

## BEING CONNECTED TO THE INTERNET: USER'S PERCEPTIONS OF PRIVACY AND SECURITY

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*The Internet is viewed as a new mass medium with considerable potential for its users, but with important privacy and security risks as well. These issues are addressed by summarizing the latest research findings and theoretical standpoints. Also, in order to investigate how the problems of security and privacy on the Internet are perceived in contrast with traditional mass media, a survey was performed among Croatian college students that are familiar with the Internet. The results of this survey indicated that Internet users are at least partially aware of the online privacy and security risks. Also, it was found that when specific information about the causes of Internet related privacy and security risks were actually provided to the users, the Internet was viewed as even more disadvantageous in comparison to television and the press. Even though such results were anticipated, they are illustrative of the forces that negatively influence the affinity for Internet use and restrain user behavior on that medium.*

**Keywords:** Internet, privacy, security, survey, mass media, television, press.

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### 1. INTRODUCTION

This paper addresses the problems of *privacy* and *security* for Internet users, as well as some other issues that may *negatively* influence the affinity for Internet use. Since consumers are likely to have a tendency toward mixing a variety of media [5], the Internet could be viewed as competing with television and the press for an audience. Even though the Internet is without doubt a less private or secure type of mass media for the user, an assessment of the perceptions of privacy and security when using the Internet, in relation to privacy and security with television and the press, could provide information about the level of awareness that Internet users have regarding these issues. Therefore, an effort was made to present the results of a recent survey on this topic and position them within the context of other novel empirical findings and theoretical viewpoints about the Internet.

After reflecting on the positive trends regarding the Internet as a new mass medium in the first part of this paper, the privacy and security issues associated with the use of the Internet are briefly elaborated upon. Then, related results of a survey of comparative perceptions of the Internet in contrast to television and the press are presented and discussed.

## 2. THE INTERNET AS A NEW MASS MEDIUM

Within a society still dominated by television and the press, the Internet is creating a new communication culture with increased individualization, fragmentation, specialization, and decentralization [9]. In comparison with traditional media, there are additional motives for Internet use [19], and its technical features, like interactivity, shape it into a startlingly different form of mass media environment [13].

Recent Internet market research conducted in 20 countries with advanced economies found that more than 295 million people were connected to the Internet from their homes [17]. According to recent polls in the U.S., approximately 37% of full-time workers have Internet access at work, and most of them (i.e. 72%) say that the use of the Internet has improved their ability to do their jobs [31]. There is also a considerable increase in the number of people that use the Internet in less advanced economic environments and, for instance, in China the number of computers connected to the Internet has grown tenfold between 1997 and 1999 [21].

Current research results on the use of media in the U.S. imply that consumers divide their time among the media that is available to them, i.e. that the more time a user devotes to the use of the Internet, the less time he/she will spend using traditional media [16]. For instance, in the U.S., there has been a notable decline in the number of people who watch broadcast news and this is related to the fact that the Internet has rapidly become a *news source* [12]. Also, significant threats are imposed on the culture of print because of the Internet competition, i.e. inexpensive and more specialized *online sources of information* for Internet users [10].

## 3. THE ISSUES OF INTERNET PRIVACY AND SECURITY

Despite indubitably favorable trends, one must not believe that there is only gratification and promise for the Internet community because there are problems too. They are reflected by the intensified interest in Internet security issues [11], along with growing concerns for Internet privacy and the way this affects human rights [7], as well as how it affects consumers and businesses [1]. To address these issues, let us consider an anecdote associated with some of the commercial forces that drive toward the violation of Internet privacy<sup>1</sup>.

"In a conference discussion on commercial misuse of personal data of Internet users, a *Caucasian male graduate student* from the US disclosed how he addressed the problem of protecting his *online* privacy. When asked for his e-mail address and particular personal information to be able to access various sites and services on the World Wide Web, he often falsely identified himself as an *Afro-American middle-aged female*. However, by concealing his identity in that way he had created an adverse effect, i.e. in his *inbox* he often received unwanted advertising e-mail messages or *spam*<sup>2</sup> targeted for that alternate cyber identity."

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<sup>1</sup> For a detailed elaboration of this issue see: [24].

<sup>2</sup> *Spam* is a term used to denote *unsolicited commercial e-mail* or "junk e-mail" used predominately for direct marketing purposes. The problems related to *spam* are outlined at <http://www.cauce.org/about/problem.shtml>.

This particular story is an illustration of some of the misuses of the Internet and how they can affect its users. There is risk of privacy violation when visiting Web sites that offer goods and services, but that also require personal information from their customers. Furthermore, Internet advertising firms use *cookies*<sup>3</sup> to identify and follow members of the Internet audience from site to site. An awareness of such risks often results in a fear of privacy violation and discomfort, or even in a feeling of abuse [14]. In fact, personal data collected *via* the Internet can be used to form speculative cyber identities of individual users. This data is sometimes sold to direct marketing firms that send e-mail messages about various products and services in an attempt to target groups of potential customers. Internet users are often dismayed by the content of such messages that are formed in relation to their vaguely and imprecisely presupposed personal characteristics and needs. Finally, this problem is augmented if such messages are sent to company servers where the content of employee e-mail is regularly monitored, as is presently the case for more than half of the major firms in the U.S. [8].

The problem of Internet (*in*)security also attracts significant interest primarily because of the following: the potential to disrupt businesses [27], the widespread reports of cyber attacks that have been detected with consequential high financial losses [18], and the increasing damage caused globally by various kinds of malicious code like the damaging *Love Letter* worm [26] that was received by millions of Internet users in the U.S. *via* e-mail [25]. However, even though as many as 25% of all the Internet users in the U.S. found out that they had a computer infected by some type of computer virus, only 4% of those connected to the Internet said that they felt threatened in some way while they were online [30].

Besides malicious code that can destroy file systems and files, or even change data, there are other Internet related threats, like the theft or misuse of private data files or passwords, as well as the misuse of credit card and social security numbers. As Internet users develop a greater awareness of these dangers, their online behavior is likely to become more restrained and cautious.

The seriousness of these problems is illustrated by the calculation that the apprehension about the potential misuse of personal information on the Internet could translate into an annual loss in online sales of 3-4 billion U.S. dollars or more in the next few years if this issue is not resolved [20]. Furthermore, instances of commercial misuse of private information collected on the Web and Internet snooping of online customers are making cover stories in top magazines [3]. The general public are also extremely concerned about the possible misuse of espionage surveillance systems like *ECHELON*, *Digital Storm*, and *Carnivore*<sup>4</sup> that enable governmental agencies to monitor private communication by telephone, fax, e-mail, and the Web. It must be emphasized that tendencies toward governmental monitoring and control of private

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<sup>3</sup> *Cookies* are small data files written to the hard drive of the computer system of the Internet user by some Web sites when they are viewed by a browser (*Internet Explorer* or *Netscape Navigator*). These data files can contain information that enable the tracking of the Web pages the user visits, and eventually to relate this data to the password, e-mail address, and other personal information the user has provided at the Web site.

<sup>4</sup> More about such systems can be found using the following keywords on popular search engines like *Yahoo*: "ECHELON", "Carnivore surveillance", "Digital Storm".

Internet traffic are spread globally, and can be found both in democratic and more totalitarian societies<sup>5</sup>.

Therefore, the initial positive image of the Internet as a new mass medium is at least in part shadowed by the issue of privacy risks for online users and these cannot be applied to the use of traditional mass media in the same way. Keeping in mind the previously outlined threat of being affected by malicious code while being *online*, it can be concluded that the Internet could be viewed as a communication environment that drastically degrades the users sphere of *privacy and anonymity*, and also reduces the degree of their *information and material security*. This brings forth the question to what extent the Internet users are aware of those disadvantages and how such knowledge can shape their perceptions when the Internet is compared with the other types of mass media like television and the press. This problem is investigated although it is apparent that many of the previously mentioned disadvantages of the Internet are not associated in a comparable way with traditional mass media, i.e. it is not likely that a media user would be exposed to the possibility of material damage or privacy violation by using the television or the press.

#### 4. PROBLEM

This research investigated the *perceptions of the disadvantageous characteristics of the Internet as a communication medium*, predominantly the perceptions of the potential risks for privacy and security violation, in relation to traditional mass media like television and the press. Also, additional interest was given to the question of how the Internet would be viewed when compared with traditional mass media after respondents are provided with specific information concerning the issues of privacy violation and online security. This was examined because such specific knowledge or experience, if more extensively acquired by Internet users, could negatively influence the affinity for Internet use, and also negatively affect the pattern of the online behavior of the Internet users.

#### 5. METHOD

A survey was performed in May 2000 on 262 Croatian students who were familiar with the Internet and had access to the Internet at college or at home. The respondents were from 4 different colleges, aged from 20 to 27, at least sophomore in their year at college and higher, and about two thirds of them were male. Even though all of the students had free Internet access at their college, about 33% of them connected to the Internet by modem and *via* a commercial Internet provider. Most of the students had some technical knowledge of the Internet and they used the Internet at least 1 hour per week. It was concluded that no significant difference was found among subgroups of subjects in their responses to the survey questions regarding factors like the type of college they attended, their gender, or the main way they connected to the Internet.

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<sup>5</sup> Numerous illustrations of worldwide Internet related abuse of individual rights can be found at the *Global Internet Liberty Campaign* Web site: <http://www.gilc.org/alert>.

The first part of the questionnaire used in the survey was designed for the collection of the demographic data. The second part of the survey was the most extensive and it was here that the respondents performed a comparative evaluation of the Internet in relation to television and the press while considering the characteristics that were both favorable and unfavorable for the Internet. In the third and final part of the survey the respondents performed comparative evaluations of the Internet after they were provided with various specific information regarding its most unfavorable attributes<sup>6</sup>.

## 6. RESULTS

When the subjects were asked to compare the Internet with television and the press in relation to *the possibility that the distributor of information is collecting data about the media content that the media consumer / user is paying attention to*, most of the subjects, as was expected, perceived the Internet as the medium that is more *disadvantageous* than television or the press (see Figure 1). A similar range of responses (as in Figure 1) from the subjects in this research were obtained in relation to *the possible monitoring of consumer / user interest for specific content on behalf of the information source without the knowledge of the consumer / user*. Even more disadvantageous comparative evaluations of the Internet were found while considering (a) *the possibility of some third party entering the communication channel and collecting information about consumer attention to media content*, and (b) *the possibility that earlier use of a medium is used by a third party to determine the content that the consumer / user was exposed to*.

Analogous results were obtained when the subjects compared the Internet with television and the press after they were provided with information about (a) secret governmental agencies being connected to Internet service providers in some countries, (b) the possibility of international eavesdropping in electronic telecommunications (i.e. telephone, fax, e-mail, and Web use), and also about (c) the so called *E.T. programs*<sup>7</sup> that secretly collect data from the computer of the user and send it to a remote Internet site. In fact, a total of 92% of the subjects considered the Internet to be more disadvantageous when evaluating on the whole *the possibility that the user unintentionally places himself/herself in a condition that enables a third party to collect data about the user illegally*. Also, about the same number of subjects unfavorably evaluated the Internet while regarding *the possibility that its use enables third parties to access data or resources that are personal, or to access confidential business data*.

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<sup>6</sup> Even though the negative information about the Internet in the final part of the survey could have been balanced with the negative information about traditional mass media, this was not done in order to test the potential changes in the perceptions of the users after exposure to increasing amount of current information about Internet security and privacy risks. Note that it is not likely that the subjects would receive equally extensive information about the comparative disadvantages of traditional mass media.

<sup>7</sup> *E.T. programs* are applications that, after being planted in the user's computer, collect information, for instance about what the user does on the Internet, and from time to time send this information to some Internet location (i.e. "phone home") without informing the user that this has been done.

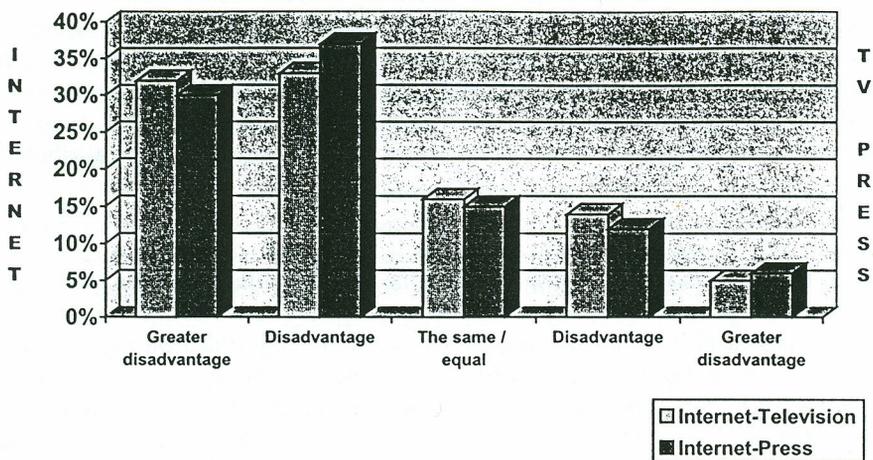


Figure 1. The responses to the question that compared the Internet and traditional mass media together, while considering the disadvantages of media, in relation to *the possibility that the distributor of the information is collecting data about the media content to which the consumer / user is paying attention* (N=262).

To summarize, it can be said that most of the subjects in this research were very much aware of the inherent possibility of a degradation of the privacy of Internet users. Therefore, the perceived risks should be taken into account along with the possible gratification for consumers because of the services available on the Internet when one is considering an affinity with this communication medium. Furthermore, the less informed Internet community should be provided with an appropriate warning about the risk of being exposed to unauthorized monitoring and surveillance *via* the Internet, as well as with the knowledge and tools to prevent such risks<sup>8</sup>.

What follows is a brief review of the means used to monitor online behavior of Internet users: (a) cookies and dynamically created "magic" cookies that monitor the history of content use within web sites; (b) a web server log file of downloaded Web pages that contains the Internet address of the computer system of the user; (c) a proxy server log file on the LAN side or on the Internet provider side of the user; (d) an Internet chat log file of the chat server; (e) Java scripts hidden within the code of the Web page that collect information about the user's identity and other data about the user that is available on the browser; (f) an e-mail and Web based communication throughout the local and global communication network; (g) *E.T. (sub)* programs in purchased or downloaded software that secretly send data from the computer of the user to a distant Internet site.

The perception of Internet (*in*)security was also investigated in this survey by considering *the possibility of experiencing material damage because of media use*. As

<sup>8</sup> Various Internet security technologies, i. e. rypography, authentication and authorization, are constantly introduced to improve the privacy and the security of the Internet users.

before, most of the subjects clearly perceived the disadvantage of the Internet in relation to television and the press when they were *not* provided with specific information about the ways their computer systems and data could be impaired (see Figure 2). However, when information on malicious code, that can be unwittingly picked up or received *via* the Internet, were presented to the respondents, the average comparative evaluation of the Internet became even more unfavorable (see Figure 3), although anti-viral programs are available and they significantly reduce such risks.

This evidential shift in the comparative perception of the Internet implies that some users could change their preference to television or the press as an information source (in general, or just for specific content) to avoid threats imposed by latent privacy or security violations if they acquire more specific information about the potential risks.

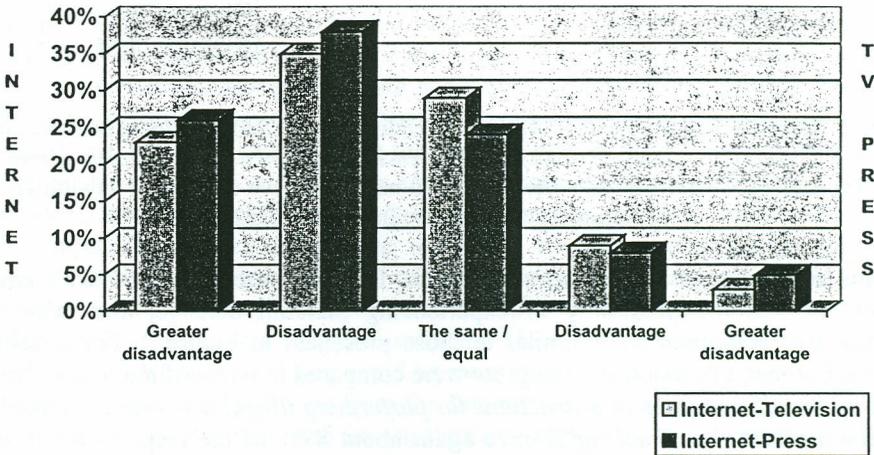


Figure 2. Responses to the question that compared the Internet and traditional mass media together and in relation to *the possibility of experiencing material damage because of media use* (the subjects were *not* previously provided with specific information about the ways their computer systems and data could be impaired; N=262).

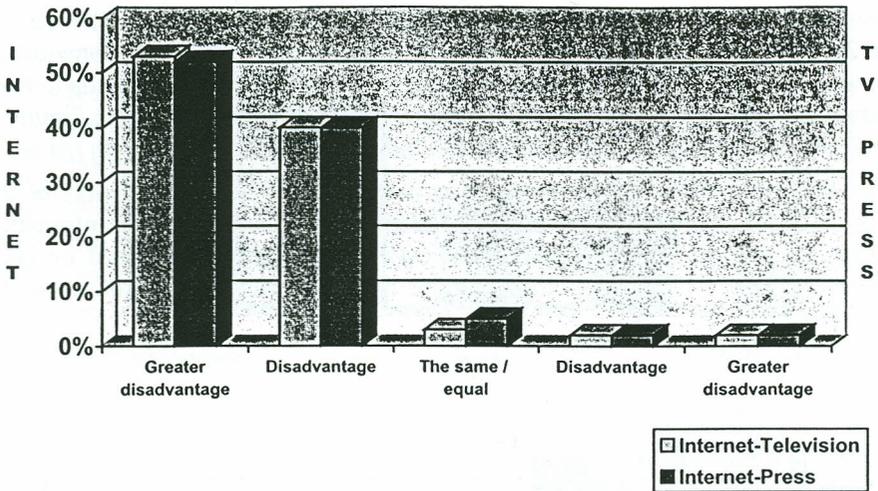


Figure 3. Responses to the question that compared the Internet and traditional mass media together and in relation to *the possibility of experiencing material damage because of media use* (the subjects were previously informed about malicious code that can be unwittingly picked up or received via the Internet; N=262).

Some other negative characteristics of the Internet were perceived with equal disfavor, as was the possibility of experiencing material damage, and even the distribution of responses were similar to those presented in Figure 3. For instance, when the Internet, television and the press were compared in terms of *the possibility of misuse of a medium to collect instructions for performing illegal acts that are linked to the same medium (i.e. "hacking")*, once again about 87% of the respondents in our survey found the Internet to be more disadvantageous.

However, the problems of privacy and security are not the only forces that could drive potential users away from using the Internet as a communication medium. *According to our study, the cost/expense of media use per time unit of usage* was regarded as equally unfavorable for the Internet, in relation to the press and television, as the previous issues, and this was felt by about 82% of the respondents. Moreover, the Internet was also viewed by the respondents as a more disadvantageous medium than television concerning the *need for the consumer / user to be technically equipped to access information*.

## 7. DISCUSSION

The results of our survey indicate that users who are familiar with the Internet and have some related technical knowledge are at least partially aware of the privacy and security risks that are associated with this medium. In comparison to television and the

press, these issues place the Internet in a less favorable position when one is considering the fact that these types of media compete for audiences.

The data that is presented in Figure 1 illustrate that the concerns for privacy of the mass media users are much more inherent with the Internet than with television or the press, even though they exist, to a lesser degree, for the traditional media too. Since traces of the online behavior of Internet users are left on many points along the activated communication channel, there is great potential for privacy violation at numerous locations, i.e. from the computers of Internet users, through the local and (*inter*)national computer networks and telecommunications systems, to the computer system of the information provider. While some Internet users may not be concerned about this problem, others are fearful that the *cyber identities* reconstructed from the leftovers of their Internet presence are only deformed and one-sided representations of their true selves and that these could be misinterpreted and misused against them. Evidently, such fears could increase an affinity for traditional communication media in the case of at least some of the Internet users.

Comparative perceptions of the security issue associated with the different types of mass media were presented in Figure 2 and Figure 3 and these considered *the potential to experience material damage because of media use*. The respondents were asked this question for control purposes since, obviously, one cannot expect significant material damage from the use of television or the press. However, it must be emphasized that generally the responses were much more unfavorable for the Internet when the respondents had been provided with specific information about the malicious code that their computer system could pick up or receive *via* the Internet. This implies that increased user's knowledge about the potential dangers of Internet use could have an influence on their online behavior. One positive consequence could be a more extensive use of up-to-date anti-viral software. However, as a negative consequence, the visits to unfamiliar Web sites could be more constrained, and there could be more avoidance to download software from the Internet, as well as a more cautious (i.e. a more limited) use of e-mail and its attachments. Moreover, since security flaws are occasionally associated with novel software products, this could affect the adoption of Internet related technological innovations by those who want to rely less on these sorts of improvements.

Different methods that can be used to technically support the need for greater privacy and security on the Internet include anti-viral software, authentication<sup>9</sup>, authorization<sup>10</sup>, cryptography<sup>11</sup>, and pseudonymity<sup>12</sup>, among others. However, most of these techniques are difficult to fully implement, they often require additional knowledge, resources, or discipline on behalf of the Internet users, and they cannot

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<sup>9</sup> The verification of the identity of a user (a person or a program) before permitting access to the requested resource.

<sup>10</sup> This is performed by prohibiting the user (or a process) from accessing resources/information that he or she is not permitted to access.

<sup>11</sup> A method of protecting private information against unauthorized access (in situations that do not ensure physical security) by transforming readable/comprehensible information into a form that is unintelligible for those it is not intended for.

<sup>12</sup> This is done by establishing a persistent relationship of the user with the server in a way that does not reveal the user's true identity or enable the server to establish with which other servers the client has recently interacted.

prevent all the possible attacks on computer systems, for instance those performed by novel types of computer worms or viruses.

Some of the results of this survey indicate that privacy and security may not be the only issues that influence an affinity for Internet use. Diverse factors have an impact in various environments. For instance, *the need for the user to be technically equipped* (i.e. have a computer and an Internet connection) may be a much greater obstacle in less economically advanced societies. Also, *the cost/expense of media use per time unit of usage* was found in this survey to be less advantageous for the Internet and it could limit the time that someone devotes to this medium as an information source, and provide more time for the use of different forms of mass media when other communication media are competing with the Internet for an audience. Other potentially negative factors could be *computer illiteracy, linguistic incompetence, users getting into the habit of using traditional mass media, convenience, and negative attitudes toward novel technology.*

## 8. CONCLUSION

Recent trends show that consumers are skeptical about their online security and that Internet related risks are worsening [6]. In addition, the growth of the Internet is accompanied with an increasing concern for online privacy and demands for appropriate legislative intervention [2; 28]. Correspondingly, problems related to Internet privacy and security issues are attracting interest from the technical community [15] and mobilizing governmental agencies devoted to consumer protection [4].

The issues of Internet privacy and security were examined in this paper and the research results on the comparative perceptions of the Internet in contrast to television and the press was presented. As was expected, the respondents rated the Internet as more disadvantageous than traditional mass media when one examine these issues. This reflected an awareness of the subjects in this study and that they had concerns about the risks associated with the Internet, but it also indicated that unresolved problems of privacy and security online could decrease the affinity toward Internet use. As was noted earlier, this could influence the behavior of the Internet audience and have a negative impact on the economy.

Today, most national economies are entering the era of electronic commerce with *information security* considered to be one of the parameters of their *e-readiness*, along with connectivity, human capital, e-leadership, and an e-business climate [23]. Moreover, the results of the *digital divide* research indicate that economic wealth is the main reason for the gap between users and non-users of computers and the Internet [29].

According to the estimates based on a recent survey of Internet use in Croatia, less than 6% of the Croatian population (i.e. some 250,000 people) regularly use the Internet, and not more than 17% of the households have a personal computer [22]. To tell the truth, factors like having a personal computer and being able to afford the cost of an Internet connection may have more importance for the growth of the Internet

audience in such a social environment than the privacy and security issues. Computer skills and computer literacy, especially the ability to use the English language, could also affect the situation [9]. However, if the problems of Internet privacy and security remain unresolved, they will continue to influence actual Internet users and what they do online, especially as they become more informed about the disadvantages of the Internet.

Actions performed in an attempt to resolve the Internet privacy and security issues would very likely increase the effects of online publishing and electronic commerce at both national and global levels. Still, users that are motivated by the gratification of Internet use may never be able to remove the risks of being online, but they could learn to reduce and avoid those risks, as well as to influence businesses and governments to help them with this very task. Further research in this area will be conducted later in order to investigate in greater detail how privacy and security risks are perceived by Internet users in real settings and how they could influence specific user behavior on the Internet. Also, additional efforts will be made to analyze various ethical aspects of Internet security and privacy violations, as well as the impact of these risks on the affinity for Internet use and the potential shift of interest from the Internet to the traditional forms of communication media.

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## BITI POVEZAN S INTERNETOM: PITANJA PRIVATNOSTI I SIGURNOSTI

### Sažetak

*Internet se smatra novim masovnim medijem sa znatnim mogućnostima za korisnike, ali i sa važnim rizicima za njihovu privatnost i sigurnost. Ova tema razmatra se kroz pregled rezultata novijih istraživanja i teorijskih razmatranja o Internetu. Također, kako bi se istražio način na koji se problemi privatnosti i sigurnosti povezani s Internetom opažaju u odnosu prema uporabi tradicionalnih masovnih medija, na nekoliko fakulteta u Hrvatskoj provedeno je anketno istraživanje u kojem su sudjelovali studenti koji su poznavali Internet. Rezultati ankete pokazuju da su korisnici Interneta barem dijelom upoznati s rizicima koji se odnose na njihovu privatnost i sigurnost kao korisnika tog medija. Također je pronađeno da se Internet još nepovoljnije opaža u usporedbi s televizijom i tiskom kad se korisnicima Interneta daju specifičniji podaci o uzrocima spomenutih rizika. Premda su navedeni rezultati bili očekivani, oni ipak preciznije ilustriraju dio činitelja koji negativno utječu na sklonost uporabi Interneta i ograničavaju ponašanje korisnika prilikom uporabe tog medija.*

**Ključne riječi:** Internet, privatnost, sigurnost, anketa, masovni mediji, televizija, tisak.