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PARTICIPATING WITH A REAL NAME, A NICKNAME OR BY BEING ANONYMOUS? – anonymous and identifiable users' skills and Internet usage habits

Data consisting of Finnish youths' technology usage habits and ICT skill test results are analysed in this paper. The analysis focuses especially on young people's preferences in presenting themselves online: whether they act under their real name, with pseudonym, anonymously or with some combination of these, and whether or not these choices relate with the respondents' information security skills in particular and ICT skills in general. The analysed data includes responses from 3,184 youths aged between 12 and 23 years. The results show that the most preferred way to be online is under a pseudonym followed by those using their legal names, while only less than one out of ten chose to use the Internet anonymously. Girls use their legal names significantly more often than boys, while boys in their turn are pseudonymous users more often than girls. Pseudonymous users were the most competent in the ICT skill test in general and also in all three information security sub-areas. Pseudonymous use was also found to correlate with more extensive use of Internet services and digital technologies than those using their legal name or being anonymous.

Keywords: Digital identity, identifiability, anonymity, Internet usage, information security skills

1. INTRODUCTION

Surfing on the Internet and participating in interactive media can be done in identifiable and non-identifiable ways. When analysing the dimensions of identifiability versus non-identifiability, anonymity turns out to be one polar value. To be anonymous means that a person can not be identified in any terms of identity knowledge. Identity knowledge can be described as an aspect of informational privacy. Privacy is not the same as confidentiality, which involves a relationship of trust between two or more people in which personal information is known, and this information is not revealed to others, or is revealed only under

restricted conditions. Secrecy, in its turn, refers to information protection in broader means: it refers to both withholding the fact that particular information exists (e.g., that a pseudonym is in use) and to its content. There exist in fact two categories of anonymity: technical and social anonymity. Technical anonymity means the removal of meaningful identifying information, such as one's name or other identifying information from Internet communications. Social anonymity refers to the perception of others, and/or one's self, as unidentifiable because of a lack of cues to use to attribute an identity to that individual. Paradoxicallyn anonymity is fundamentally social because it always requires some kind of audience. (Christopherson, 2007; Marx, 1999; Hayne & Rice, 1997.)

Marx (1999) specifies seven types of identity knowledge which are pieces of information that allow certain amount of profile-building about users. These types are: legal name, locatability, pseudonyms that can be linked to legal name and/or locatability (which is a form of pseudo-anonymity), pseudonyms that can not be linked to other forms of identity knowledge (the equivalent of "real" anonymity), pattern knowledge, social categorisation, and symbols of eligibility/non-eligibility. Pattern knowledge covers such things as a person's daily routines or the writing style when acting as an anonymous user. Social categorisation involves, for example, age, education, and employment. Symbols of eligibility or non-eligibility refers to a situation where a person knows something (e.g. passwords) or has something (e.g. personal bus card) that would classify the knowledge holder as eligible (or else as non-eligible). (Marx, 1999.)

Internet users can not always choose whether or not to participate with real name or nickname (pseudonym) or to be a fully anonymous user. For example, many social networks, like Facebook and Google+, enforce a real-name policy. That means that they require users to use their legal names when creating accounts. A real-name policy is said to improve the quality of content and the service, and increases accountability. However, it also enables the social networks to associate the data concerning users' interests or usage patterns with their real names. This is sometimes claimed to erode online freedom. Some other services, like Twitter, do not impose strict rules for users to provide their legal names, but they do require users to register with, and employ, unique nicknames. (Peddinti et al, 2014; Edwards & McAuley, 2013.)

There are various reasons to desire pseudonyms. Some users want to be associated with a particular nickname when acting within different Internet services. They might have used the same nickname for several years and it has become a part of their digital identity, and they can be known widely based on their nickname both on the Internet and in the real world. (e.g., Keipi & Oksanen, 2014; van Kokswijk, 2007.) On the other hand, others just want to be associated with a funny or interesting pseudonym within some particular forum. Contrastingly, many users tend to choose to use pseudonyms with no relation to their real names because they want to be anonymous. (Peddinti et al, 2014.) Based on a study by Kang et al (2013), some of the users are anonymous online by default while most users are selective on the matter. Based on interviews, users adduced a number of cases for anonymity such as selling and buying goods online, publishing critiques and trying to avoid 'backlash' when someone does not like what was posted. A non-specific threat can also be a reason behind the anonymity. Over half of the anonymous users committed illegal or otherwise malicious activities. Anonymous participation is also described to be short-term (Keipi & Oksanen, 2014). It should be noted that as Marx (1999) emphasises, people can be identified by more means than just names or nicknames. As a result, even if people choose to use pseudonyms with no relation to their legal name, they could be, in fact, identified based on what they share about their life or the way in which they write. There is also the possibility to be visually anonymous or non-anonymous on the Internet, as adding a picture to one's profile makes people visually identifiable (e.g., Misoch, 2015; Hollenbaugh & Everett, 2013).

Self-disclosure refers to the process of exposing personal information (e.g., Archer, 1980). Previous studies about Internet behaviour have shown that willingness to disclose information is higher in the context of Internet communication than in traditional face-to-face situations. In addition, it has been found that people self-disclose more intimate information about themselves under conditions of anonymity because there are fewer related risks and constraints (see e.g., Chiou, 2006, 2007; Bargh et al, 2002). Hollenbaugh and Everett (2013) found that people disclosed more information in their blog entries when they were sharing a picture of themselves (as being visually identifiable). On the contrary the discursive anonymity (sharing one's real name) did not impact the amount, breadth, or depth of their self-disclosures. Gender and age also predicted the amount, breadth, and depth of self-disclosure: younger participants and women disclosed a larger amount to a greater extent than older participants and men, and women were more intimate when disclosing personal

information in their blog entries than men. Conversely Misoch (2015) found that people also tended to disclose information in visually non-anonymous settings, which questions the linkage between self-disclosure and visual anonymity.

The research results of Tomczyk and Kopecky (2015) concerning sharing confidential data among young Internet users indicate that the willingness to share one's personal data online such as pictures or accepting strangers to a group of people with access to sensitive data, associate with risky behaviours in other areas like meeting strangers in offline. Generally speaking, young people were willing to share information like one's name, email address, photo and phone number with their online friends. On the contrary, the kind of information they usually did not share with strangers were, for example, passwords, personal identification numbers, credit card PINs, and their home address. The study by Van Gool et al (2015) indicates that young people's' self-disclosing behaviour on social media like Facebook is mostly influenced by their intention to share, in others words by their rational decision-making, not by mistake or carelessness. Sometimes the sharing behaviour can be influenced by a more spontaneous emotional response to a given online situation, but typically young people do evaluate the risks and consequences of the information they share online.

In this study, we are examining young people's Internet usage habits and ICT skills, with a focus on their information security skills as associated with their tendency to participate on the Internet with their legal name, a pseudonym, or anonymously. The research questions analysed here are:

1 a) Which proportion of the youths use their legal name or a pseudonym, and which proportion choose to be anonymous on Internet?

1 b) Does there exist differences between genders in these choices?

2) Does there exist differences in information security skills and in ICT skills in general between the different kind of Internet users?

3) Does the use of legal name, a pseudonym or being anonymous relate to usage activity of certain Internet services?

2. METHOD

2.1 Participants

The data collection was conducted in Finland during the years 2014 and 2015. The 41 upper comprehensive and upper secondary level schools that took part in the study were chosen in terms of convenience sampling. Pupils were tested a class at a time, so the bias caused by self-imposed participation was as slight as possible. Altogether 3,184 youths from 12 to 23 years were tested 51.6% were boys and 48.4% girls. The mean age of participants was 15.85.

2.2 Questionnaire and test

The data was collected with a combination of a Web based electronic usage habit questionnaire (appendix 1) and an ICT skill test. The usage habit questionnaire contained questions relating to the kinds of social media or other Internet services, communication tools and content creation tools the examinees used, and how often (scoring from 0='never' to 4='several hours per day') they used them. In addition participants were asked if they used the Internet with their legal name, with one or more pseudonyms or anonymously. There was a possibility to choose one or more options according to a respondent's common habits in participating on the Internet. After the examinees had ended the questionnaire, they started solving the ICT skill test problems. The test consisted of 18 fields of ICT skills (basic operational skills, information seeking, word processing, spreadsheets, presentations, image processing, software installation and initialisation, operating system installation and initialisation, maintenance and updating, information security, social networking, Web content creation, database operations, programming, information networks, server environments, and digital technology). Participants could achieve 4 points from each field, which resulted in the maximum total scores for the ICT skill test being 68.

Only the total scores of the ICT skill test and the information security knowledge, meaning the information security field (assignments about how to evaluate the security of Internet services and about information security methods) and one item from social networking field (assignment about how and when to limit the audience when sharing personal information on social networking sites) were analysed in this paper. These items have been referred to as the information security sub-areas called services, methods, and persons. The two first sub-areas had a maximum score of 2 points, while the last sub-area had a maximum score of 1 point. Because of this, these values have been normalised to the range of 0 to 1 for analysis.

3. RESULTS

The Venn diagram in figure 1 displays the relations between a collection of different online participation habits of Internet users. The largest proportion of the respondents used Internet services pseudonymously (30.5%), followed by those using their legal names (26.8%), and by those using both their legal names and nickname(s) (26.2%). Anonymous use of the Internet was discovered to be unusual among youths; only 7.3% chose completely anonymous usage. Half of the pseudonymous users have a single pseudonym while the other half utilises multiple pseudonyms. Approximately 1.5% of the youths surveyed browse the Internet using all three options, which indicates that the majority have assumed a certain personal habit of operating on the Internet.
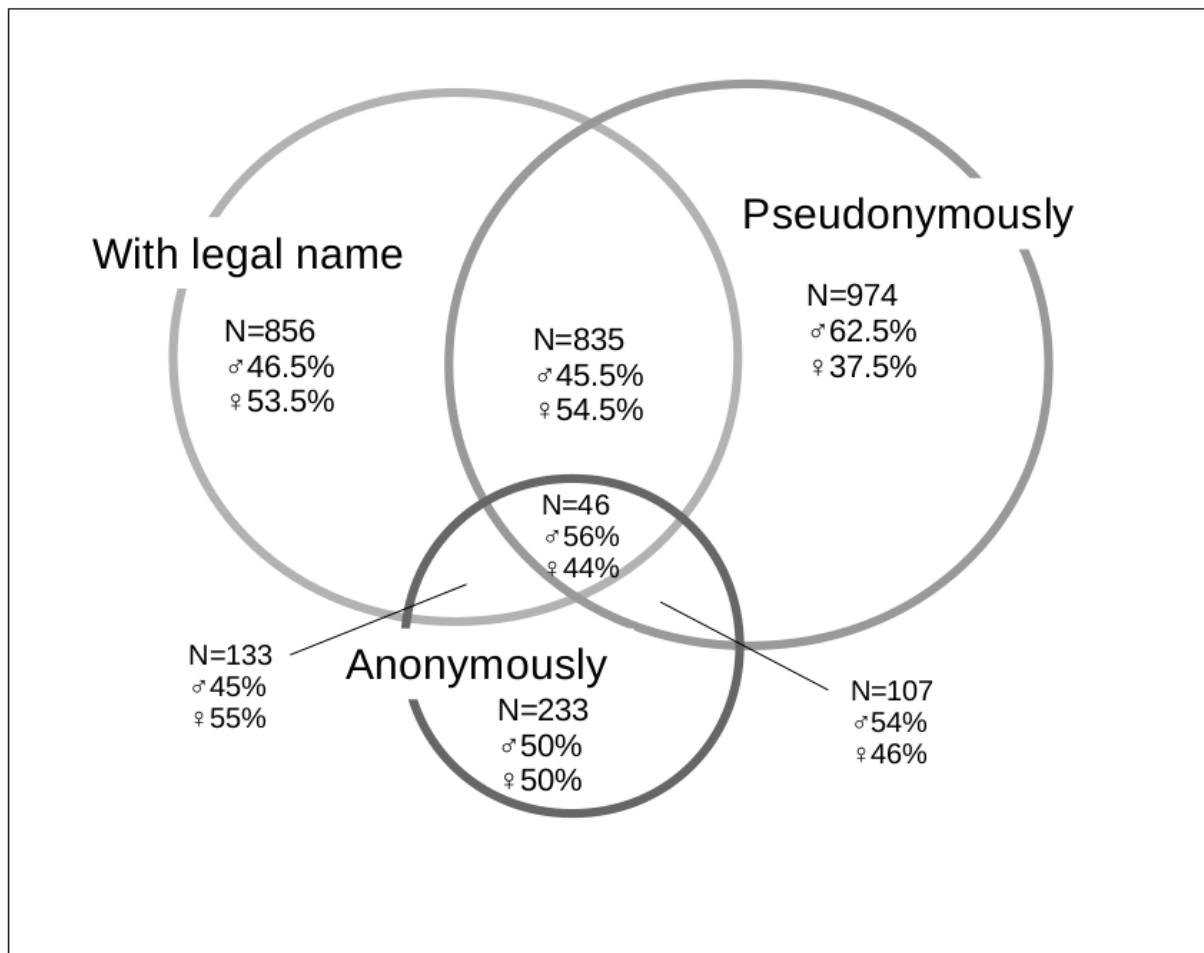

Figure 1. Venn diagram about the Internet users.

Girls use their legal names on the Internet significantly more often than boys (χ^2=53,673, df=1, p<0.001), while boys use pseudonyms significantly more often than girls (χ^2=11,448,

df=1, p=0.001). Boys use a specific nickname a slightly, but not significantly more often than girls (χ^2=3,011, df=1, p=0.083). In addition, girls are online fully anonymously significantly more frequently than boys (χ^2=6,688, df=1, p=0.01).

Table 1. Internet users' information security and ICT skills

| | Information security skills | | | | | | ICT skill test total scores | |
| | Persons | | Services | | Methods | | | |
	M	SD	M	SD	M	SD	M	SD
Legal name	0.73	0.44	0.34	0.41	0.29	0.40	25.17	11.28
Pseudonym	0.78	0.41	0.39	0.42	0.32	0.40	27.95	11.49
Anonymous	0.77	0.42	0.36	0.42	0.30	0.39	25.94	11.04

Table 1 represents the performance in three sub-areas of information security and in ICT skill test performance. As the table indicates, the highest scores were in the skills pertaining to personal information security, while the skills relating to methods of information security had the lowest scores. Based on ANOVA analysis, the differences between different kinds of Internet users in all sub-areas of information security are significant (persons: F=10,838, df=2, p<0.001; services: F=10,670, df=2, p<0.001; methods: F=4,561, df=2, p=0.011). Multiple comparisons with Bonferroni correction shows that in the personal information security sub-area, the significant difference occurs between the pseudonymous users and the two other groups, with those who use nickname(s) being more skilful in that sub-area. In the security of services area, the difference occurs between the legal name and pseudonymous users, while in the information security methods sub-area the difference is between the legal name and pseudonymous users: in both sub-areas the pseudonymous users are identified as being the most skilful and the legal name users are the least skilful. In addition, the differences in total scores of the ICT skills test between Internet users are significant (F=57,121, df=2, p<0.001). Here the difference occurs between the pseudonymous and the other two groups, as those who use one or more nicknames perform significantly better in ICT skills test than those who use legal names or stay anonymous.

When examining usage habits of different Internet users, we analysed which items from the usage habit questionnaire correlate (Pearson's *r*) with the tendency to use a legal name, pseudonym(s), or to use the Internet anonymously. Table 2 shows those usage targets of technology that have a positive and significant (p<0.001) correlation with each alternative Internet user type. It should be noted that in all cases the correlation is moderate at best. Nevertheless, the correlation analysis exposes marked differences between the Internet users' usage habits. Favouring one's legal name associates with the use of social networking sites, photo-sharing services, and instant messaging, in addition to associating marginally with web-blogging, watching web TV or movies online, downloading/listening to music online and with the use of maps and route planners on the web. Anonymous use of the Internet correlates only, and even then very slightly, with web-blogging, Internet forum activity, and the use of online newspapers and wikis.

Pseudonymous users are the most active users of different Internet services and content creation tools. Pseudonymous use of the Internet correlates most with the use of voice/video chats and with video gaming and video-sharing activity. Pseudonymous users are also active users of Internet forums, emails, e-government services, online banking services and online shops, online newspapers and newsgroups, IRC, maps and route planners, wikis, online dictionaries, Internet pornography, peer-to-peer file sharing services, and various content creation tools.

Table 2. Correlation between the Internet users and usage targets of technology

Legal name	Pseudonymous	Anonymous
Social networking services (.17**)	Video-sharing services (.17**)	Web-blogging (.07**)
Photo-sharing services (.26**)	Internet forums (.15**)	Internet forums (.12**)
Web-blogging (.09**)	e-Government services (.08**)	Online newspapers (.06**)
Online shopping (.06**)	Online banking (.07**)	Wikis (.06**)
Instant messaging (.25**)	Online shopping (.09**)	
Maps / route planners (.06**)	Online newspapers (.08**)	
Internet yellow pages (.08**)	Newsgroups (.08**)	
Web TV (.07**)	Emailing (.15**)	
Downloading/watching movies online (.09**)	Voice/video chatting (.21**)	
Downloading/listening music online (.15**)	Internet Relay Chatting (.08**)	
	Video games (in single-player mode) (.22**)	
	Video games (in multiplayer mode) (.27**)	
	Browsing for information (.13**)	
	Maps / route planners (.06**)	
	Wikis (.10**)	

Online dictionaries (.08**)

Internet pornography (.08**)

Peer-to-peer file sharing (.14**)

Word processing softwares (.08**)

Image processing softwares (.17**)

Computer graphics softwares (.09**)

Video editing softwares (.15**)

Audio editing softwares (.11**)

Integrated developed environments (.07**)

Note: **$p<0.001$

4. DISCUSSION

Based on the results, young people were found to be more likely to act online using pseudonym or their legal name than being fully anonymous. The boys prefer to use pseudonyms noticeably more than the girls, whereas the girls use their real names more often than the boys. Those who remain anonymous formed only a small group in which gender differences were not found. Half of the pseudonymous users have assumed a single nickname, which can be seen as a wish to maintain identifiability by means of a single digital identity across the Internet (see e.g., van Kokswijk, 2007). The other half uses multiple pseudonyms – arguably for distinct nicknames on different services or forums – and therefore wish to remain unidentified as a single user. Like Peddinti et al (2014) argues, using a pseudonym can also be seen as a wish to stay anonymous to the audience on the Internet forums. The use of multiple pseudonyms can also be seen as a solution which helps users control their identifiability and the personal information they share in different Internet forums; they can be identified by a well-known pseudonym in one Internet service and remain unidentifiable under the cover of a random nickname in other forums. In the last-mentioned case, the pseudonymous use resembles anonymous use.

The participants performed best in the problem solving assignments concerning personal information security, while weakly succeeding in assignments concerning with assessing the security of an Internet service and identifying methods of information security. Perhaps the personal interest and active public campaigning (e.g., MEC, 2013) about the dangers of the online world have raised awareness when sharing personal information. Like Van Gool et al

(2015) stated, young people typically evaluate the risks and consequences of the information they share online, and the sharing of personal information happens in consequence of their rational decision-making and intention to share information about their lives. This could be one of the causes behind the participants' success in the personal information security assignment.

The use of one's legal name was found to associate with less skills in the ICT skill test and its information security related assignments than the use of pseudonyms or being anonymous. These findings are linked with differences in Internet users' usage habits. Those using their legal name are usually active users of social networking services (such as Facebook), photo-sharing sites (e.g. Instagram), and instant messaging. (e.g. Whatsapp). This kind of behaviour is logical considering the real-name policy (see e.g., Peddinti et al, 2014; Edwards & McAuley, 2013) currently, or previously, enforced by social networking sites, preventing user registrations under a pseudonym. Anonymous use is mostly related to participation in online discussions and commentary and can be seen as simple unidentifiable participation or , on the other hand, considered to be related to mischievous activities such as 'trolling' on Internet discussion forums, which was found in a previous study by Kang et al (2013). In addition, anonymous use has recently been linked with online behaviour, which manifests as grandiosity, narcissism, and having a low self-esteem, but also with having a stronger trust toward people online and in real-life situations than other users (Keipi et al, 2015).

The pseudonymous users of the Internet were discovered to be the most competent Internet users. Pseudonymous use, according to our results, is related to active use of communication and content creation tools, video-sharing services, Internet discussion forums and other forms of new media, particularly video games. This kind of Internet usage is emphasised by video game related participatory cultures (see Kaarakainen et al, 2015) where it is typical to use identifiable pseudonyms. The entire Internet is for these users a place to spend their leisure time and to adopt important skills. It seems that many young people also wish to become recognised, not with their legal name, but with their nickname on the Internet and in the real world. Therefore, in many cases, identifiability in the form of pseudonyms is not to be interpreted as a sign of carelessness or ignorance, but rather preferable for the users. On the other hand, identifiability in the form of legal name usage is associated to real name policies of different services; in some cases it also seems to be associated with narrow user

experiences and, to some degree, lack of Internet skills and information security knowledge. More thorough examination in this matter, and especially qualitative research supporting the quantitative analysis in this paper, is required for a better understanding of these matters in the future.

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Appendix 1. The content of usage habit questionnaire and the ICT skill test

USAGE HABIT QUESTIONNAIRE	ICT SKILL TEST
Social media:	Basic operational use of computers
Social networking services	Software installation and initialisation
Video-sharing services	Operating system installation and initialisation
Photo-sharing services	Maintenance and updating
Web-blogging	Information security
Internet forums	Information networks
Daily errands and current events:	Information seeking
e-Government services	Word processing
Online banking	Spreadsheets
Online shopping	Presentations
Online newspapers	Image processing
Newsgroups	Social networking
Weather services	Web content creation
Communication	Database operations
Emailing	Programming
Instant messaging	Server environments
Voice/video chatting	Digital technology
Internet relay chatting	
Gaming activities:	
Casual games	
Video games (in single-player mode)	
Video games (in multiplayer mode)	
Browsing for information:	
Information seeking	
Maps / route planners	
Internet yellow pages	
Wikis	
Online dictionaries	
Online dating services	
Entertainment:	
Web TV	
Downloading/listening music online	
Downloading/watching movies online	
Internet pornography	
Peer-to-peer file sharing	
Content creation tools:	
Word processing softwares	
Spreadsheet softwares	
Presentation softwares	
Image manipulation softwares	
Audio editing softwares	
Video editing softwares	
Computer graphics softwares	
Integrated development environments	
e-Learning environments	