like Italy, Ireland and Greece.

Institutional theory suggests several possible explanations for variance in DeCSS posting across nations. The theory emphasizes how regulative, normative, and cultural-cognitive forces can both empower and constrain choices for individual actors, such as the choice of whether or not to post DeCSS [11, 12].

Regulative institutions like law and government actions might provide an explanation for variance in DeCSS posting, but our data do not support this. We found no relationship between DeCSS posting and passage of national level anti-circumvention laws. Some nations with high levels of DeCSS posting had passed laws (e.g. Germany) but others had not (e.g. France and the Netherlands). Some nations that had passed laws showed lower rates of DeCSS posting (e.g. Ireland, Italy, Greece, Denmark) but others had high rates of posting (e.g. Germany). We also could not find a correlation between posting and legal exemptions for non-commercial distribution of circumvention devices. For example, Ireland and Italy had equivalent numbers of DeCSS posting sites (one each) but Italian law provides an exemption for non-commercial distribution, while the Irish law does not.

To be sure, all of the anti-circumvention laws are new, and so the lack of a clear relationship between law and DeCSS posting could simply be the result of a lag

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time in the impact of legal changes. But the lack of correlation also complies with institutional theory views of law as an opportunity for social interpretation and meaning-making between regulators and the regulated, rather than as a tool for direct coercion [12]. More ethnographic work is required to better understand how law influences DeCSS posting. Nonetheless, our data suggest that whether or not a nation has a law that arguably prohibits the posting of DeCSS makes little difference to the incidence of such posting – at least in the short term.

It is difficult to say whether government censorship could explain the lack of DeCSS posting in the PRC. Our preliminary testing had led us to believe that DeCSS posting was not a censorship target. On the other hand, numerous foreign news sources have noted that government censorship is still rife in the PRC and the government has begun new initiatives to monitor internet usage in cyber cafés and other access points [66, 67]. IP industry groups also report using automated spiders to locate pirated movies on PRC servers [41]. It could be that these spiders also search for the DeCSS files and lead to requests to server administrators to remove the file.

Internet penetration rates provide some explanation for the observed variance. One would expect that nations with higher numbers of internet users and internet hosts would have more DeCSS posting, and our data show that in general this is the case (see Table 2 – sorted by number of DeCSS posting sites descending). Examining the data in Table 2, however, one can easily see exceptions to this relationship. For example, Italy has a similar number of users to France and a similar number of hosts to Sweden, but fewer DeCSS posting sites. Spain has more users and hosts than many nations, but no DeCSS posting. And the PRC has a huge internet user population compared to most EU nations, and no DeCSS posting. This suggests that while internet penetration may enable DeCSS posting, it does not necessarily promote it.

From a cultural-cognitive standpoint, we expected that DeCSS posting might vary by proximity to Norway, as Norway had prosecuted Jon Johansen, one of the creators of DeCSS. The data do not support this expectation as Finland had a relatively low number of DeCSS posting sites.

From a normative standpoint, we began the study with the expectation that differences in F/OS developer populations might explain variations in DeCSS posting [9, 10]. Our data provide contradictory evidence. Most contributors to F/OS projects are located in France, Germany, or the UK, followed by Italy and the Netherlands [58–60]. On one hand, this fact comports with our findings that four of those five countries had the

Table 2
DeCSS posting websites, internet users and internet hosts by EU nations ranked in terms of number of DeCSS posting sites

Nation	# DeCSS posting sites	2002 ITU survey internet users (millions)	2002 ITU survey internet hosts (100k)
Netherlands	21	8.20	31.37
Germany	20	34.00	25.94
France	13	18.72	13.89
UK	11	25.00	28.66
Sweden	6	5.13	8.49
Austria	5	3.34	3.68
Denmark	3	2.76	8.37
Finland	2	2.65	12.20
Belgium	2	3.40	3.37
Italy	1	19.9	6.73
Greece	1	1.70	1.61
Ireland	1	1.10	1.36
Hong Kong	1	2.92	3.90
Portugal	0	2.00	1.65
Spain	0	6.36	5.90
Luxembourg	0	0.17	0.17
PRC	0	59.00	1.50
Macau	0	0.00	0.12

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most DeCSS posting sites: The Netherlands hosted the most DeCSS posting sites, followed by Germany, France, and the UK. On the other hand, our results show little DeCSS posting in Italy and Spain, nations home to more F/OS developers than many nations with higher levels of DeCSS posting. Given the number of F/OS developers in Italy and Spain, we expected more DeCSS posting. The lack of correlation suggests that either not all F/OS developers are equally motivated to post DeCSS, or that F/OS usage is not a good explanation for the DeCSS posting in the Netherlands, Germany, France and the UK. We continue this discussion later within the context of collective action theory.

Also from a normative perspective, one aim of the study was to explore the possible relationship between DeCSS posting and piracy rates for DVDs. Our data show that high piracy rates do not coincide with high DeCSS posting. Rather, Greece, Italy, Spain and China have higher piracy rates and less DeCSS posting than other nations with comparable internet user/host populations [41]. And nations with the highest DeCSS posting rates (e.g., Holland, Germany) have lower piracy rates. There are exceptions to this relationship, but only when the numbers are low for both variables; some nations with low DeCSS posting rates (e.g. Luxembourg, Portugal) also have low piracy rates [40, 41].

But our data also suggest that DeCSS posting may sometimes be linked with piracy. Examining the non-functional DeCSS sites in the broadened sample, we found the DeCSS link was often presented in a context consonant with the MPAA's view of DeCSS as a piracy tool. Most of the PRC websites in our broadened PRC sample were large collections of audio/video or security cracking tools. Further, the PRC websites had names like 'DVD Rippers,' 'DeCoding,' 'Most Used DeCoding Software,' and 'Popular Cracking Utilities.' Finally, the DeCSS file had been placed in categories of software such as 'decoding software,' along with files such as 'CRACKCODE 2000' and 'Email CRACK.' Further, no PRC DeCSS site contained any speech linking DeCSS to changes in copyright law or the other legal issues related with the WIPO treaties. It is likely that PRC DeCSS posters did not associate DeCSS with protest, and therefore did not include any DeCSS speech.

In contrast, we found no contextual linkage between DeCSS posting and piracy in the EU. EU DeCSS sites, including the sites in Italy and Greece, did not place DeCSS in a piracy context. The DeCSS file was often presented by itself; or, sometimes it was presented as part of a collection of files unrelated to audio/video or cracking software. Titles for EU DeCSS sites included 'Linux DVD,' 'DeCSS Mirror List,' 'DeCSS Central,' and 'You Have One Bat, and There Are 100 Million Holes.' It could be, however, that further data collection of non-functioning DeCSS sites in the EU might reveal more DeCSS posting associated with audio/visual piracy or security cracking.

While our data suggest an inverse relationship between DeCSS posting and piracy, it could be that no relationship exists between the two. It could be that DeCSS posting has nothing to do with high or low piracy rates and that the correlation we found is spurious; after all, a would-be pirate in a zero DeCSS posting nation could easily download DeCSS from the Netherlands or Germany to begin copying DVDs.

None of the institutional factors we examined provides a completely satisfactory explanation for variance in DeCSS posting. But summarizing our institutional analysis we can say that nations with low internet penetration and fewer English speakers tend to have less DeCSS posting than nations with higher internet penetration and more English speakers [68]. Further, nations with higher piracy rates tend to have low DeCSS posting. Finally, nations with very high numbers of F/OS developers tend to have more DeCSS posting, although numerous nations with sizable F/OS developer populations had little DeCSS posting.

Collective action theory, which grows out of institutional theory, provides a complementary lens to explain variance in DeCSS posting. Collective action theory investigates how and why individuals come together to develop and sustain collaborative contentious action against power holders [15]. The theory emphasizes the role of mobilizing structures such as group affiliation or social networks in generating and sustaining collective action; the use of cultural symbols such as icons, language, or dress as collective action symbols to produce consensus, develop shared meaning, and mobilize protest participants; the coordinated use of symbols and meaning to produce collective action frames that communicate a uniform message; and the interpretation of particular opportunities and threats in the environment by key actors [15]. If we view DeCSS posting as a form of contentious action, and DeCSS itself as a collective action symbol, the theory explains variation in DeCSS posting in terms of differences in mobilizing structures, collective action frames, and opportunities and threats across time and space [15].

We have argued that DeCSS holds special significance for the F/OS community because digital rights management technologies (of which CSS is one

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example) arguably deter F/OS development [49, 69]. Further, some F/OS users oppose anti-circumvention laws due to their desire to avoid using commercial operating systems to access consumer media such as DVDs.

It seems reasonable to posit that the F/OS community acted as a mobilizing structure to educate computer users about DeCSS and to encourage them to post it. But as described earlier, our data do not show a clear relationship between numbers of F/OS developers and DeCSS posting. Some nations with growing populations of F/OS developers (e.g., Italy, Spain, and China) do not show any significant DeCSS posting. This suggests that the F/OS community does not function as a mobilizing structure equally well across space and time.

There are several possible explanations for the observed variation. First, it is possible that language differences limit the ability of the F/OS community to mobilize new DeCSS posters. For example, learning about the political significance of DeCSS may require fluency in English, and EU data show that Spain, Portugal, and Italy have fewer citizens who speak English as a second language than other non-Anglophone nations. But differences in language use do not provide a complete explanation for the observed variance. Some small Anglophone or heavily English speaking nations (Ireland and Luxembourg) had little DeCSS posting.

Regionalization of the F/OS developer community is another possible explanation. Numerous nations have begun their own F/OS development projects; and regionalized projects may have less interaction with F/OS developers from other nations.[8] This would reduce the opportunity to learn about issues, like DeCSS, considered important by other F/OS developers.

It is also possible that the collective action frame currently surrounding DeCSS may not appeal equally to all F/OS developers across different nations. The current collective action frame appeals to rights such as fair use, free speech, and the right to tinker [10]. But F/OS communities in different nations may be concerned with different issues. For example, in China, Hong Kong or Macau, F/OS developers may be more concerned about political or religious repression. Likewise, perhaps F/OS developers in Italy and Spain are focused on other issues. F/OS developers are not a homogeneous group [61, 70, 71].

Another explanation is that a 'generation gap' exists stemming from the changing threats and opportunities surrounding DeCSS. More experienced F/OS developers might have been motivated to post DeCSS in 2000 and 2001 during the Corley litigation, and may continue to do so. But DeCSS may not have retained its power as a collective action symbol to mobilize newer F/OS developers, who may be focused on other issues.

Several changes in threats and opportunities may have contributed to this generation gap. First, when movie studios initially brought a suit against Corley and others in the United States, DeCSS represented a unique opportunity to play DVDs without using a commercial operating system. But by the time of data collection, other F/OS DVD players were widely available. Further, the highly visible suits against Corley, Bunner and Reimerdes in the United States and Johansen in Norway likely motivated many to post the software in 2000 and 2001. It may be that new F/OS developers do not perceive a threat because no new lawsuits have been brought against DeCSS posters in the US or the EU. Finally, the lack of more recent suits means that DeCSS has not commanded news headlines. Perhaps new F/OS developers are less aware of DeCSS, and therefore less motivated to post it. It may be that attention has shifted to circumvention devices related to other products such as digital music files or video game platforms.[9]

On a related note, it may be that the continued wide availability of DeCSS on the internet has discouraged new F/OS developers from posting it. They may feel confident that the MPAA has failed to have DeCSS files removed and no further action is therefore necessary.

On the other hand, our data collection took place while numerous EU nations were in the process of implementing the anti-circumvention provision of the EUCD. One might have expected that news about this new threat would have encouraged more DeCSS posting. Indeed, it may have encouraged much of the EU DeCSS posting that we did observe – several EU DeCSS posting sites specifically mentioned the EUCD. More data collection is necessary to explain the variation in DeCSS posting within the EU and further explore our generation gap hypothesis.

8.1. The limits of DeCSS posting

The results begin to define some boundaries to the relationships between DeCSS, F/OS and copyright protest proposed in earlier research [9, 10]. The study data show a good deal of variance in DeCSS posting between nations – even within the EU. Further, the results show that not all nations that have active F/OS communities contain DeCSS posting. Moreover, results

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show significant differences between the representation of DeCSS in EU nations (and to some extent Hong Kong) and the PRC. Within the PRC sites we observed, DeCSS was not linked to political issues such as copyright law change, fair use, free speech, or reverse engineering. Further, DeCSS did not seem to be affiliated with F/OS. In contrast, in the EU numerous DeCSS posting sites contained references to both political issues and F/OS.

The variation in DeCSS posting and presentation suggests that DeCSS has different social meanings in different nations and it suggests that DeCSS is not employed as a collective action symbol in the PRC, Macau, Luxembourg, Portugal or Spain. Also important, the paper shows no short term relationship between DeCSS posting and national level anti-circumvention laws.

This paper can only offer tentative explanations for the observed variations in DeCSS posting across nations. An institutional analysis suggests that DeCSS posting is somewhat correlated with internet penetration, F/OS usage, and piracy rates; but the relationships are not clear. The collective action perspective suggests that variance in DeCSS may be due to weakening of the F/OS community as a mobilizing structure, and the weakening of DeCSS as a collective action symbol due to decreased threats associated with DeCSS.

These findings have significant implications for those involved in activist movements related to copyright, digital rights management, and use rights in the digital age. They suggest that the current collective action frame and mobilization structures may not motivate all potential DeCSS posters equally well. Activists wishing to motivate protest activity globally may need to develop new collective action frames or mobilization structures complementary to priority issues and existing social networks within many different nations.

The findings also hold significance for the F/OS community and studies of the sociology of F/OS. The results suggest that the cultural values shared by F/OS developers in the US and Northern Europe may not extend to the rapidly expanding F/OS community in other nations. The results suggest that adoption of F/OS software does not necessarily include adoption of the values and goals of the US/Northern European F/OS community. As the number of F/OS developers outside of the US and Northern Europe increase, the culture of F/OS software may become more fractured – with different regional norms and practices.

9. Limitations and future research

The findings from this study are subject to several limitations. First, the results are subject to sampling bias because they are drawn from a search engine index [62, 72]. The search results represent pages more likely to be included in the Google index – typically popular pages that are linked to by other highly rated pages. Thus, the results likely leave out some new or less popular websites. Further, the results do not include websites that block robots.

The study attempts to infer relationships between DeCSS posting and passage of national level anti-circumvention provisions. Both these variables are moving targets. Several EU member nations were in the process of passing anti-circumvention provisions at the time of data collection. It could be that many website authors are not yet aware that the laws of their nation have changed to prohibit their posting of DeCSS. Further, DVD technologies are changing such that CSS may no longer be the primary or sole protection tool for DVDs [73, 74].

Further, the number of nations included in this study was limited by resource constraints such as data management capacity, legal analysis resource limitations, and the need to hire translators. In order to get a better picture of the extent of DeCSS protest posting globally, further data collection is needed based on samples from other nations. The authors are currently collecting data from South Korea, Brazil and India.

Further, we deliberately excluded from our results websites that we believed posted the html style sheet remover also named 'DeCSS'. In particular, we excluded F/OS archive sites that listed DeCSS under a web/html-utils directory.[10] This exclusion may have led us to undercount the number of DeCSS posting websites. Further, posting this non-circumvention device DeCSS arguably also qualifies as an important form of collective action within the broader DeCSS/anti-circumvention debate.

Finally, our conclusion that website authors from low or no DeCSS posting nations do not recognize DeCSS as a symbol within a collective action frame may be overly simplistic. We have not spoken directly with any website authors, so we cannot say why they post DeCSS (or not), or what meanings DeCSS has for them. It may be that these authors are well aware of the protest value attached to DeCSS, but do not post DeCSS for a myriad of other reasons including censorship, high website hosting fees, availability of cheap pirated DVDs, public protest norms and traditions, and more

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immediate protest aims. Further research involving interviews with or surveys of DeCSS site authors is necessary to better understand why DeCSS posting does or does not occur.

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Endnotes

(1) All references in this paper to 'the EU' or 'EU nations' are limited to the 15 nations in the EU prior to 1 May 2004.

(2) Looking at the International Telecommunications Union (ITU) 2002 data, the PRC has more overall internet users than any single EU nation. It has host numbers similar to Greece, Ireland, and Portugal. The number of internet users in Hong Kong is similar to some smaller EU nations. The numbers of users and hosts in both Macau and Luxembourg are very small [17].

(3) Since then, both Luxembourg and the Netherlands have passed laws transposing the EUCD [27].

(4) Using a proxy web server maintained by the Berkman Center for Internet Law and Society at Harvard Law School that routes web page requests through servers in the PRC, we successfully accessed two well-known DeCSS posting sites: Dr David Touretzky's Gallery of DeCSS Descramblers and www.lemuria.org. More information about the proxy server system is available through the Berkman Center at http://cyber.law.harvard.edu/filtering/china/. Further, we searched the last two years of several national Chinese news sources using DeCSS as a keyword.

(5) The nine file names are: css-auth.tar.gz, css-auth.tgz, decss.c, decss.exe, decss.pl, decss.tar, decss.tar.bz2, decss.tar.gz, decss.zip

(6) We excluded DeCSS websites with the following characteristics: (a) F/OS distribution sites listed under a web/html-utils/directory structure. (b) Websites that mentioned 'PigDog'. (c) Websites that stated the software provided was the style sheet remover. We assumed that all of these websites contained the style sheet remover as opposed to the CSS circumvention device.

(7) These included www.sina.com.cn, www.sohu.com, www.yahoo.com.cn, and www.baidu.com

(8) For a list of F/OS distributions by nation, see YoLinux http://yolinux.com/TUTORIALS/LinuxListOfDistributions.html. The EU IDABC maintains a list of news about F/OS government applications by EU nation at http://europa.eu.int/idabc/en/chapter/469. In this paper, we do not consider the role of F/OS users who are not also software developers. Further data on the number of F/OS developers per nation and the longevity of use would be necessary to explore the relationship between F/OS use and DeCSS posting.

(9) We conducted a quick search for articles containing the term DeCSS in Wired Magazine, Slashdot (a popular online magazine) and The Register (a technology-oriented online newspaper from the UK) and found that coverage of DeCSS dropped dramatically between 2001 and 2004. For example, Wired carried 23 stories about DeCSS in 2001 and 1 story in 2004. Slashdot carried 34 stories in 2001 and 11 stories in 2004. The Register carried 27 stories in 2001 and 10 in 2004. The authors are currently conducting research on the posting of jhymn, a circumvention device for iTunes music files.

(10) The number of F/OS distribution sites containing a DeCSS file in a /web/html-utils directory included: Austria 2, Finland 2, France 3, Ireland 3, Italy 4, Portugal 3, Spain 2, Sweden 2, Hong Kong 2.

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