Who responds to website visitor satisfaction surveys?[1]

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Introduction

A lot of websites use web based exit surveys in order to measure the satisfaction of their visitors (about web surveys see: Couper, 2000; about website evaluation see: Elling et al., 2007). The related literature includes user satisfaction studies of educational (Saunders et al, 2005), library (Kwon and Gregory, 2007), health related and other more commercial-oriented websites. Usually the response rate to these exit surveys is very low. This is in accordance with previous research finding web surveys with the lowest response rates when compared with other survey modes. For instance, Manfreda et al (2008) after conducting a meta-analysis of 45 experimental comparisons between web and other survey modes they found that web surveys yield an 11% lower response rate compared to other modes. This low response rate raises questions about the quality of the data collected by the web survey.

Several socio-demographic factors appear to be related with web survey participation but this finding should be considered taking into account respondents' Internet resources and computer literacy (Diment & Garrett-Jones, 2007). Firstly, we should point out that not everyone is on the internet (at least not yet). Couper et al. (2007) using a panel study of people aged >= 50 years find significant demographic, financial, and health-related differences in Internet access and they conclude that lack of access to the Internet appears to be of greater concern than unwillingness to participate given access for representation in web surveys (at least for people of older age).

In this paper I try to provide some answers to the question if the sample is representative of the total population of website visitors. I will do this using data from the Greek Voting Advice Application[2] HelpMeVote (Andreadis, forthcoming) but first we need to understand the profile of the Internet users in the European Union.

[1] The author would like to acknowledge the contribution of the COST Action IS1004. www.webdatanet.eu

[2] Voting Advice Applications (VAAs) are web applications that enable voters to compare their political views with the positions of the political parties. VAAs have been used successfully in many European countries for more than a decade.

Internet users in the European Union

Table 1 Internet use frequency[3] in EU27

	Frequency	Percent	Cumulative Percent
Everyday/Almost everyday	12815	48,2	48,2
Two or three times a week	2699	10,2	58,4
About once a week	1007	3,8	62,2
Two or three times a month	411	1,5	63,7
Less often	588	2,2	65,9
Never	6813	25,6	91,6
No Internet access (SPONT.)	2241	8,4	100,0

Source Own analysis of Eurobarometer 74.3 (using W22 WEIGHT EU 27 which provides adjustments for each national sample in proportion to its share in the total EU population aged 15 and over).

In this section I analyse the profile of the Internet user in the European Union. I restrict the analysis to the EU for two reasons: Firstly, this is a decision driven by the availability of the data: Eurobarometer 74.3[4] includes a lot of useful variables with regard to the frequency of Internet use and the type of use. Secondly, the findings presented in the following sections of this paper is based on the analysis of VAA data. Since most of the successful VAAs have appeared in EU countries[5], using the aforementioned Eurobarometer appears as a reasonable choice.

As it is obvious from Table 1 not everyone is using the Internet in the EU. Circa one out of three EU citizens is either with no Internet access at all (8.4%) or they have Internet access but they never use it. In addition, not every internet user, uses the Internet with the same frequency. In fact less than half, of the EU population uses the Internet daily or almost daily. This should be kept in mind when we try to assess the popularity of a website. Simply put, if people do not have Internet access or do not use the Internet at all, they will not have any chances to visit a website.

Table 2 shows that the highest rate of no Internet use is observed in Portugal (almost two out of three respondents), followed by Romania, Greece, Bulgaria, Cyprus. In all these countries more than half of the respondents were found with no Internet use. At the bottom of the list there are Denmark and Sweden (about 13 per cent of no Internet use and the last row is occupied by the Netherlands (5.6 per cent of no Internet use).
Nevertheless, there are more differences than the obvious difference between people who use and do not use the Internet. Firstly, there are differences between Internet users regarding the frequency of use. For instance, Germany does not have many people who do not use Internet at all, (it is among the five nations with the lowest rate) but on the other hand there are a lot of Internet users in Germany who do not use

[3] Internet use frequency is created using three variables in the dataset: D62 INTERNET USE FREQ: AT HOME, D62 INTERNET USE FREQ: AT PLACE OF WORK, and D62 INTERNET USE FREQ: SOMEWHERE ELSE by taking the minimum value of them i.e. if someone has responded "Never" at home, "about once a week" at work and "Less often" somewhere else, I have kept the answer: "about once a week".
[4] European Commission (2013): Eurobarometer 74.3 (2010). TNS OPINION & SOCIAL, Brussels [Producer]. GESIS Data Archive, Cologne. ZA5450 Data file Version 5.2.0, doi:10.4232/1.11627
[5] A significant exception is Smartvote in Switzerland

the Internet daily or almost daily, thus Germany ranks below the top ten according to the percentage of frequent (everyday/almost everyday) users.

Table 2 Internet use frequency per nation in EU27

Nation	Everyday/Almost everyday	Two or three times a week	Less often	No access or never use
Portugal	26,9%	6,4%	2,8%	63,8%
Romania	28,8%	6,6%	7,5%	57,1%
Greece	25,0%	12,1%	6,5%	56,3%
Bulgaria	32,9%	9,3%	3,3%	54,5%
Cyprus (Republic)	34,9%	7,0%	4,7%	53,5%
Hungary	34,1%	11,2%	8,3%	46,4%
Spain	40,2%	9,1%	7,3%	43,3%
Italy	35,6%	11,3%	9,8%	43,3%
Poland	41,8%	8,8%	6,4%	43,0%
Lithuania	43,9%	7,0%	8,0%	41,2%
Malta	45,5%	9,1%	4,5%	40,9%
Austria	43,6%	14,0%	7,9%	34,4%
Slovenia	50,4%	8,8%	7,1%	33,6%
Czech Republic	40,7%	14,0%	11,8%	33,6%
Slovakia	43,6%	14,4%	10,4%	31,5%
Ireland	46,8%	14,5%	7,3%	31,4%
Belgium	54,1%	10,7%	6,4%	28,8%
Latvia	55,3%	7,4%	8,5%	28,7%
France	60,0%	6,7%	5,5%	27,8%
Estonia	61,7%	5,0%	6,7%	26,7%
Germany	49,5%	16,3%	9,2%	25,0%
UK	59,2%	8,6%	8,4%	23,7%
Luxembourg	59,3%	11,1%	7,4%	22,2%
Finland	68,2%	6,2%	5,5%	20,1%
Denmark	81,4%	4,4%	4,4%	9,8%
Sweden	81,4%	5,3%	4,6%	8,7%
The Netherlands	84,1%	6,5%	3,8%	5,6%

Source: Own analysis on Eurobarometer 74.3 data (using W22 WEIGHT EU 27)

The large differences per country should be taken into account when we try to estimate the ratio of the total population of a country that has "selected" to visit a website of national interest. For instance, if a Portuguese website was used by one third of the total Portuguese population, we could argue that practically, the website was visited by everyone who was able to access it. People who have not visited the website, they have not selected to do so; they were unable to do it. If a similar ratio was observed for a website in the Netherlands (where almost everyone has Internet access) the conclusion would be totally different, since the website would have been visited only by a small part of the group of Dutch people who were able to do so.

This fact should be kept in mind when analysing VAA use. VAAs offer political information but we should not conclude that people who have not used a VAA, they necessarily are not interested in political information. Political information is available to everyone through many communication channels (e.g. TV news, TV political shows and debates, radio news, newspapers etc). Thus, all subjects have the

opportunity to get political information (in fact, during the pre-electoral period it is rather difficult to avoid it). On the other hand, in order to talk about self selection of not using a VAA, we need to assume first that i) the voter has internet access and ii) the vote was informed about the existence of the VAA. The second condition is sometimes neglected, but similarly to web surveys everyone who has Internet access does not necessarily have an equal chance to visit a VAA website or participate in a survey[6].

I argue that the differences we observe between VAA users and the total population (i.e. male, younger, more educated, etc) are very similar to the differences we observe between Internet user and the total population. A significant factor for VAA use is Internet use (in fact, people who do not use the Internet, they are unable to use a VAA).

Age

Table 3 clearly shows that there is a strong negative correlation between age and Internet use. Less than one out of four European citizens over 64 years old uses the Internet. Moreover, only 13.6 per cent of this age group use the Internet daily or almost daily.

Table 3 Internet use frequency per age group in EU27

	Everyday/Almost everyday	Two or three times a week	Less often	No access or never use
18-24	75,8%	11,2%	5,8%	7,2%
25-34	69,3%	10,9%	7,1%	12,8%
35-49	54,3%	14,1%	9,3%	22,3%
50-64	39,3%	9,4%	9,0%	42,3%
>64	13,6%	5,0%	5,5%	75,9%

Source: Own analysis of Eurobarometer 74.3 (using W22 WEIGHT EU 27 which provides adjustments for each national sample in proportion to its share in the total EU population aged 15 and over). Cases with respondent's age less than 18 years old were filtered out.

What are the implications of the age distribution of Internet users for the analysis of the traffic of a European website? If we assume that a website is equally appealing to everyone regardless of the age group he/she belongs to, we should not expect to find the website visitors with an age distribution similar to the age distribution of the entire population; it should look more like the age distribution of the population of Internet users. To make the differences between the two distributions clear on Diagram 1 I present a comparison of age distributions between total sample (using W22 WEIGHT EU 27 of Eurobarometer 74.3) and the Internet users of the same dataset. It becomes obvious that people aged 50+ years old are under-represented in the Internet population.

[6] Fan, Weimiao and Yan, Zheng. Factors affecting response rates of the web survey: A systematic review, Computers in Human Behavior, Volume 26, Issue 2, March 2010, Pages 132–139 http://dx.doi.org/10.1016/j.chb.2009.10.015

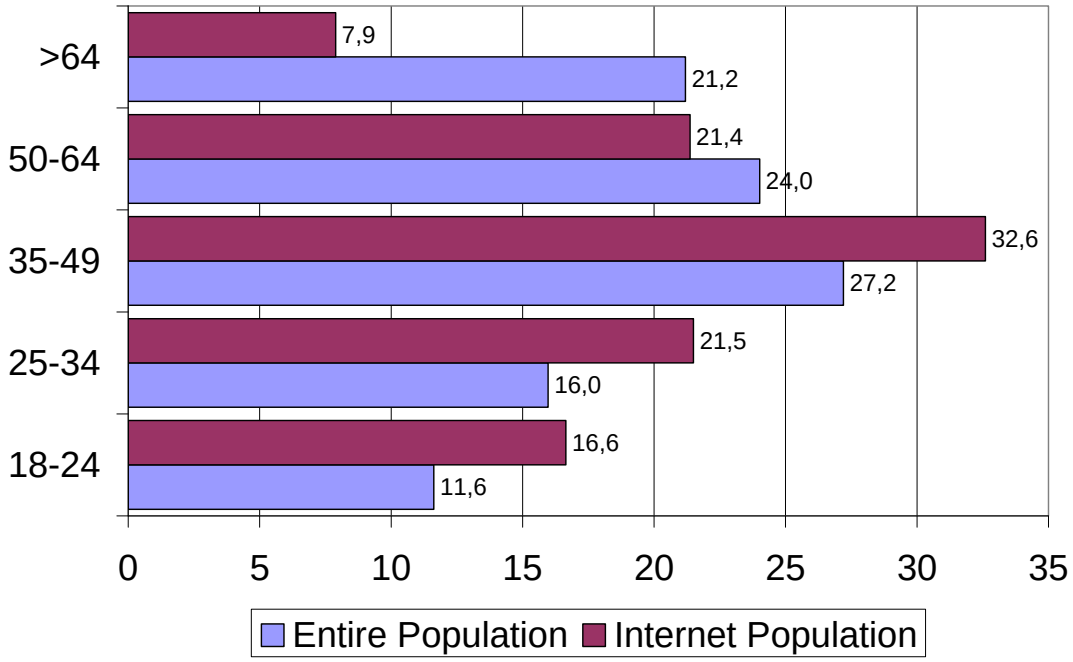

Diagram 1 Comparison of age distributions between total sample and Internet users

My main point here is that if we observe that the age group of 65+ years old corresponds only to 7.9% of the total population of the users of a European VAA (instead of 21.2% which is the share of this age group in the total EU27 population), we should not be surprised. On the contrary, if the website is equally appealing to all age groups, then the age distribution of its visitors will be similar to the age distribution of the Internet population.

Table 4 Comparison of age distributions between total sample and Internet users in Greece, in Germany and in the Netherlands

	Greek Population	Greek Internet users	German Population	German Internet users	Dutch Population	Dutch Internet users
18-24	13,8%	26,5%	10,1%	12,8%	9,5%	10,1%
25-34	17,9%	29,9%	14,5%	18,6%	14,9%	15,8%
35-49	27,4%	33,1%	25,6%	31,0%	30,3%	31,9%
50-64	20,6%	9,4%	24,4%	25,3%	27,0%	27,8%
>64	20,3%	1,1%	25,5%	12,3%	18,3%	14,4%

I should point out that the differences of the age distributions between the entire population and the Internet populations are not the same in each EU country. Table 4 provides adequate evidence to support this argument: by comparing the shares of people aged over 64 between the national populations and the corresponding Internet populations in each country we can observe that this age group is seriously under-represented in Greece, moderately under-represented in Germany and slightly under-represented in the Netherlands. As a result if people aged over 64 represent only 1% of the visitors of a Greek website and 12% of the visitors of a German website, this difference can be totally explained by the differences of the age distributions between the corresponding Internet populations.

Education

Table 5 Internet use frequency per age when stopped full-time education

	Everyday/Almost everyday	Two or three times a week	Less often	No access or never use
No full-time education	10,3%	,6%	,6%	88,5%
Up to 15 years	14,5%	5,2%	5,9%	74,4%
16-18 years	41,9%	13,4%	10,9%	33,8%
19 - 23 years	61,8%	11,7%	7,8%	18,7%
24 years and older	77,8%	9,3%	3,9%	9,1%
Still studying	87,6%	7,3%	3,4%	1,7%

Source: Eurobarometer 74.3 (using W22 WEIGHT EU 27 which provides adjustments for each national sample in proportion to its share in the total EU population aged 15 and over). Cases with respondent's age less than 18 years old were filtered out.

Table 5 shows the relationship between age of respondents when they stopped full-time education and frequency of Internet use[7]. The range of values for the percentage of the people who do not have Internet access or they never use it, is even larger than the corresponding range observed for the age groups, i.e. from 7.2% for the younger group to 75.9% for the older group. For the education level groups these values range from 1.7% for people who are still studying up to 88.5% for people who have not had full time education

Table 6 Comparison of education level distributions between total sample and Internet users

	Entire Population	Internet Population
No full-time education	0,6%	0,1%
Up to 15 years	22,1%	8,6%
16-18 years	34,0%	34,1%
19 - 23 years	23,1%	28,4%
24 years and older	10,9%	15,0%
Still studying	9,2%	13,8%

Similarly to age distribution of the visitors of a EU website, we should expect that the education level distribution should look more like the education level distribution of the population of Internet users. To make the differences between the two distributions clear, I present on Table 6 a comparison of education level distributions between the total sample (using W22 WEIGHT EU 27 of Eurobarometer 74.3) and the Internet users of the same dataset. It is obvious that the group of people who

[7] See also Jaap J.A. Denissen, Linus Neumann, and Maarten van Zalk, (2010) How the internet is changing the implementation of traditional research methods, people's daily lives, and the way in which developmental scientists conduct research International Journal of Behavioral Development 34: 564-575, doi:10.1177/0165025410383746

stopped full time education when they were 15 years old or younger is under-represented in the Internet population, and the group of people who continued after the age of 18 is over-represented.

In the following sections I will use data from a Greek VAA, thus I present in Table 7 the differences of education level distributions between Greek population and Greek Internet users. It is obvious that the group of people who stopped full time education when they were 15 years old or younger is far more under-represented in the Greek Internet population than in the EU Internet population.

Table 7 Comparison of education level distributions between Greek population and Greek Internet users

	Greek Population	Greek Internet users
No full-time education	1,1%	0,6%
Up to 15 years	30,3%	2,1%
16-18 years	33,8%	32,3%
19 - 23 years	17,8%	29,3%
24 years and older	6,9%	13,4%
Still studying	10,2%	22,3%

Gender

Table 8 shows the relationship between gender and frequency of Internet use. The percentages of the two middle columns ("Two or three times a week" and "Less often") are very similar both for men and women. The difference is observed on the daily and almost daily Internet (9% more in the male than on the female group) and on the last column showing that more women than men have no Internet access or they never use it.

Table 8 Internet use frequency per gender

	Everyday/Almost everyday	Two or three times a week	Less often	No access or never use
Male	52,9%	10,1%	7,2%	29,8%
Female	43,9%	10,2%	7,9%	38,1%

Source: Eurobarometer 74.3 (using W22 WEIGHT EU 27 which provides adjustments for each national sample in proportion to its share in the total EU population aged 15 and over). Cases with respondent's age less than 18 years old were filtered out.

In order to be able to compare with the data from a Greek VAA presented in the following sections, I present in Table 9 the differences of gender distributions between Greek population and Greek Internet users.

Table 9 Comparison of gender distributions between Greek population and Greek Internet users

	Greek Population	Greek Internet users
Male	49%	57%
Female	51%	43%

Visitors of an informational website

The role of type of Internet use

Of course, people who do not have Internet access or who are not using Internet at all are unable to visit a website. On the other hand, using the Internet does not guarantee that the Internet user will visit the website under study. Two other important factors are the frequency of Internet use and the personal interests of the Internet user. With regard to frequency of Internet use, it is easy to anticipate that someone who uses the Internet only once per month can visit only a very limited number of website and he/she is less probable to visit the website under study than someone who uses the Internet every day. With regard to the second factor (personal interests) the hypothesis is that if a website provides information we expect that its visitors will be people who use the Internet not only to get amused but also to seek for information, while a gaming website will attract the visitors who go online having as their main task to have some joyful time.

Table 10 Using internet for government services by age when stopped full-time education

	INTERNET USE: GOVERNMENT SERVICES	
	Not mentioned	Mentioned
No full-time education	95,0%	5,0%
Up to 15 years	86,3%	13,7%
16-18 years	80,2%	19,8%
19 - 23 years	71,6%	28,4%
24 years and older	58,6%	41,4%
Still studying	91,2%	8,8%
Total	76,6%	23,4%

I argue that the main factor that distinguishes people who use the Internet to seek for information from the rest of Internet users is their education level. Table 10 in comparison with Table 11 provides support to this argument. While sharing pictures does not appear related to education level (it appears to be very popular among students; thus it is probably more associated with age than it is with education level), using Internet for government services is strongly correlated with the education level.

As a final conclusion with regard to education level and its connection with Internet use, I would like to point out that education affects Internet use in multiple ways: i) the less educated are people the less probable they are to use Internet, ii) among Internet users: higher education corresponds to more frequent use and iii) among

Internet users: the higher the education level of an Internet user, the more probable it is that he/she will visit a website that provides useful information.

Table 11 Using internet for sharing pictures by age when stopped full-time education

	INTERNET USE: SHARING PICTURES	
	No	Yes
No full-time education	63,2%	36,8%
Up to 15 years	70,0%	30,0%
16-18 years	60,9%	39,1%
19 - 23 years	59,2%	40,8%
24 years and older	61,4%	38,6%
Still studying	22,7%	77,3%
Total	56,0%	44,0%

Greek Internet Population and HelpMeVote users

Table 12 Comparison of gender distributions between HelpMeVote population and Greek Internet users

	HelpMeVote population	Greek Internet users
Male	58,4%	57%
Female	41,6%	43%

HelpMeVote.gr is a Greek Voting Advice Application and its setting is perfect to study the profile of its users. A HelpMeVote user answers to a series of questions in order to get his/her proximity with the Greek political parties. Before giving the output, users are asked to fill-in a form with their personal information (mostly demographics, i.e. Sex, Age group, Education Level, but also related to their voting behaviour, i.e. Vote Choice, Confidence to their vote intention). Although it is not mandatory (users can click “continue” and move on to the output without answering) the vast majority responds to these questions, probably, because they are in responsive mood, or because they consider this form as part of the procedure.

Table 13 Comparison of education level distributions between HelpMeVote population and Greek Internet users

	HelpMeVote population	Greek Internet users
Compulsory (up to 15 years)	3,6%	2,70%
Secondary (16-18 years)	27,1%	32,30%
Tertiary (>18 years)	69,4%	65,00%

Table 12 displays the comparison of gender distributions between HelpMeVote population and Greek Internet users. The two distributions are very similar. Men are slightly over-represented in HelpMeVote population in comparison with the Greek Internet population. Table 13 displays the comparison of education level distributions between HelpMeVote population and Greek Internet users. Greek people with tertiary education are over-represented in HelpMeVote. This can be attributed to the

aforementioned argument regarding the type of Internet use that among the Internet users the higher educated are expected to use more informational sites than Internet users with lower education.

Table 14 Comparison of age distributions between HelpMeVote population and Greek Internet users

	HelpMeVote population	Greek Internet users
18-24	16,7%	26,5%
25-34	32,0%	29,9%
35-49	34,7%	33,1%
50-64	13,9%	9,4%
>64	2,7%	1,1%

I believe that Table 14 is very interesting because VAA researchers usually support that older people are under-represented in VAAs. This is only partially true: it is true if you compare VAA users with the total electorate, but not all of them are able to use the VAA. The eligible population is the group of Internet users. And if we compare HelpMeVote users with the corresponding eligible population (Greek Internet users) we will observe that older people are in fact over-represented and younger people (aged 18-24) are under-represented! Of course this can be easily explained in terms of both type of use (younger people tend to spend more time online sharing photos) and political interest which is lower in the age group 18-24.

HelpMeVote users and exit survey participants

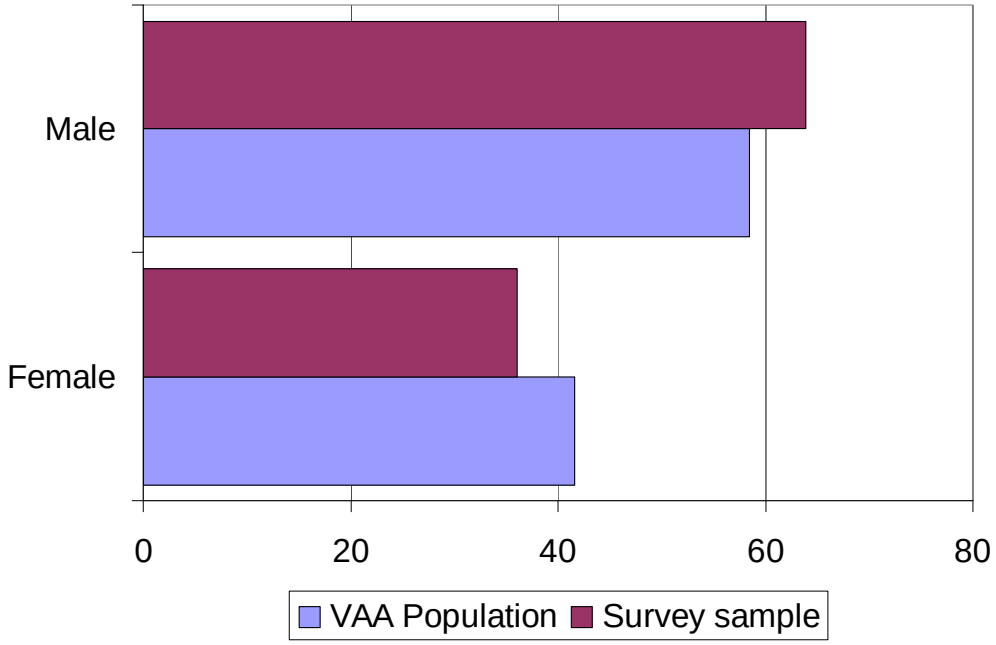

Diagram 2 Comparison of gender distributions between VAA population and exit survey sample

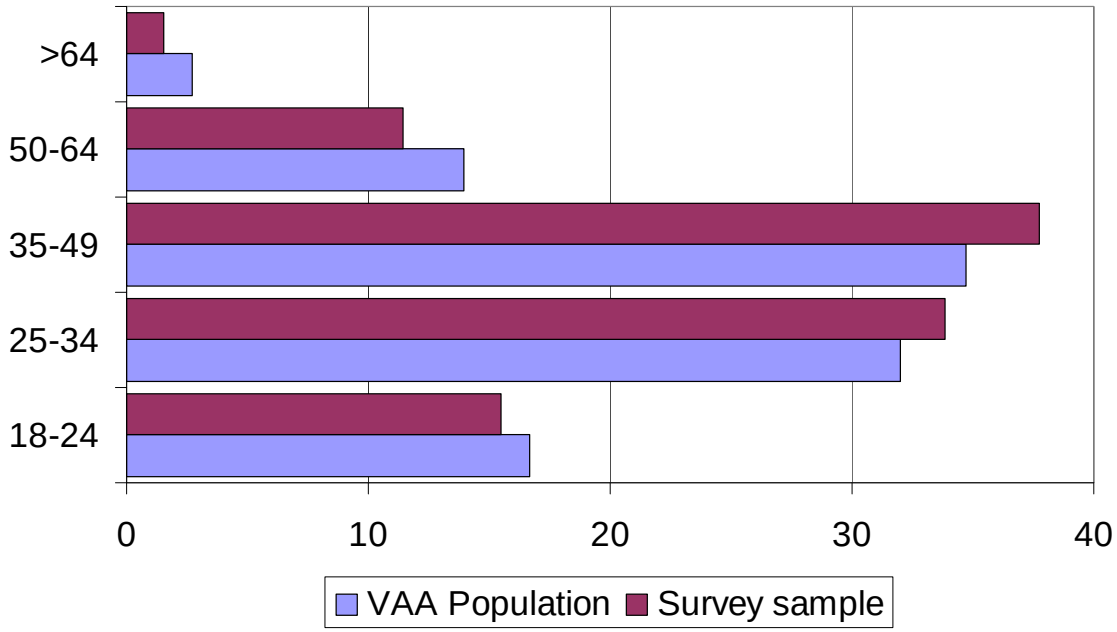

Diagram 3 Comparison of age distributions between VAA population and exit survey sample

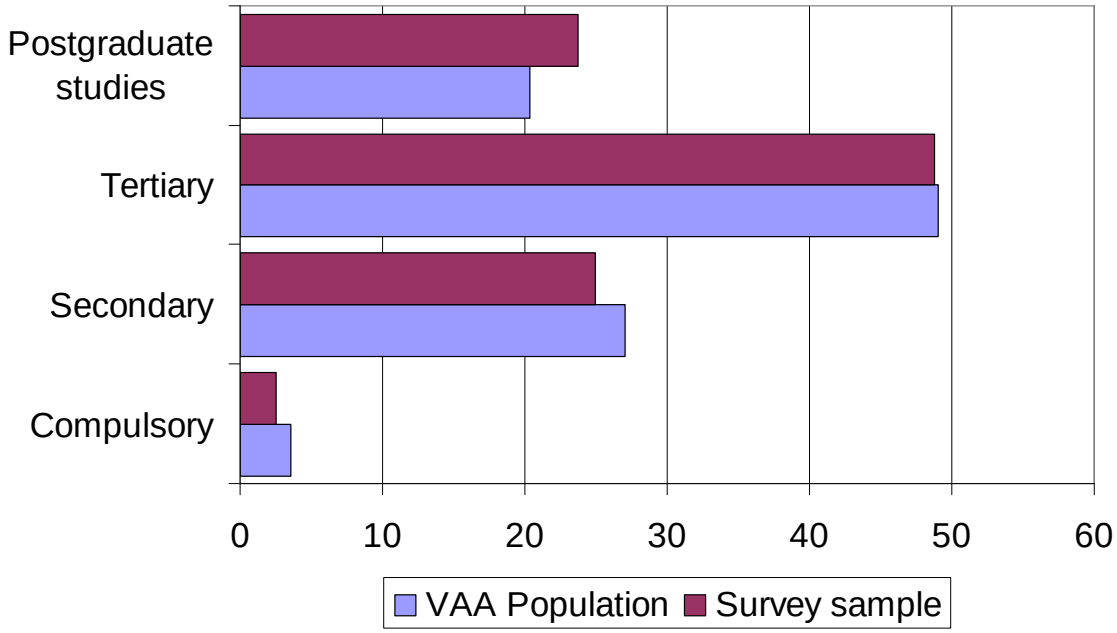

Diagram 4 Comparison of education level distributions between VAA population and exit survey sample

After displaying the outcome, HelpMeVote requests users to participate to a web-survey. Questionnaires are attached to outcomes, i.e. each outcome can have only one completed web questionnaire. Outcomes are session based, i.e. the user needs to close the browser or click a special link to start from the beginning. In any case the user has to answer the whole series of VAA questions before participating to the web survey. The first question I have tried to answer is the following: Is the exit survey sample representative of the population of all VAA users regarding gender, age and education level? According to the diagrams above the answer is positive. The second question I try to answer in the next section is the following: Is the exit survey sample

representative of the population of all VAA users regarding their satisfaction with HelpMeVote?

Estimated Satisfaction Level

VAAs rank parties according to their proximity/similarity with the user e.g.: Party A 80%, Party B 70%, Party C 30%. If a voter has selected a party before using the VAA the following alternatives may occur:

- If the selected party appears first (e.g. user's initial selection was party A), then the user will be very satisfied.
- If the selected party appears near the top (e.g. user's initial selection was party B), the user will be somewhat satisfied
- If the selected party appears near the bottom (e.g. user's initial selection was party C), the user will be dissatisfied

Thus, for the subset of users who have indicated one of the VAA parties as their vote choice I have used the following algorithm:

- Calculate maximum SDC (maxSDC)
- Calculate SDC of users' vote choice (selSDC)
- Transform both SDC from [-100,100] to [0,100]
- Calculate surprise index as SI=(maxSDC-selSDC)/maxSDC
- Recode SI to 3 satisfaction – expected results (ER) categories: (break points by data of the survey)
- If SI<0.3 => ER=Very, if 0.3<SI<0.11 => ER=Somewhat and if SI>0.11 => ER=Not at all

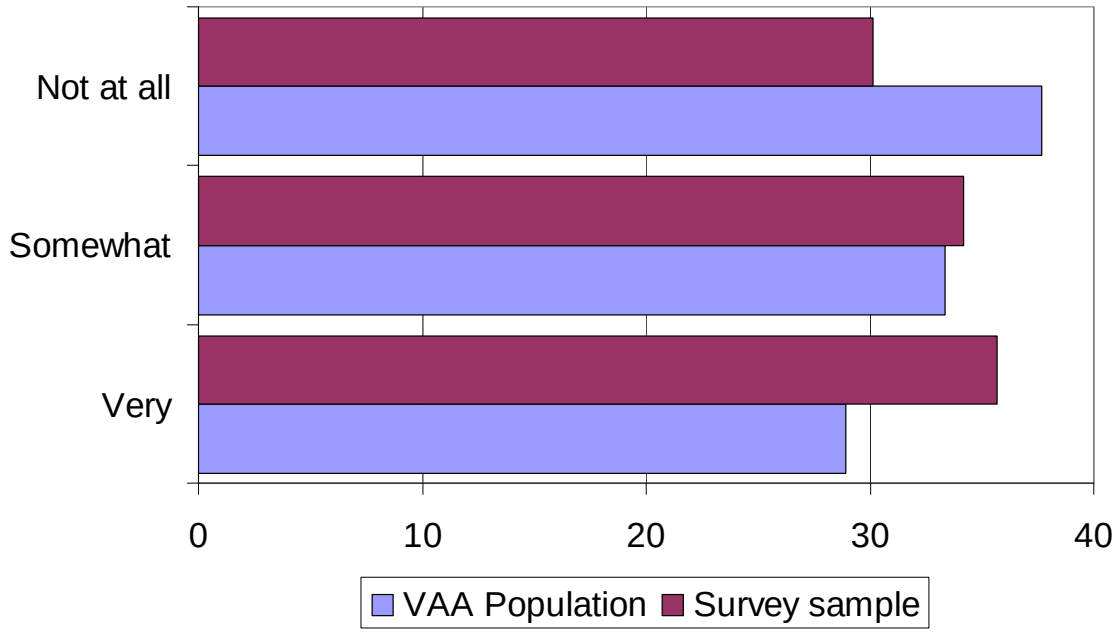

Diagram 5 Comparison of satisfaction level between VAA population and exit survey sample

My point here is that if VAA users get expected results the will be very satisfied, if they get somewhat surprising they will be partially satisfied and if the get very

surprising results they will not be satisfied. Diagram 5 shows overestimation of satisfied users and underestimation of unsatisfied users.

Conclusions

The findings presented in this paper are based on the analysis of data collected by the Greek voting advice application HelpMeVote and the analysis of data collected by the corresponding exit survey. The setting of HelpMeVote is perfect for the comparison between the total set of visitors and the subset of people who have responded to the web survey. The only reason someone visits a voting advice application is to answer to a series of questions in order to get his/her proximity with the political parties. Before giving the output I ask users to fill-in a form with their personal information. Although it is not mandatory (users can click "continue" and move on to the output without answering the questions of the form) the vast majority responds to these questions. As a result I have the distribution of the population and I can compare it with the distribution of the sample.

The analysis shows that the probability to respond to the website exit survey is larger for satisfied users. As a result, satisfied users are over-represented and unsatisfied users are under-represented in the sample, but with the method presented in this paper we can estimate the magnitude of over (under) representation of satisfied (unsatisfied) users and adjust our estimations accordingly.

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