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# Looking beyond the veil – what makes the micro organisation end-user developers tick?

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# Looking beyond the veil – what makes the micro organisation end-user developers tick?

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**ABSTRACT**

Information and communication technology offers the opportunity to make current work more effective and enable new developments. This is in particular needed in micro-organisations, who have to cope with very limited resources. End-user development could be a solution for these problems. However, supporting the heterogeneous user population is problematic. On-line sources could possibly bridge this gap, but are they suitable for all end-user developers? What, if any, are the characteristics of potential end-user developers and how are they connected to the current use of support. What can we say about the future?

**Keywords**

ICT, SME, end-user development, on-line support, small organisations

## INTRODUCTION

Many Finnish municipal organisations face diminishing resources and are struggling to keep up with their current service level. The problem is in particular critical in the smallest municipalities located in the archipelago. The Åland Islands have 16 municipalities, of which six are regarded as archipelago municipalities. These archipelago municipalities are very small, having from circa 100 inhabitants in the smallest to about 600 in the largest of the municipalities. However, the smallest islands' municipalities shoulder the same responsibility as their bigger and more affluent neighbours to give high-standard service to their citizens. This is a challenge in particular for the municipalities that have the least resources. Still, they are required by law to provide full service in the social sector, education and other areas.

In a similar manner, the private enterprises in the archipelago also face challenges. Small businesses in the archipelago face additional challenges that their mainland colleagues and competitors usually do not. Small and medium enterprises (SMEs) and entrepreneurs in the archipelago spend more resources at finding solutions to communication and logistics problems. Communication problems might exist between the businesses and their customers, in a worst case scenario leading to lost business opportunities.

Both these groups share some similarities. For example, they have limited monetary resources and knowledge resources. The persons working in the organisations usually have to do a lot of different, diverse work, often in fields that would require unique expertise. As the organisations are small they have less access to traditional support in-house and have limited capabilities to hire outside expertise. By experience, they manage to cope with the present situation. However, it leaves little or no room for improvements of the service level.

Information and communication technology (ICT) offers the potential to improve the situation for both these groups of small organisations by enabling improvements in current work methods and new possibilities. End-user development (EUD) is an alternative for the resource poor small organisations which might not be able to procure traditional ICT systems. However, to take full advantage of EUD SMEs need to be able to support their activities, which can be a major problem. Small organisations, in particular micro organisations, cannot maintain the same level of support staff as a large organisation can. Many SMEs will therefore be completely without a traditional computer support. We believe the Internet can help alleviate some of the problems SMEs would have in finding support for their particular problems.

This paper is structured as follows: next we will describe the background and theory in brief. Then we describe the aim, research questions and methodology. The next section is an analysis of our results and we end with some concluding remarks.

## BACKGROUND, FACTORS AFFECTING CHOICE OF SUPPORT SOURCE

We know little of the people using Internet as a source of support. While there are some studies about support in open-source software (OSS), e.g. (Lakhani and von Hippel, 2003), it is likely that they are a much more homogenous population as OSS requires a level of computer skill above most regular users. End-user developers are a very heterogeneous population (Klann, Paternò and Wulf, 2006). It is possible that some SMEs lack the skills, knowledge or self-efficacy to use the Internet sources of support such as Internet forums which seem to be well suited for support (Korvela and Packalén, 2009).

To be able to use Internet sources people would need to be comfortable with computers and using the Internet and search engines (Liaw, 2002). Liaw also shows that skill is related to usage as better computer skills increases confidence in using computers. Gender could also be a factor in using Internet sources, either directly or indirectly. There are studies that show that males are more comfortable with computers and the web (Liaw, 2002) and that gender impact areas of end-user development such as debugging (Beckwith, Kissinger, Burnett, Wiedenbeck, Lawrance, Blackwell and Cook, 2006) and self-efficacy in end-user developers (Beckwith, Inman, Rector and Burnett 2007).

Thus, previous research suggests that gender, self-efficacy and computer skills all impact the use of computers and Internet (Beckwith et al., 2006, 2007; Liaw, 2002). Additionally we have decided to look at education and whether the person is a self-employed small-business owner (SBO) or a public worker. We speculate there is a possibility for these two groups to differ. SBOs do not have access to all the same sources of support as those in the public-sector do who invariably work in larger organisations where e.g. colleagues and formal support are more readily available. Age might also be a factor. It is much more common with computer education in younger people where it has been part of the syllabus whereas older persons are more likely to have been trained on and specifically for that job, if at all. In our experience this is common and computer skills are often constrained to using those applications needed for their job. Our study showed a clear advantage (albeit self-reported) for the younger groups in computer skills and Internet use. Age also matters as people who have grown up with technology are more familiar and comfortable with its use (Brown, 2002). Young people use the Internet more frequently according to Statistics and Research Åland (2001).

## AIM AND METHODOLOGY

The aim of this paper is to investigate what support sources are used and what connections, if any, there are to demographics. Figure 1 shows our research model. End-user developers are all very different in demographics and perform a multitude of different tasks. In Korvela and Packalén (2009) we investigated which sources of support were used by end-user developers in small organisations, but could not look at demographics and if there were any patterns to the people who used the different sources of support available.

We therefore ask:

- Are there any particular groups who are more/less likely to use Internet based support?
- Are there any particular groups who are more/less likely to use other support?
- What impact do the demographic factors have?

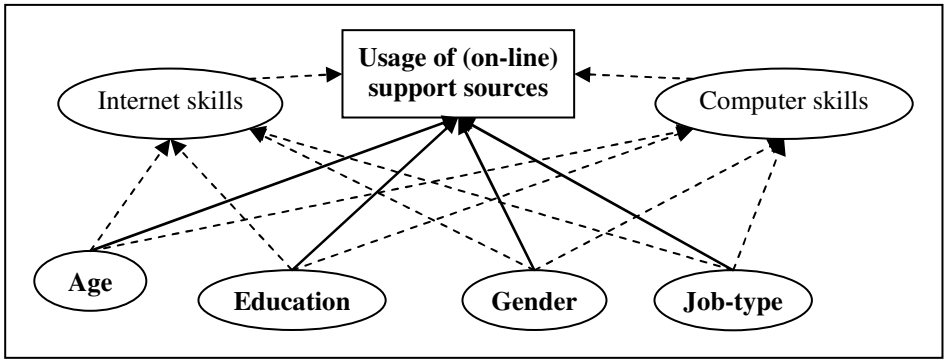


**Figure 1. Preliminary research model**

In order to fulfil the aim and answer the research questions empirical data was used. The empirical data for our study were collected within a project that gathered background information through a questionnaire about the present ICT situation of micro- and small organisations in the Åland Island archipelago, of skills and technologies used, and to identify need and

wishes for improvements of skills. In this paper we use part of that data: namely, the questions on their current use of support and the current/future usage of applications and corresponding questions related to Internet services. The respondents were asked to rate their computer knowledge and indicate their usage of different applications or services, both on a scale of 1-5.

Aiming at practicality at the same time as remaining academic means that trade-offs needs to be made which provide limitations to the research. For example the language of the researcher should be adapted to the skills and knowledge of the respondents, which is not always easy. Using too complex or advanced language can lead to misunderstandings, and using too simplistic language can lead to poor measurable results. Since we expected many of the respondents not to have direct experience of EUD, or might not recognize if they had it, we asked people to list the support sources used for "work-related problems" and "computer-related problems". This would give us some idea of how they might behave when performing EUD activities which combines the more familiar domain (work) knowledge with the potentially less familiar computer knowledge.

The questionnaires were sent to all municipal offices for distribution among the employees of all segments including schools, day-care and elderly care as well as to all firms in the Åland Island archipelago using the regional post office's services. We thus have answers from a full sample of firms registered in any of the six municipalities constituting the Åland Island archipelago. The number of firms according to the regional post office was 209 of which we got responses from 36. Hence, the response rate among private enterprises was 17.2%. In addition to this, we have results from 41 municipal employees. Here the sampling was random, as all employees were encouraged to fill in the questionnaire. According to Statistics and Research Åland (2001) there are a total of 232 employees in the public-sectors in the Åland Island Archipelago, giving a response rate of 17.6%.

## RESULTS

### Basic demographics

We received 77 responses of which 60 reported what support sources were currently in use. In Table 1 we show the basic demographic breakdown among these according to the groups we have chosen to analyse, namely: gender, SBO or public-sector worker, age group and the levels of education.

| **Gender** | | **Job-type** | | **Age** | | **Education** | |
|---|---|---|---|---|---|---|---|
| Male | 43 % | SBO | 45 % | 25-35 | 17 % | Elementary | 7 % |
| Female | 57 % | Public | 55 % | 36-45 | 27 % | High-school | 38 % |
| | | | | 46-55 | 43 % | Lower academic | 22 % |
| | | | | 56+ | 13 % | Higher academic | 33 % |

**Table 1. Basic demographics of respondents**

| | **Current study** | | | | **(Korvela and Packalén, 2009)** | | | |
|---|---|---|---|---|---|---|---|---|
| ***Source of support used*** | *Work problems (n=60)* | | *Computer problems (n=60)* | | *Work problems (n=19)* | | *Computer problems (n=19)* | |
| *Personal contacts* | 47 | 78 % | 51 | 85 % | 15 | 79 % | 15 | 79 % |
| *Trial and error* | 18 | 30 % | 28 | 47 % | 5 | 26 % | 9 | 47 % |
| *Internet searches* | 41 | 68 % | 21 | 35 % | 11 | 58 % | 4 | 21 % |
| *Internet forums* | 8 | 13 % | 6 | 10 % | 3 | 16 % | 3 | 16 % |
| *Windows/application help function* | - | N/A* | 16 | 27 % | - | N/A* | 5 | 26 % |
| *Helpdesk* | - | N/A* | 6 | 10 % | - | -** | - | -** |
| *Books* | 19 | 32 % | 1 | 2 % | 2 | 11 % | 3 | 16 % |

* not applicable to work-related problems; ** was not included in previous

**Table 2. Comparing our current study with previous one in (Korvela and Packalén, 2009)**

## SOURCES OF SUPPORT

Table 2 shows how the respondents used the different sources of support. The same themes from (Korvela and Packalén, 2009) are repeated where personal contacts, searching the Internet and trial and error are the main sources of support. And

these sources are consulted in much the same way, trial and error for computer problems and Internet searches for work problems. Books as a source are problematic. Though ranking as the third most popular source for work problems in this study, much more popular than the previous study, only one response indicated use for computer problem. We therefore note that books do not seem to be a choice for the computer problems and choose to exclude them from the analysis to save space.

### *Usage of personal contacts*

Table 3 shows that more females than males choose personal contacts for both work related and computer related types of problems. One possibility is that the females are more likely to be in a position where they have colleagues to contact for support. As mentioned a higher percentage worked in public-sector. Also the men in the public-sector are more often in management positions and do not have as many colleagues in the normal sense. For computer questions where the users might be more equal the differences is less, despite men in the public-sector having a self-reported higher level of skill. Looking at the numbers broken down by job-type, however, there is little difference between SBOs and public-sector. So it seems that gender impacts usage of personal contacts. The age groups show little variation in using personal contacts though looking at work problems the 46-55 groups uses them somewhat less than could be expected, this groups has more males and more SBOs so it makes sense that they have less opportunities to ask colleagues for help. Personal contacts are somewhat more prevalent in the high-school group which is strongly populated by females, a likely explanation. The higher academics are often found in management positions and potentially have less inclination to ask colleagues. It would seem gender and job-type impact on the use of personal contacts.

| | **Total** | **(n)** | **%** | **Computer problems (n)** | **% of question** | **% of total** | **Work problems(n)** | **% of question** | **% of total** |
|---|---|---|---|---|---|---|---|---|---|
| ***Gender*** | **60** | **100 %** | | **51** | **100 %** | **85 %** | **47** | **100 %** | **78 %** |
| *Male* | 26 | 43 % | | 19 | 37 % | 73 % | 16 | 34 % | 62 % |
| *Female* | 34 | 57 % | | 32 | 63 % | 94 % | 31 | 66 % | 91 % |
| ***Job-type*** | **60** | **100 %** | | **51** | **100 %** | **85 %** | **47** | **100 %** | **78 %** |
| *SBO* | 27 | 45 % | | 23 | 45 % | 85 % | 23 | 49 % | 85 % |
| *Public* | 33 | 55 % | | 28 | 55 % | 85 % | 24 | 51 % | 73 % |
| ***Age*** | **60** | **100 %** | | **51** | **100 %** | **85 %** | **47** | **100 %** | **78 %** |
| *25-35* | 10 | 17 % | | 10 | 20 % | 100 % | 8 | 17 % | 80 % |
| *36-45* | 16 | 27 % | | 14 | 27 % | 88 % | 15 | 32 % | 94 % |
| *46-55* | 26 | 43 % | | 20 | 39 % | 77 % | 17 | 36 % | 65 % |
| *56+* | 8 | 13 % | | 7 | 14 % | 88 % | 7 | 15 % | 88 % |
| ***Education*** | **60** | **100 %** | | **51** | **100 %** | **85 %** | **47** | **100 %** | **78 %** |
| *Elementary* | 4 | 7 % | | 2 | 4 % | 50 % | 3 | 6 % | 75 % |
| *High-school* | 23 | 38 % | | 21 | 41 % | 91 % | 21 | 45 % | 91 % |
| *Lower academic* | 13 | 22 % | | 12 | 24 % | 92 % | 11 | 23 % | 85 % |
| *Higher academic* | 20 | 33 % | | 16 | 31 % | 80 % | 12 | 26 % | 60 % |

**Table 3. Breakdown of the usage of personal contacts, computer vs. work problems**

### *Usage of trial and error*

Table 4 summarises the usage of trial and error. There is a slight bias to males with computers, possibly an indication of the higher self-efficacy in males and computers. Beckwith et al. (2006) showed that males tinker more than females and trial and error is a form of tinkering. The higher skill reported by males in our study indicates (at least) higher self-efficacy by males and support the expectation that they tinker more. However for work there are many more women using trial and error than men. We do not have an explanation for this.

The use of trial and error does not seem to be affected by the job-type; the distribution follows it almost exactly. For computer problems just under half of the respondents use trial and error regardless of category. However for work problems this changes. The number of SBOs and public-sector that use trial and error for work is much lower than for computer problems but the distribution is essentially the same. As such job-type does not seem to affect the use of support source for

computer-related problems. If we look at age then there's a clear edge to the youngest users, both for computers and work problems. The only exception is the 46-55 age group who uses trial and error with computers slightly more than could be expected. As noted earlier this group leans towards SBOs and males which could be the explanation. The highest educated group use trial and error more, as the most skilled users they are more likely to have the confidence to experiment with computers. It seems trial and error is an activity mainly associated with males and younger people, as well as skill and confidence.

| | **Total** | **(n)** | **%** | **Computer problems (n)** | **% of question** | **% of total** | **Work problems(n)** | **% of question** | **% of total** |
|---|---|---|---|---|---|---|---|---|---|
| ***Gender*** | **60** | **100 %** | | **28** | **100 %** | **47 %** | **18** | **100 %** | **30 %** |
| *Male* | 26 | 43 % | | 14 | 50 % | 54 % | 5 | 28 % | 19 % |
| *Female* | 34 | 57 % | | 14 | 50 % | 41 % | 13 | 72 % | 38 % |
| ***Job-type*** | **60** | **100 %** | | **28** | **100 %** | **47 %** | **18** | **100 %** | **30 %** |
| *SBO* | 27 | 45 % | | 13 | 46 % | 48 % | 8 | 44 % | 30 % |
| *Public* | 33 | 55 % | | 15 | 54 % | 45 % | 10 | 56 % | 30 % |
| ***Age*** | **60** | **100 %** | | **28** | **100 %** | **47 %** | **18** | **100 %** | **30 %** |
| *25-35* | 10 | 17 % | | 9 | 32 % | 90 % | 5 | 28 % | 50 % |
| *36-45* | 16 | 27 % | | 4 | 14 % | 25 % | 4 | 22 % | 25 % |
| *46-55* | 26 | 43 % | | 13 | 46 % | 50 % | 7 | 39 % | 27 % |
| *56+* | 8 | 13 % | | 2 | 7 % | 25 % | 2 | 11 % | 25 % |
| ***Education*** | **60** | **100 %** | | **28** | **100 %** | **47 %** | **18** | **100 %** | **30 %** |
| *Elementary* | 4 | 7 % | | 2 | 7 % | 50 % | 1 | 6 % | 25 % |
| *High-school* | 23 | 38 % | | 9 | 32 % | 39 % | 6 | 33 % | 26 % |
| *Lower academic* | 13 | 22 % | | 5 | 18 % | 38 % | 4 | 22 % | 31 % |
| *Higher academic* | 20 | 33 % | | 12 | 43 % | 60 % | 7 | 39 % | 35 % |

**Table 4. Breakdown trial and error, computer vs. work problems**

*Usage of Internet searches*

Table 5 shows the use of internet searches. With almost twice the number of people searching for work problems compared to computer problems this is an interesting question. More males search with a search engine for computer problems. But more females searched for work-related problems. Males had a self-reported Internet skill of 2.74/5.0 with females reporting 2.3/5.0. This could be an indication of higher male self-efficacy with regards to computers. Males also had higher computer skills (2.83/5.0) than females (2.42/5.0) in this study. The higher number of females searching for work problems cannot be explained this way. It could possibly be explained by the types of functions and the breakdown of males/females with regards to type of jobs, as 63% of the public-sector respondents are women to only 37% males. The nature of the job-tasks in the public-sector e.g. healthcare and education lends itself towards finding support in existing sources, problems and solutions are well defined. However, this does not bear over to the breakdown into job-types. Interestingly a higher percentage of SBOs search the Internet for computer problems, which is not surprising considering it is likely one of their main sources of support. This also ties in with the previous figures; more males are SBOs so that likely increases the number of males using Internet as support for computers. However, the numbers for computer and work-related problems are inverse, male and SBO seems to indicate using the Internet for computer problems while females and public workers are more strongly associated with using the Internet with work problems. It is not clear why this is so.

Contrary to what we had expected the use of the Internet for computer problems is higher in the 46-55 group than the 25-35 and 36-45 groups. Though the 46-55 group had slight overweight of SBOs which are also more likely to use the Internet to solve computer problems. The numbers are more even for work problems. However, few of the oldest group are using the Internet, possibly due to lack of skills. Internet searches follow the education groups quite closely. Only for work problems are the high-school group underrepresented and the highest educated group overrepresented. This is odd since the high-school group has more females which used the Internet searches more. Usage of Internet searches poses an interesting dilemma. For computer problems males and SBOs seem to indicate use, while for work problems it is females and public-

sector.

| | Total (n) | % | Computer problems (n) | % of question | % of total | Work problems(n) | % of question | % of total |
|---|---|---|---|---|---|---|---|---|
| ***Gender*** | **60** | **100 %** | **21** | **100 %** | **35 %** | **41** | **100 %** | **68 %** |
| *Male* | 26 | 43 % | 11 | 52 % | 42 % | 16 | 39 % | 62 % |
| *Female* | 34 | 57 % | 10 | 48 % | 29 % | 25 | 61 % | 74 % |
| ***Job-type*** | **60** | **100 %** | **21** | **100 %** | **35 %** | **41** | **100 %** | **68 %** |
| *SBO* | 27 | 45 % | 13 | 62 % | 48 % | 18 | 44 % | 67 % |
| *Public* | 33 | 55 % | 8 | 38 % | 24 % | 23 | 56 % | 70 % |
| ***Age*** | **60** | **100 %** | **21** | **100 %** | **35 %** | **41** | **100 %** | **68 %** |
| *25-35* | 10 | 17 % | 3 | 14 % | 30 % | 9 | 22 % | 90 % |
| *36-45* | 16 | 27 % | 3 | 14 % | 19 % | 10 | 24 % | 63 % |
| *46-55* | 26 | 43 % | 14 | 67 % | 54 % | 19 | 46 % | 73 % |
| *56+* | 8 | 13 % | 1 | 5 % | 13 % | 3 | 7 % | 38 % |
| ***Education*** | **60** | **100 %** | **21** | **100 %** | **35 %** | **41** | **100 %** | **68 %** |
| *Elementary* | 4 | 7 % | 2 | 10 % | 50 % | 3 | 7 % | 75 % |
| *High-school* | 23 | 38 % | 7 | 33 % | 30 % | 11 | 27 % | 48 % |
| *Lower academic* | 13 | 22 % | 5 | 24 % | 38 % | 10 | 24 % | 77 % |
| *Higher academic* | 20 | 33 % | 7 | 33 % | 35 % | 17 | 41 % | 85 % |

**Table 5. Breakdown Internet search usage, computer vs. work problems**

| | Total (n) | % | Computer problems (n) | % of question | % of total | Work problems(n) | % of question | % of total |
|---|---|---|---|---|---|---|---|---|
| ***Gender*** | **60** | **100 %** | **6** | **100 %** | **10 %** | **8** | **100 %** | **13 %** |
| *Male* | 26 | 43 % | 4 | 67 % | 15 % | 5 | 63 % | 19 % |
| *Female* | 34 | 57 % | 2 | 33 % | 6 % | 3 | 38 % | 9 % |
| ***Job-type*** | **60** | **100 %** | **6** | **100 %** | **10 %** | **8** | **100 %** | **13 %** |
| *SBO* | 27 | 45 % | 4 | 67 % | 15 % | 4 | 50 % | 15 % |
| *Public* | 33 | 55 % | 2 | 33 % | 6 % | 4 | 50 % | 12 % |
| ***Age*** | **60** | **100 %** | **6** | **100 %** | **10 %** | **8** | **100 %** | **13 %** |
| *25-35* | 10 | 17 % | 1 | 17 % | 10 % | 1 | 13 % | 10 % |
| *36-45* | 16 | 27 % | 0 | 0 % | 0 % | 1 | 13 % | 6 % |
| *46-55* | 26 | 43 % | 5 | 83 % | 19 % | 5 | 63 % | 19 % |
| *56+* | 8 | 13 % | 0 | 0 % | 0 % | 1 | 13 % | 13 % |
| ***Education*** | **60** | **100 %** | **6** | **100 %** | **10 %** | **8** | **100 %** | **13 %** |
| *Elementary* | 4 | 7 % | 1 | 17 % | 25 % | 2 | 25 % | 50 % |
| *High-school* | 23 | 38 % | 0 | 0 % | 0 % | 2 | 25 % | 9 % |
| *Lower academic* | 13 | 22 % | 2 | 33 % | 15 % | 2 | 25 % | 15 % |
| *Higher academic* | 20 | 33 % | 3 | 50 % | 15 % | 2 | 25 % | 10 % |

**Table 6. Breakdown of the Internet forum usage, computer vs. work problems**

*Usage of Internet forums*

The use of Internet forums is displayed in Table 6. It seems more common among males for both types of problems. This could possibly be due to a higher self-efficacy with computers and technology as more people are using forums for work questions where they would likely be more confident, i.e. have domain familiarity. The numbers are much the same when breaking it down by job-type. More SBOs report using forums, only in work related questions is the numbers more even. Internet forums and searching the Internet seems related, as females were more often searching for work related problems and this seems to be the case with Internet forums as well. Again interestingly the use of an internet forum is mainly in an older

age group. The indication seems to be that males and SBOs are driving this. Comparing to searching the Internet this seems to be a trend in this population. The higher education group is more likely to use internet forums for computer problems. That males and SBOs are using forums the most is something we would expect as they have higher skills and less options. That the more educated people are also overrepresented is not surprising as the higher education is associated with more skill.

### *Usage of windows/application help function & helpdesks*

Table 7 shows the breakdown of the system/application help function and helpdesks. There is little difference between usage for males and females, both groups being equally likely to consult this source. However, slightly more SBOs use it than public-sector workers. One probable explanation is that organisations in the public-sector fairly generally have some kind of official computer support. Looking at age groups the 25-35 group seem less inclined to use the help function while the 46-55 groups uses it more. The job-type explanation seems to fit. The young group has less SBOs while the older group have more SBOs. In education the differences are small, only the highest educated, who are also the most skilled use the help function. This often requires some understanding so greater skill helps with understanding and using the help functions. However, the youngest are the most skilled but also less likely to use the help function. It seems skill and job-type are the most likely explanations for help function usage.

Regarding helpdesks it is somewhat more common for males to use them for computer problems, but with so few respondents it is difficult to generalise. Helpdesks are only available to public-sector workers as no larger private companies were part of the questionnaire. The SBO with a helpdesk is a person who works as both a SBO and in the public-sector. The same 46-55 group is also the one using the helpdesk the most. There's no obvious reason to why one group should use the helpdesk more than another. The answer is likely that these groups are more often found in administrative/higher functions where more computer tasks are performed. This interpretation is also supported when looking at the groups broken down by education where the majority of helpdesk users fall in among the highest educated.

| | **Total** | **(n)** | **%** | **Help function (n)** | **% of question** | **% of total** | **Helpdesks (n)** | **% of question** | **% of total** |
|---|---|---|---|---|---|---|---|---|---|
| ***Gender*** | **60** | | **100 %** | **16** | **100 %** | **27 %** | **6** | **100 %** | **10 %** |
| *Male* | 26 | | 43 % | 7 | 44 % | 27 % | 3 | 50 % | 12 % |
| *Female* | 34 | | 57 % | 9 | 56 % | 26 % | 3 | 50 % | 9 % |
| ***Job-type*** | **60** | | **100 %** | **16** | **100 %** | **27 %** | **6** | **100 %** | **10 %** |
| *SBO* | 27 | | 45 % | 8 | 50 % | 30 % | 1 | 17 % | 4 % |
| *Public* | 33 | | 55 % | 8 | 50 % | 24 % | 5 | 83 % | 15 % |
| **Age** | **60** | | **100 %** | **16** | **100 %** | **27 %** | **6** | **100 %** | **10 %** |
| *25-35* | 10 | | 17 % | 1 | 6 % | 10 % | 1 | 17 % | 10 % |
| *36-45* | 16 | | 27 % | 4 | 25 % | 25 % | 1 | 17 % | 6 % |
| *46-55* | 26 | | 43 % | 9 | 56 % | 35 % | 4 | 67 % | 15 % |
| *56+* | 8 | | 13 % | 2 | 13 % | 25 % | 0 | 0 % | 0 % |
| **Education** | **60** | | **100 %** | **16** | **100 %** | **27 %** | **6** | **100 %** | **10 %** |
| *Elementary* | 4 | | 7 % | 0 | 0 % | 0 % | 0 | 0 % | 0 % |
| *High-school* | 23 | | 38 % | 6 | 38 % | 26 % | 1 | 17 % | 4 % |
| *Lower academic* | 13 | | 22 % | 3 | 19 % | 23 % | 1 | 17 % | 8 % |
| *Higher academic* | 20 | | 33 % | 7 | 44 % | 35 % | 4 | 67 % | 20 % |

**Table 7. Breakdown of the use of the help function and helpdesk**

## LIMITATIONS

We acknowledge limitations of the sampling, as the objective of the questionnaire also was to gather interested participants to an educational programme, where the entrepreneurs were given the possibility to participate in ICT-training. As such there is a potential non-response bias among people not interested in gaining more ICT skills. This focus also potentially impairs generalisation as we are targeting a very specific group of respondents both geographically and in interests, though many of the challenges remain the same regardless of the SBOs' immediate environment.

Regarding small firms, which often consist of only one worker, the owner, it can be difficult to differentiate between the firm and the owner as these are closely inter-related. This means that it can be difficult to know if the person speak on his own or his company's behalf. Also the owner / manager's opinions, values, and competence affect the firm (Johannisson and Lindmark, 1996).

The respondents were asked to do a self-evaluation of their current ICT skills. Self-evaluation is subjective, and there is no common baseline to determine own skills. This potential overconfidence was something we considered when looking at the skill levels in the analysis.

## CONCLUSIONS

In this study we looked at a set of potential and actual end-user developers (EUDs). We found that a minority are currently using Internet sources for computer-related problems, but we believe this will increase in the future as peoples' skills and comfort with computers and the Internet increases. Looking at demographics we found that there are indeed differences between groups, though they are seldom large. However, the differences may not always be those we would expect. For example, age was not a determining factor in using Internet searches, but it was for helpdesks and Internet forums. In most cases when differences existed there was a corresponding increase in skill for the group.

It seems skills are more important than demographic factors. We find this reassuring, as skills can be improved. We add the caveat though that we cannot say this with certainty as the survey and subsequent analysis was not fully built to facilitate this type of analysis. We have yet to analyse the data on skills compared to the use of support sources in depth, yet none of the demographic factors seemed able to explain all the variation.

Currently there seems to be barriers and knowledge gaps preventing users from taking advantage of on-line sources. When we know who the EUDs are we can then compare them to those already using on-line sources and hopefully determine something of what is needed for EUDs to choose to go on-line to find support.

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