Publishing of Personal Information on Facebook with Regard to Gender: Comparison of Pupils and University Students

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Abstract - The goal of this research was to explore and compare personal information Facebook publishing behaviour of male and female pupils and university students. One important finding is that very small percentage of all examinees publish items in most sensitive data types regarding the privacy: religious and political views, mobile phone, email, address. Additionally, it was established that a similar percentage of male and female pupils publish information in almost all data types. The exception is a Books data type where female pupils publish about two times more than male pupils. Also, on average, female pupils publish about 7.5 times more often information in Books data type than male pupils. Male pupils, on average, publish information in Sports data type about 4.5 times more often than female pupils. Considerably higher percentage of male students publish information in data types: High School, Apps and Games, Music, Friends, TV Shows, Movies. On average, male students publish about 8 times more often information in Sports data type than female students. Female students, on average, publish information considerably more frequently in Check-Ins data type: about 3.5 times more often than male students.

I. INTRODUCTION

Many young people use Facebook every day publishing various information about their interests, opinions, friends and other topics. The goal of this study is to provide insights about the Facebook publishing behaviour of young people with regard to their gender. These insights could help educators to better understand similarities and differences between the interests of female and male pupils and students. This could help them to create educational programs which are more closely connected with the young people's interests and with regard to their gender.

Also, these insights could be helpful for educators to create programs for the improvement of privacy protection behaviour. Privacy is a fundamental human right. It is „the claim of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated to others" [1, p.154]. Today, when information technology has a strong presence in our lives, privacy on the Internet is something everyone should be paying attention to. With the fast development of information technology and the creation of new devices and forms of media, such as smartphones and social networking sites (SNS), privacy of individuals becomes an issue that needs to be addressed and protected against those who want to harm it.

Gross and Acquisti said that "privacy implications associated with social networking sites depend on the level of identifiability of the information provided, its possible recipients, and its possible uses." [2, p.73]. They stated that even if some SNS do not expose their users' identities, they still may provide information that identifies the profile's owners [2].

On social media sites, such as Facebook, people can voluntarily disclose their personal information: their names, comments, likes, posts and photos or videos can be visible to their friends as well as friends of their friends and anyone else with Facebook account. These publicly available personal traces can be seen by many unknown persons and organizations, including advertisers [1]. Personal information can be taken from social media and used without the knowledge of users who are facing risks like identity theft, physical or online stalking and even blackmailing [2].

In the next section we will present insights from the studies about young Facebook users. In the third section we will present the research methodology used to explore the Facebook publishing behaviour of young people. In the fourth section all findings will be presented in detail. In the fifth section we will emphasize the most important findings, suggest some possibilities for using these findings and suggest several ways for additional research that could be made as an extension of this research.

II. YOUNG FACEBOOK USERS

With the rise of Facebook and other social media, online privacy of children and young people becomes an especially important issue, as they are less likely to understand the possible effects of disclosing personal information which may affect their lives [3]. In a study conducted by the Pew Research Center it was confirmed that teens share a wide range of information about themselves on SNSs, as the sites are designed to encourage the sharing of private details with others [4]. Feng and Xie [1, p.156] claim that it seems hard to stop teens from disclosing personal information on SNSs. Boyd [5] points out that the notion that teens do not care about privacy is very entrenched in the public discourse. However, the truth is that teens often do care about privacy although this can be ignored by the public and the

media [5]. Herring and Kapidzic [6] emphasized that there are concerns about the lack of parental control over teenage use of the Internet, but there are indications that more and more parents are trying to protect their child's online privacy. While older users may perceive privacy as protecting personal data from outside intrusion such as advertisers and the government, younger users perceive privacy as control over their personal space and social situations, as they are more worried about parents and teachers than advertisers and other third parties [7].

Today there are many types of social networks, but as Lenhart [8] pointed out, Facebook remains the most used social media site among American teens. Herring and Kapidzic cite the claim that "girls on average spend more time on social network sites and use them more actively than boys do" [6]. In several studies it was found that teenagers, from 15 to 17 years old, post more pictures and other personal information on their Facebook profiles [9]. Girls post more romantic pictures and the boys create more self-promotional pictures and comments with sexual content or alcohol references [6]. In a study of young adults' perceptions of appropriate content, it was established that they expressed "little concern about sharing posts and pictures on social network sites such as Facebook. Female participants expressed more concern about future employers seeing some of their pictures and comments" [6, p.4]. It seems that young adults predominantly utilize social media to build and strengthen relationships with their peers. They are not concerned with their more formal, professional image on social media [6].

III. RESEARCH

A. Research goal and methods

The research goal of this study was to explore and compare the extent to which personal information about male and female pupils and university students is publicly available on Facebook. The content analysis method was used to determine the extent to which male and female pupils' and university students' personal information of the various data types is publicly available on their Facebook profiles [10]. We determined the extent of publicly available items for various data types by counting the number of all items that were publicly published on Facebook profiles of examinees.

The method of comparative analysis was used to compare the extent to which various types of personal information about examinees are publicly available on their Facebook profiles [11]. We compared the percentage of examinees of different gender that published at least one item in a specific data type of personal information. We also compared the average number of items in a specific data type that were published by examinees of different gender.

B. Study participants

400 Facebook profiles were selected: 100 profiles of male university students and 100 profiles of female university students were randomly chosen from among Facebook community „Sveučilište u Zadru" which gathers students from the University of Zadar in Croatia [12]. Also, 100 profiles of female pupils were randomly chosen from among the pupils' Facebook community „OK je OK!" [13]; additionally, 100 profiles of male pupils were randomly chosen from among the Facebook friends of the members of „OK je OK!" Facebook community.

The pupils were about 10 to 13 years old and the university students were about 18 to 24 years old. The data were collected in March and April 2016. This study is a continuation of research about the Facebook publishing behaviour of young people which was presented in the year 2016 at European Conference on Information Literacy. In that presentation the same sample of Facebook profiles was used, but the data were analysed regardless of Facebook profile owners' gender [14].

IV. FINDINGS

In this section various findings from the research are presented in detail. Findings are presented according to following themes: items published by female examinees; items published by male examinees; comparison of all examinees with regard to gender; comparison between female and male pupils; comparison between female and male students.

A. Items published by female examinees

In Table 1 we can see to what extent female pupils and university students publish items in 15 most populated data types. In Part 1 of Table 1 we see that data types in which at least one item was published publicly by more than a half of female examinees are: Photos, Posts, Gender, Groups. A considerable percentage of them have published at least one item in data types about their interests: Movies, TV Shows, Apps & Games. Many of them have published about Current City (38.5%), Friends (37%) and Hometown (35%). Also, about one third of them published about their interests (Music, TV Shows, Movies, Books, Apps & Games), wrote reviews and marked their location with mobile devices (Check-Ins). It is important to note that very small number of them published at least one item in these data types: Religious Views (4%), Mobile Phone (0.5%), Email (0.5%), Political Views (0.5%), Address (0%). These most private data types of personal information are mostly unavailable on their Facebook profiles.

In Part 2 of Table 1 we see that on average a female pupil or university student has 123.1 friends, 51.4 published photos and 5.8 posts. On average, they published the largest amount of items in data types about their interests and especially about their music interests: 32 items. Other interests that have a high average of items are: Music, TV Shows and Movies. In comparison to these interests, female examinees published considerably less information about Sports, Apps & Games and Books. The following data types are also less present on their profiles: Groups, Check-Ins, Events.

TABLE I. TO WHAT EXTENT FEMALE PUPILS AND UNIVERSITY STUDENTS PUBLISH ITEMS IN 15 MOST POPULATED DATA TYPES

Part 1: Percentage of female pupils and univ. students that published at least one item			**Part 2:** Average of items published by female pupils and university students	
Data Type	**%**		**Data Type**	**av. it.**
Photos	98%		Friends	123.1
Posts	86.5%		Photos	51.4
Gender	81.5%		Music	31.8
Groups	71%		TV Shows	14.4
Current City	38.5%		Movies	13.4
Friends	37%		Groups	6.2
Music	37%		Posts	5.8
TV Shows	36.5%		Sports	5
Hometown	35%		Check-Ins	4.9
Movies	35%		Events	3.6
Check-Ins	30.5%		Apps & G.	2.1
Reviews	28.5%		Books	1.9
Books	28.5%		Reviews	0.9
Apps & Games	27.5%		Gender	0.8
Family Members	17.5%		Current City	0.4

B. *Items published by male examinees*

In Table 2 we can see to what extent male pupils and university students publish items in 15 most populated data types. In Part 1 of Table 2 we see data types in which at least one item was published publicly by more than a half of male examinees: Photos, Gender, Posts, Groups, Music, Friends.

TABLE II. TO WHAT EXTENT MALE PUPILS AND UNIVERSITY STUDENTS PUBLISH ITEMS IN 15 MOST POPULATED DATA TYPES

Part 1: Percentage of male pup. and univ. students that published at least one item			**Part 2:** Average of items published by male pupils and university students	
Data Type	**%**		**Data Type**	**av. it.**
Photos	95.5%		Friends	290.7
Gender	84.5%		Photos	39.7
Posts	81.5%		Sports	24.1
Groups	71%		Music	18.1
Music	54.5%		Movies	7.7
Friends	51.5%		Groups	6.4
Sports	47.5%		TV Shows	5.7
TV Shows	45%		Posts	4.3
Current city	44%		Apps & Games	3.8
Movies	44%		Check-Ins	2
Hometown	43.5%		Reviews	1.7
Apps & Games	40.5%		Events	1.6
Check-Ins	27%		Books	1.1
Books	27%		Gender	0.9
Reviews	21%		Current City	0.4

Almost half of them have published at least one item in data types about following interests: Sports, TV Shows, Movies, Apps & Games. Only 27% of male examinees published at least one book item as well as information about their locations (Check-Ins). While almost half of them published the names of the city in which they live and their hometown, nobody or very few of them published at least one item in most private data types: Religious Views (4.5%), Political Views (2.5%), Address (1%), Mobile Phone (0%), Email (0%).

C. *Comparison of all examinees with regard to gender*

Table 3 presents the comparison of the percentage of female and male pupils and students for data types in which at least one item was published by more than 30 percent of pupils or students. In relation to male examinees, a higher percentage of female examinees published at least one item in three data types. In Part 1 of Table 3 we see that among these data types, Check-Ins is a data type in which disparity between items published by female and male examinees is greatest. 1.13 times more female examinees than male examinees published at least one item in this data type.

In Part 2 of Table 3 we see nine data types in which male examinees published more often than female. Music, as well as Apps & Games are two data types in which disparity between items published by female and male examinees is greatest. 1.47 times more male examinees published at least one item in these data types. They also published more frequently at least one item in following data types: Friends (proportion: p:1.39), Movies (p:1.26), Hometown (p:1.24), TV Shows (p:1.23), Sports (p:1.23), Current City (p:1.14).

TABLE III. COMPARISON OF THE PERCENTAGE OF FEMALE PUPILS AND UNIVERSITY STUDENTS WITH MALE PUPILS AND UNI. STUDENTS

Part 1: Data types in which more items were published by female pupils and university students			
Data Type	**Female**	**Male**	**Proportion**
Check-Ins	30.5%	27%	1.13
Posts	86.5%	81.5%	1.06
Photos	98%	95.5%	1.03
Part 2: Data types in which more items were published by male pupils and university students			
Data type	**Male**	**Female**	**Proportion**
Music	54.5%	37%	1.47
Apps & G	40.5%	27.5%	1.47
Friends	51.5%	37%	1.39
Movies	44%	35%	1.26
Hometown	43.5%	35%	1.24
TV Shows	45%	36.5%	1.23
Sports	47.5%	38.5%	1.23
Curr. City	44%	38.5%	1.14
Gender	84.5%	81.5%	1.04

Table 4 presents comparison of the average of items that were published by female and male pupils and students for data types in which at least one item was published by more than 30 percent of pupils or students. A

higher percentage of female examinees published, on average, more items in six data types. In Part 1 of Table 4 we see that among these data types, the disparity between items published by female and male examinees is greatest for TV shows (proportion: 2.52) and Check-Ins data types (p:2.49). Also, about 1.75 times more female examinees than male examinees published, on average, more items in Movies and Music data types.

In Part 2 of Table 4 we see four data types in which male pupils and university students published more items on average than female. Sports is a data type in which there is by far the largest disparity: 4.85 times more male examinees published more frequently items in Sports data type. They also published more frequently in following data types: Friends (proportion: 2.36) and Apps & Games (p:1.77).

TABLE IV. COMPARISON OF THE AVERAGE OF ITEMS PUBLISHED BY FEMALE PUPILS AND UNI. STUDENTS WITH MALE PUPILS AND UNIVERSITY STUDENTS

Part 1: Data types in which more items on average were published by female pupils and univ. students			
Data Type	**Female**	**Male**	**Proportion**
TV Shows	14.42	5.73	2.52
Check-Ins	4.85	1.95	2.49
Movies	13.42	7.65	1.75
Music	31.83	18.8	1.69
Posts	5.79	4.28	1.35
Photos	51.44	39.66	1.3
Part 2: Data types in which more items on average were published by male pupils and univ. students			
Data type	**Male**	**Female**	**Proportion**
Sports	24.07	4.96	4.85
Friends	290.65	123.1	2.36
Apps & G.	3.75	2.12	1.77
Groups	6.36	6.21	1.02

D. Comparison between female and male pupils

Table 5 presents the comparison of the percentage of items that were published by female and male pupils for data types in which at least one item was published by more than 30 percent of female or male pupils.

In relation to male pupils, a higher percentage of female pupils published, on average, more items in six data types that are presented in Part 1 of Table 5. Among these data types, disparity between female and male pupils is by far the largest for books (proportion: 2.06). Also, 1.28 times more female pupils than male pupils more frequently published at least one item in TV Shows (p:1.28) and Posts data types (p:1.16). In other data types there is very small difference between two sexes.

In Part 2 of Table 5 there are data types in which male pupils published more frequently at least one item. For all those data types (Apps & Games, Groups, Music) there is very small difference between two sexes because for all those data types proportion is less than 1.05.

TABLE V. COMPARISON OF THE PERCENTAGE OF ITEMS THAT WERE PUBLISHED BY FEMALE AND MALE PUPILS

Part 1: Data types in which more items were published by female pupils			
Data Type	**Female**	**Male**	**Proportion**
Books	35%	17%	2.06
TV Shows	51%	40%	1.28
Posts	78%	67%	1.16
Movies	50%	46%	1.09
Curr. City	40%	38%	1.05
Friends	52%	50%	1.04
Gender	99%	97%	1.02
Sports	51%	50%	1.02
Photos	100%	99%	1.01
Part 2: Data types in which more items were published by male pupils			
Data type	**Male**	**Female**	**Proportion**
Apps & G.	43%	41%	1.05
Groups	72%	69%	1.04
Music	52%	51%	1.02

Table 6 presents the comparison of the average of items that were published by female and male pupils for data types in which at least one item was published by more than 30 percent of female or male pupils. In relation to male pupils, a higher percentage of female pupils published more items on average in six data types that are presented in Part 1 of Table 5. Among these data types, disparity between female and male pupils is by far the greatest for Books (proportion: 7.57). Large disparity is also found in data types TV Shows (p:4.23), Music (3.51), Movies (2.7).

In Part 2 of Table 6 there are four data types in which male pupils published more items on average. The disparity between female and male pupils is by far the greatest for Sports (p: 4.58). Large disparity is also found in data types Friends (p:1.78) and Apps & Games (1.34).

TABLE VI. COMPARISON OF THE AVERAGE OF ITEMS THAT WERE PUBLISHED BY FEMALE AND MALE PUPILS

Part 1: Data types in which more items on average were published by female pupils			
Data Type	**Female**	**Male**	**Proportion**
Books	2.8	0.37	7.57
TV Shows	23.44	5.54	4.23
Music	49.83	14.19	3.51
Movies	23.36	8.66	2.7
Photos	73.42	47.49	1.55
Posts	7.32	5.03	1.46
Part 2: Data types in which more items on average were published by male pupils			
Data type	**Male**	**Female**	**Proportion**
Sports	41.62	9.09	4.58
Friends	315.5	177.3	1.78
Apps & G.	5.13	3.84	1.34
Groups	5.57	4.98	1.12

E. Comparison between female and male students

Table 7 presents the comparison of the percentage of items that were published by female and male university students for data types in which at least one item was published by more than 30 percent of female or male pupils. In relation to male students, a higher percentage of female students published more frequently at least one item in four data types that are presented in Part 1 of Table 7. Among these data types, disparity between female and male students is greatest for Reviews (proportion: 1.5). The much smaller disparity is found in other three data types Check-Ins (p:1.15), Photos (p:1.04), Groups (p:1.04).

In Part 2 of Table 7 there are 13 data types in which male students published more frequently at least one item. The disparity between female and male students is largest for following data types High School (p: 2.83), Apps & Games (p:2.71), Music (p:2.48), Friends (p:2.41), TV Shows (p:2.27), Movies (p:2.1). Significant disparity is also found in data types College (p:1.85), Sports (p:1.73), Books (p:1.68), Hometown (p:1.53), Current City (p:1.35).

TABLE VII. COMPARISON OF THE PERCENTAGE OF ITEMS THAT WERE PUBLISHED BY FEMALE AND MALE UNIVERSITY STUDENTS

Part 1: Data types in which more items were published by female university students			
Data Type	**Female**	**Male**	**Proportion**
Reviews	33%	22%	1.5
Check-Ins	39%	34%	1.15
Photos	96%	92%	1.04
Groups	73%	70%	1.04
Part 2: Data types in which more items were published by male university students			
Data type	**Male**	**Female**	**Proportion**
Hi. School	34%	12%	2.83
Apps & G.	38%	14%	2.71
Music	57%	23%	2.48
Friends	53%	22%	2.41
TV Shows	50%	22%	2.27
Movies	42%	20%	2.1
College	48%	26%	1.85
Sports	45%	26%	1.73
Books	37%	22%	1.68
Hometown	49%	32%	1.53
Curr. City	50%	37%	1.35
Gender	72%	64%	1.13
Posts	96%	95%	1.01

Table 8 presents the comparison of the average of items that were published by female and male university students for data types in which at least one item was published by more than 30 percent of female or male university students. In relation to male students, a higher percentage of female students published more items on average in four data types that are presented in Part 1 of Table 8. Among these data types, disparity between female and male students is by far the greatest for Check-Ins (proportion: 3.43). Considerably smaller disparity is found in Posts data type (p:1.2).

In Part 2 of Table 8 there are eight data types in which male students published more items on average. The disparity between female and male students is by far the greatest for Sports (p:7.86), Apps & Games (p:5.9) and Friends (p:3.86). Large disparity is also found in data types Movies (p:1.91), Music (p:1.69), Books (p:1.67). In two data types: TV Shows (p: 1.1) and Photos (p:1.08), there is very small difference between two sexes.

TABLE VIII. COMPARISON OF THE AVERAGE OF ITEMS THAT WERE PUBLISHED BY FEMALE AND MALE UNIVERSITY STUDENTS

Part 1: Data types in which more items on average were published by female university students			
Data Type	**Female**	**Male**	**Proportion**
Check-Ins	8.23	2.4	3.43
Posts	4.25	3.53	1.2
Reviews	0.78	0.74	1.05
Groups	7.43	7.15	1.04
Part 2: Data types in which more items on average were published by male university students			
Data type	**Male**	**Female**	**Proportion**
Sports	6.52	0.83	7.86
Apps & G.	2.36	0.4	5.9
Friends	265.8	68.89	3.86
Movies	6.64	3.47	1.91
Music	23.41	13.82	1.69
Books	1.77	1.06	1.67
TV Shows	5.92	5.39	1.1
Photos	31.83	29.45	1.08

V. CONCLUSION

A. Main insights from the research

Through this research, we acquired three types of insights about publishing behaviour of young Facebook users:

a) **Comparison of pupils' and university students' publishing data.** Very small percentage of examinees of both sexes publish items in most sensitive data types regarding the privacy: Religious Views, Mobile Phone, Email, Political Views, Address. In relation to male examinees, there is no data type in which female examinees publish information in somewhat higher ($1.2<proportion<2$) or considerably higher percentage ($p>2$). On average, female examinees publish information considerably more frequently ($p>2$) in following data types: TV Shows and Check-Ins. They also publish information somewhat more frequently ($1.2<p<2$) in data types Movies, Music, Posts, Photos. Male examinees on average publish information considerably more frequently in data types: Sports and Friends. They also publish information somewhat more frequently in Apps & Games data type. Regarding the most sensitive data types, both male and female examinees publish on average similar amount of information except in data type Political Views for which male examinees publish five times more often.

b) **Comparison of pupils' publishing data.** A similar percentage of both male and female pupils publish information in almost all data types ($proportion<1.2$). The

only exceptions are Books data type where female pupils publish about two times more than male pupils and TV Shows data type where they publish about 1.3 times more than male pupils. On average, female pupils publish information considerably more frequently in following data types: Books, TV Shows, Music, Movies. Books data type is by far the most popular type for publishing information because female pupils publish about 7.5 times more often information in that type than male pupils. They also publish somewhat more frequently photos and posts. On average, male pupils publish information considerably more frequently in Sports data type - about 4.5 times more often than female pupils. They also publish information somewhat more frequently in data types: Friends and Apps & Games.

c) **Comparison of university students' publishing data.** In relation to male university students, somewhat higher percentage of female university students publish information in Reviews data type. Somewhat higher percentage of male students publish information in data types: College, Sports, Books, Hometown, Current City. Considerably higher percentage of male students publish information in data types: High School, Apps and Games, Music, Friends, TV Shows, Movies. On average, female students publish information considerably more frequently in Check-Ins data type where they publish about 3.5 times more often than male students. They also publish somewhat more frequently in Posts data type. On average, male students publish information considerably more frequently in data types: Sports, Apps & Games, Friends. Sports data type is by far the most popular type for publishing of information because male students publish about 8 times more often information in that type than female students. They also publish somewhat more frequently in data types: Movies, Music, Books.

B. Some possibilities for using these findings and further research

This study provided many insights about the characteristics of Facebook publishing behaviour of young people with regard to their gender. These insights could be helpful to create better educational programs for the improvement of privacy protection behaviour to alleviate risky information disclosure behaviour. For example, the focus of these programs could be on Facebook data types in which majority of male or female pupils and students are publishing much information (photos, posts, memberships in Facebook groups, interests: movies, music, books…). Based on insights from this study, young people educational programs could be made that are more adjusted to their gender. Various institutions (schools, universities, libraries, museums…), could use the findings to create more interesting and relevant programs with regard to their users' gender. Promotion of various educational and other types of programs could also be improved when interests of young people of different gender (presented through their Facebook publishing behaviour) are more thoroughly known. Also, this study and its findings could be informative and inspirational for further research on the related topics. Facebook profiles of the same pupils and students explored in this study could be explored a few years from now to determine the extent of changes in their publishing behaviour. Additionally, Facebook data types that were explored in this study could be analysed by using the method of the qualitative content analysis. The research about adults' publishing behaviour on Facebook could be compared with the behaviour of the young people of different genders. The comparisons of educational and cultural differences regarding the Facebook publishing behaviour are another way to broaden the findings related to this area.

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