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Lost productivity due to IT problems and inadequate computer skills in the workplace

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Contents

Management summary and recommendations

The average Dutch employee loses 7.6% of productive time due to poor IT resources or inadequate personal computer skills. To date, this problem seems to have escaped the attention of both employees and managers. Potential solutions include appropriate training, a more prominent role for the helpdesk, and better support from informal networks such as colleagues, whereupon the productivity losses can be reduced.

For the vast majority of Dutch employees, using the computer is now an essential work skill: it is all 'part of the job'. However, the importance of computers – and of IT in the broader sense – goes far beyond the impact on our daily work routine. IT facilitates and simplifies many activities, and renders some unnecessary altogether. IT allows companies to compete effectively, promoting transparency and innovation in products, services and processes. The importance of computers and IT is underscored by the findings of several studies, all of which conclude that IT has been the main factor in the significant increase in productivity achieved by the Dutch national economy in recent decades.

Nevertheless, there has been relatively little research examining the other side of the equation: the productivity *loss* for which the use of computers are responsible. At one time or another, most of us have been kept waiting on the phone while the person at the other end apologises profusely because his computer is taking so long to start. We may have lost an entire morning because the (mail) server was down. We know the frustration of not being able to log into the company systems from a remote location. This study is concerned with this productivity loss, and with the ways in which it can be resolved.

The various study results presented in this report are summarised in the table opposite [#overleaf]. On average, the respondents in our sample group lose almost half an hour (27 minutes and 37 seconds) of productive time due to IT-related problems, representing an overall productivity loss of 7.6%. In other words, for every hour spent at the computer, 4 minutes and 34 seconds are entirely unproductive. The problem is most acute among lower-grade professions and staff with a lower level of education, whose productivity loss can be as high as ten per cent.

For various reasons, it is difficult to quantify the precise economic value of this lost productivity although a simple calculation reveals that it is a substantial amount.[1] The authors have reason to believe that employees tend to underestimate the extent of the problem. This is certainly the case among the respondents in this study.

Average productivity loss per day due to use of IT (excluding smartphones and tablets)

[1] A 2009 study conducted by the Netherlands Organisation for Applied Scientific Research (TNO) concluded that the average Dutch employee spends 19.1 hours a week at the computer. According to figures published by Statistics Netherlands (CBS) in 2011, the working population of the Netherlands (aged 16 and over) is 9.2 million. A total of approximately 175,720,000 hours are therefore spent working at the computer each week. Allowing for holidays, there are 48 working weeks in a year, whereupon the annual figure is 8,434,560,000 hours. According to the findings of the current report, 7.6% of this time is unproductive, i.e. 641,026,560 hours. According to Statistics Netherlands, staffing costs average 30.08 euros per employee per hour (2008 level). Based on our findings, the total value of lost productivity is therefore in the order of 19.3 billion euros per annum. However, it would be inappropriate to offer this figure as a firm research result in view of the limited validity of the respondents' self-reported data. We include it only as an indication of the extreme seriousness of the problem.

	Total time at computer	Loss due to IT problems (incl. help)	Loss due to inadequate computer skills (incl. help)	Total loss	
	Hr:min	*Hr:min:sec*	*Hr:min:sec*	*Hr:min:sec*	*%*
Total	6:02	0:14.30	0:13.07	0:27.37	7.6
Gender					
Male	5:56	0:14.45	0:14.27	0:29.12	8.2
Female	6:10	0:14.08	0:11.01	0:25.09	6.8
Age					
16-33	6:16	0:13.43	0:13.25	0:27.08	7.2
34-51	6:10	0:15.40	0:13.23	0:29.03	7.9
52-67	5:30	0:13.16	0:11.48	0:25.04	7.6
Education					
Higher	6:05	0:11.23	0:10.59	0:22.22	6.1
Intermediate	6:07	0:13.06	0:14.50	0:27.56	7.6
Lower	5:50	0:22.11	0:13.05	0:35.16	10.1
Position/professional level					
Senior management	5:41	0:11.46	0:12.39	0:24.25	7.2
Middle management	5:52	0:12.57	0:10.54	0:23.51	6.8
Higher professions	6:07	0:13.32	0:12.29	0:26.01	7.1
Intermediate professions	6:12	0:13.52	0:14.19	0:28.11	7.6
Lower professions	5:47	0:20.09	0:12.41	0:32.50	9.5

Problem is not widely acknowledged

According to our findings, this extremely significant productivity loss goes largely ignored, as do the underlying causes. Employees consistently rate their own computer skills to be at a far higher level than can be justified by any other study. Notably, the vast majority of employees have had no IT training whatsoever in the last three years. Many claim that such training is unnecessary because their skills are already at the required level.

Perhaps even more surprising is that organisations have done very little to improve their employees' computer skills. **Respondents state that they developed more than 75% of their computer knowledge and skills independently, rather than relying on training or resources provided by their employer.** This is particularly true of respondents in the senior management subgroup, who generally seek help in developing their computer skills beyond the organisation itself.

As a result, development of computer skills relies on the informal support offered by an employee's colleagues: a form of unstructured, on-the-job training. This study reveals that this type of assistance is of far greater importance than any other. Of course, questions can be raised concerning the quality and effectiveness of this non-professional (although not necessarily unprofessional) approach. Moreover, it must be remembered that time spent helping colleagues (whether to solve acute IT problems or to develop their general computer skills) is time which cannot be spent on other things, and is therefore another cause of lost productivity.

Solutions are available

The findings of this study reveal that there are indeed plentiful opportunities to address the problem of lost productivity. The first potential solution is to provide better training, and to do so more frequently. Of all respondents, only 22% report having attended a formal training course during the past three years. Training is likely to have a major impact on productivity: the study reveals that those who have attended a course gain 33 minutes of productive time each day. Although this figure may appear to be high, we must remember that developments in IT are extremely rapid. New hardware devices and new programs are introduced on a regular basis, while new versions of existing software may include additional time-saving features and functionality. Good, targeted training can therefore be particularly effective in keeping employees' skills up to date.

A second potential solution is to enhance the effectiveness of the helpdesk function. At various points in this study it becomes apparent that the support offered by the organisation's IT helpdesk is not always in keeping with the organisation's actual requirements. The first indication is, of course, that employees generally seek each other's help to solve problems before they even think of contacting the helpdesk. A number of respondents in this study are themselves helpdesk staff. They state that many of the hardware and software problems brought to their attention are due to lack of experience and inadequate computer skills on the part of the user. However, they do not see it as their responsibility to improve user skills. The average helpdesk employee sees his role as primarily that of a technical adviser.

A third potential solution is to build upon the existing informal networks in which colleagues help each other to solve IT-related problems and develop the necessary computer skills. In other words, those informal networks should be formalised, at least in part.

The solutions suggested in this report are primarily intended to solve the problem of lost productivity by improving individual computer skills. Doing so will automatically resolve a number of the problems associated with the use of hardware and software. There are alternative approaches which may serve the same purpose, such as devoting attention to the stability and user-friendliness of applications. Organisations should undertake a careful selection and purchasing process to ensure that any new IT applications are the most appropriate choice in the circumstances. These are aspects to which organisations and their IT providers must indeed devote attention, but which fall outside the scope of the current report and recommendations.

10 Recommendations

No matter what solutions are implemented, it will be impossible to reduce the identified loss of productivity to zero, if only because the rapid technological developments will call for ongoing investment – in both time and money – to assimilate new devices and applications. However, we are able to present ten firm recommendations which we believe will go some way towards resolving the problem of lost productivity.

Recommendation 1: Identify the exact causes of lost productivity

It will be extremely useful to determine precisely which system(s) or application(s) account for the greatest loss of productive time within the organisation. This is something that the average employee already knows. However, it is rare for the problems to be expressly stated or quantified (as in this study).

Recommendation 2: Formalise support by colleagues

Because the assistance provided by colleagues is largely ad hoc, it is difficult for the organisation to exert any influence over its form or frequency. In some cases, however, it is possible to formalise support to some degree by designating a person within the department or unit who will then be responsible for all 'first-line support'. He or she will then develop a network which acts as an adjunct and extension to the existing helpdesk function. Some organisations assign an 'IT buddy' to their (new) employees.

Recommendation 3: Review the scope of the helpdesk function

It is not only a good idea to identify the various sorts of problems which affect (or are caused by) the existing applications and systems, but to identify the person or department which is best placed to resolve them. This may be the individual user (perhaps by means of training), the user's colleagues, the internal helpdesk, or some external service provider (outsourcing). Having done so, it becomes possible to redefine the roles and responsibilities of the helpdesk itself, whereby the scope of its activities is made either broader or narrower. In some organisations, the helpdesk has only a technical support function. In others, it is also responsible for general user support and training. The results of this study suggest that the latter role is more appropriate.

Recommendation 4: Devote particular attention to lower-grade staff

Identify the IT-related problems experienced by employees in the lower grades, and determine whether they are due to unnecessarily complex technology, inadequate computer skills, or the nature of the work itself. This particular group of staff may well require closer supervision, more support from managers or the helpdesk, and more training than those in the higher grades (who may generally be assumed to have a higher level of education and qualifications).

Recommendation 5: Devote greater attention to internet and other online skills (by means of training)

Organisations should formulate a policy governing the use of the internet in the workplace. This policy will identify the online applications which are of value and significance to the organisation, and those which are not. It should also establish clear rules for private internet use at work. There is a role for IT training organisations, which should adapt and expand their services accordingly. The current range of internet and online communication training courses is rather limited.

Recommendation 6: Assess computer skills as part of the recruitment process and monitor computer usage over time

Employers should not automatically assume that all young people are computer literate. Their computer skills should be assessed as part of the recruitment process. It will also be appropriate to monitor internet usage by young employees and other new recruits. To what extent is it necessary for their work? That said, it can be undesirable to apply overly rigid restrictions; there are internet sites which, although not directly work-related, will help employees to develop innovative insight and creative ability.

Recommendation 7: Establish an effective policy covering the use of smartphones and tablets

Smartphones and tablet computers are gradually becoming standard business resources. Such devices have many advantages: they enable the employee to work virtually anywhere and at any time. However, there are also disadvantages, one of which is the huge range of 'apps' which bring the risk of non-productive (private) usage during working hours. The organisation should therefore try to determine which applications are useful and permissible, and which are not. It will be useful to have a set of rules governing work-related use of personal devices, and the applications which may be installed on a device provided by the organisation itself.

Recommendation 8: Establish guidelines for efficient e-mail use

It will be useful to offer staff tips and guidelines for efficient e-mail use. These will include a small number of general rules on matters such as how often to check incoming e-mail (which may vary according to the employee's position), the use of the CC button, and so forth. Such rules can increase productivity by avoiding unnecessary distractions.

Recommendation 9: Devote attention to training and certification

It is important to assess the computer skills of all staff, regardless of level or position, in order to identify any shortcomings which can then be resolved by means of training. Ideally, a training course should lead to a recognised certificate as this will guarantee an effective skill level. The current study reveals a significant staff training requirement. Provided training has the desired effect of increasing productivity, the costs will quickly be recouped.

Recommendation 10: Examine employees' own solutions to IT-related problems

It will be useful to examine how the organisations' staff solve the IT-related problems they encounter (other than helping each other or calling the helpdesk). There may be books or internet sites which have proven particularly useful to some staff and which should be brought to the attention of others. Similarly, solutions may be found in an application's own 'Help' file. Where staff have been unable to find their own solutions, the organisation should determine the requirement for further training.

Structure of this report

This report presents and discusses the findings of a study into the productivity loss due to IT-related problems and inadequate computer skills in the workplace. The problem of lost productivity is approached from two angles. On the one hand, lost productivity can be due to inadequate resources: the systems, hardware and software made available to employees, known jointly as the 'IT environment'. On the other, productivity can be eroded by inadequate computer skills on the part of employees themselves.

Chapter 1 provides an account of the form and methodology of the study.

Chapter 2 is concerned with the productive time lost due to IT-related problems in the workplace, and specifically those due to the inadequate functioning of systems, hardware and software: the 'IT environment'.

In Chapter 3, our attention turns to the productivity loss caused by inadequate computer skills on the part of employees. In both Chapter 2 and Chapter 3 we consider the time spent helping others and the various other sources of assistance that are available.

Chapter 4 examines the use of smartphones and tablet computers. Once again, we attempt to quantify the productive time that is lost due to both technical issues and inadequate user skills.

Chapter 5 examines the level of formal IT training given to employees in the Netherlands and the economic importance of such training.

Chapter 6 lists the main problems encountered by the organisation's IT helpdesk, together with the underlying causes of these problems as stated by helpdesk staff.

Each chapter concludes with a summary of the main findings.

1 Methodology

1.1 Research method

To quantify the productivity loss due to IT problems and inadequate computer skills in the workplace, the authors conducted a survey among a large representative sample of the Dutch working population. Only a limited number of selection criteria were applied:

- Respondents must be aged between 16 and 67.
- Respondents must work at least 12 hours a week (93.7% of the initial respondents met this requirement).
- Respondents should spend at least two hours at the computer during the course of the working day (70.7% met this requirement).

The latter two requirements were imposed because there would be little point in analysing the responses of people who work very few hours, or who make little or no use of the computer at work. For the purposes of interpretation and comparison, the research results presented in this report relate only to the respondents who met all three criteria.

1.2 Response

To gain a representative impression of the Dutch working population within the relevant group, an e-mail was sent to 10,136 potential respondents inviting them to take part in the study. This invitation was accepted by 3,105 people. Having excluded those working fewer than 12 hours a week or spending less than two hours at the computer during the course of the working day (see above), we were left with 2,039 completed questionnaires. Of these, 35 had been completed incorrectly. The remaining 2,004 questionnaires (r = 19.8%) were used in our analyses.

The socio-demographic breakdown of the sample is shown in Table 1.1. Respondents are classified according to their level of education to date. There are three levels: ‘Lower’ refers to those who have completed basic secondary education (usually to the age of 16). The second category, ‘Intermediate’ includes those who have completed some further education, such as sixth-form college or Intermediate Vocational Education. The third category, ‘Higher’ relates to those who have completed tertiary education and therefore hold a degree (or equivalent).

A further five categories relate to the professional level at which the respondents actually work, based on the Standard Professions Classification applied by Statistics Netherlands (CBS). The ‘Lower’ category includes semi-skilled ‘blue collar’ workers such as fishermen, metalworkers, concierges, construction workers, salesmen and drivers. The ‘Intermediate’ category includes skilled professions such as laboratory technician, nurse, baker, secretary or bookkeeper. The ‘Higher’ category includes the ‘white collar’ staff such as project managers, therapists, writers, journalists, as well as the recognised professions such as teacher, doctor, economist, information scientist, etc. The terms ‘Middle Management’ and ‘Senior Management’ are self-explanatory, whereby the latter may include members of a board of directors.

Table 1.1 Socio-demographic characteristics of respondent group

	n	*%*	Average working week *Hr:min*	Average time spent at computer during working day *Hr:min*
Total	2004	100	36:08	6:02
Gender				
Male	1089	54.3	38:48	5:56
Female	915	45.7	32:59	6:10
Age				
16-33	510	25.8	36:26	6:16
34-51	1018	51.5	35:58	6:10
51-67	448	22.7	36:12	5:30
Education				
Higher	716	35.7	36:59	6:05
Intermediate	837	41.8	35:43	6:07
Lower	450	22.5	35:46	5:50
Position/professional level				
Senior management	145	7.2	43:04	5:41
Middle management	216	10.8	38:15	5:52
Higher professions	554	27.6	36:16	6:07
Intermediate professions	767	38.3	34:39	6:12
Lower professions	316	15.8	35:00	5:47

Table 1.2 Sectors in which respondents work

	n	*%*
Horticulture	100	5.0
Agriculture, forestry, fisheries	56	2.8
Water	72	3.6
Energy	82	4.1
High Tech Systems and Materials (HTSM)	101	5.0
Construction	81	4.0
Logistics	142	7.1
Retail	139	6.9
Hospitality and catering	34	1.7
Public sector	212	10.6
Information and Communication Technology (ICT)	147	7.3
Creative industry	57	2.8
Financial services	159	7.9
Education	137	6.8
Property and real estate	19	0.9
Business services	213	10.6
Health and welfare	202	10.1
Culture, sport and recreation	51	2.5

Various sectors were included in the study to reflect the great diversity of the Dutch working population. A breakdown of respondents by economic sector is shown in Table 1.2. This report does not draw any firm conclusions with regard to differences between the eighteen sectors because the sample group in each is too small, and because the demographic characteristics (age, gender and education) of the respondents are so dissimilar.

The respondents in this study have an average working week of 36 hours and 8 minutes per week. This is slightly longer than the national average of 34.3 hours per week reported by Statistics Netherlands (CBS Statline) for the second quarter of 2011. The disparity is due to the fact that the current study expressly excluded respondents with a working week shorter than twelve hours.

On average, respondents spend 6 hours and 2 minutes at the computer during the course of their working day. This figure is also likely to be higher than the national average because the sample includes only those who spend at least two hours a day at the computer: 70.7% of the respondents originally invited to complete the questionnaire. The 2,004 respondents whose data was eventually included in the analyses are broadly representative of those Dutch employees whose work requires them to spend two hours or more at the computer each day. It is not possible to apply any weighting or correction because the necessary information is not available. The average percentages of lost productivity as stated in this report are nevertheless applicable to the entire working population of the Netherlands.

1.3 Review group

The design, implementation and reporting of this study involved the input of a review group which had two main tasks. First, it was invited to advise the researchers on the form and implementation of the study. Second, it assisted in formulating the recommendations which will enable organisations to reduce the productivity loss we have identified. Alongside the authors of this report, who represent the University of Twente, the members of the review group were:

Louis Spaninks (CA ICT)
Joep Swagemakers (ECABO)
Leo Besemer (ECDL)
Roy Osinga (ECDL)
Frans Jacobs (Hogeschool Zuyd, a regional institute of higher education)
Mieke de Haan (MBO Council, the governmental advisory board on vocational education)
Yvonne van der Steenhoven (MBO Council)
Sander Ruiter (Ministry of Economic Affairs, Agriculture and Innovation)
Jan Julianus (Ministry of Economic Affairs, Agriculture and Innovation)
René Montenarie (Digivaardig & Digiveilig, a public-private partnership to promote computer skills)
Rachel Peeters (Digivaardig & Digiveilig)
David de Nood (VNO-NCW employers' federation)
Nanja Appel (NOiV programme: 'Netherlands Open and Connected', since discontinued).

2 IT problems in the workplace

2.1 Introduction

This chapter considers the problems which employees experience due to technical shortcomings in the computer environment, whether those affecting systems, hardware or software.

To gain an impression of the nature of such problems, the frequency with which they occur, how they are resolved or overcome, and how much time it takes to do so, the respondents were asked to consider various hypothetical IT-related problems. These included being unable to log in, a very slow or dysfunctional network, applications which will not open, computers which 'hang' or suddenly become very slow, applications which are incompatible with each other or the IT platform, and non-functioning peripherals such as printers or scanners.

The frequency and duration of such problems is described in §2.1. We then consider the average productivity loss for which they account (§2.2 to §2.4), the manner in they are resolved (§2.3) and the average time which employees spend helping their colleagues to deal with IT-related problems (§2.4).

Respondents were also asked to rate the functionality of the IT environment in their workplace by assigning a score to each of three statements:

1. 'All the programs I use for my work are up to date'
2. 'My company's IT environment is in order'
3. 'The programs I use support the business processes'

Respondents were asked to score these statements on a five-point Likert scale, whereby 1 indicates 'strongly disagree' and 5 indicates 'strongly agree'. The results are given in §2.4.

The concluding section (2.5) includes the general conclusions which may be drawn from the findings.

2.2 Productivity loss due to IT problems

Table 2.1 shows the average time that employees spend at the computer each day, the time that is lost due to IT problems, and the resultant productivity loss expressed as a percentage.

As stated above, the (selected) respondents spend an average of 6 hours and 2 minutes working at the computer each day. On average, they lose 12 minutes and 13 seconds of productive time due to IT-related problems. The average productivity loss due to a poorly functioning IT environment is therefore 3.4%.

Table 2.1 also shows the differences between the subgroups in this study. The most significant difference can be seen in terms of educational level. Respondents in the 'Lower' group report that the time lost to IT problems averages 19 minutes and 58 seconds, which represents a productivity

loss of 5.7%. This figure falls to 2.9% in the Intermediate group, and falls again to 2.6% in the Higher group. A comparison based on professional level shows a similar picture, which is hardly surprising given that there is likely to be a marked degree of correlation between a respondent's educational background and the level at which he or she works. Even so, the correlation is not direct. Productivity loss is highest in the Lower professions subgroup (5.2%) and lowest among the Middle Management category (2.9%). The productivity loss experienced by respondents in the Senior Management group is 3.1%.

It is interesting to note that the respondents' age has relatively little effect on average productivity loss. The percentage loss in the youngest group (3.0%) is very slightly lower than in the age group 34 to 51 (3.6%) and the 52 to 67 age group (3.5%). The differences are significantly smaller than those seen in terms of educational or professional level.

Table 2.1 Productivity loss due to inadequate or non-functional IT resources

	Average time spent at computer each day	Average time lost due to IT problems	Average productivity loss
	Hr:min	*Hr:min.sec*	*%*
Total	6:02	0:12.13	3.4
Gender			
Male	5:56	0:12.16	3.4
Female	6:10	0:12.10	3.3
Age			
16-33	6:16	0:11.08	3.0
34-51	6:10	0:13.16	3.6
52-67	5:30	0:11.02	3.5
Education			
Higher	6:05	0:09.19	2.6
Intermediate	6:07	0:10.35	2.9
Lower	5:50	0:19.58	5.7
Position/professional level			
Senior management	5:41	0:10.25	3.1
Middle management	5:52	0:10.17	2.9
Higher professions	6:07	0:11.27	3.1
Intermediate professions	6:12	0:11.23	3.1
Lower professions	5:47	0:18.04	5.2

The productivity losses shown in Table 2.1 are average percentages *per day*. However, IT-related problems are not encountered every day. Table 2.2 therefore shows the average frequency of IT problems and the average time lost by respondents in resolving or working around such problems.

Table 2.2 Frequency and duration of IT-related problems

	Average frequency *No. times per week*	Average duration *Hr:min.sec*
Total	1.7	0:35.26
Gender		
Male	1.6	0:36.16
Female	1.8	0:34.23
Age		
16-33	1.6	0:34.34
34-51	1.7	0:36.54
52-67	1.7	0:33.14
Education		
Higher	1.4	0:34.49
Intermediate	1.6	0:35.31
Lower	2.4	0:36.14
Position/professional level		
Senior management	1.6	0:34.49
Middle management	1.5	0:35.22
Higher professions	1.3	0:36.27
Intermediate professions	1.7	0:34.22
Lower professions	2.5	0:36.57

Table 2.2 shows that, on average, an employee encounters an IT-related problem 1.7 times a week and loses an average of 35 minutes and 26 seconds' productive time as a result.

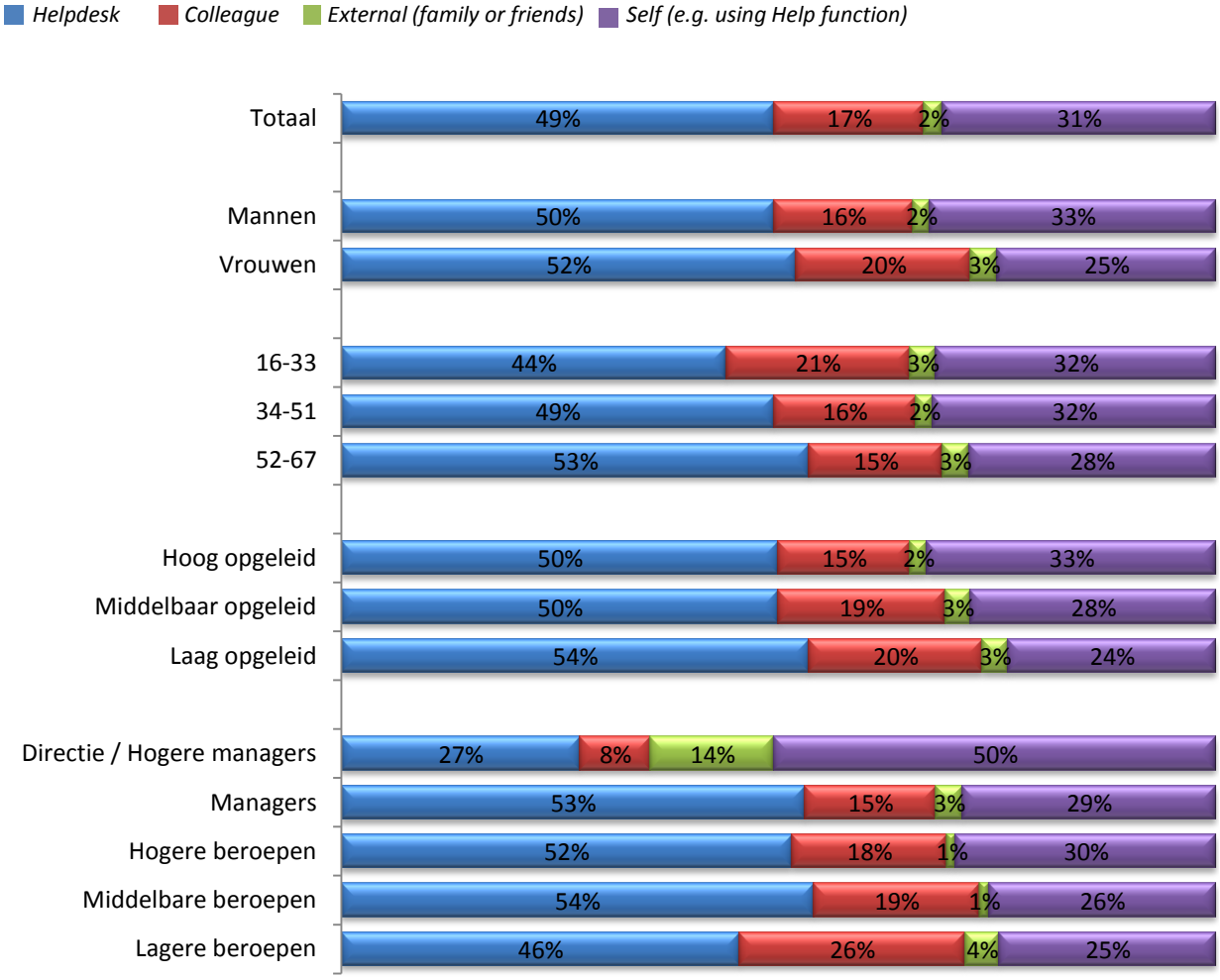
Once again, the differences are the most marked in terms of professional level. The frequency with which IT-related problems are encountered is highest among the 'lower professions' category, averaging 2.5 times per week, and the average duration of those problems is also greatest in this group at 36 minutes and 57 seconds. Respondents in the higher professional group report that they experience problems only 1.3 times a week on average, and that the average duration of a problem is 35 minutes and 26 seconds.

Remarkably, it is the members of the most senior age group who lose least time to IT problems: 33 minutes and 14 seconds on each occasion. One possible explanation is that these are the employees who are most likely to call the helpdesk, as described below.

2.3 Resolving IT problems

Respondents were also asked to state how they generally attempt to resolve an IT-related problem. The questionnaire offered several options: calling a helpdesk, asking a colleague for assistance, seeking help outside the workplace (e.g. from friends or family), or attempting to solve the problem themselves, perhaps using the 'Help' function of the computer or relevant program.

Figure 2.1 Sources of assistance in resolving IT problems



As we see from Figure 2.1, the helpdesk is the main source of assistance for almost all respondent groups. The sole exception is the senior management subgroup, in which members (claim to) solve 50% of problems themselves. This autonomous DIY approach to IT-related problems is the second most common response in almost all groups, regardless of educational or professional level. Only the respondents in the lower groups are slightly more likely to seek assistance. There is a clear inverse relationship between educational and professional level on the one hand and readiness to seek assistance on the other: the higher the respondent's qualifications or professional level, the less likely he or she is to seek a colleague's assistance.

Men are slightly more likely to attempt to solve the problem unaided than women: 33% of male respondents claim to do so, as opposed to 25% of female respondents, the latter being slightly more likely to ask a colleague for help.

The results are particularly interesting in terms of the differences between the age groups. Employees in the senior age group (52 to 67) are more likely to contact the helpdesk, doing so in 53% of cases, compared to 49% among those aged 34-51 and only 44% in the youngest age group (16 to 33). This method of solving problems obviously reduces the number of occasions on which the respondent seeks help from a colleague or attempts to solve the problem unaided.

Notably, the senior management group seek external help in 14% of cases. Other groups make only incidental use of this source of assistance.

Table 2.3 Average time lost in resolving IT problems, by source of assistance

Source of assistance	Average duration of IT problems per day *Hr:min.sec*
Helpdesk	0:13.22
Colleagues	0:08.33
Self (e.g. using help function)	0:12.38
External (friends, family)	0:10.13

Table 2.3 shows the average time lost to solving IT problems according to the type of assistance sought by the respondents. On average, those who ask a colleague for help lose the least productive time. As noted above, this is the preferred option for the members of the youngest age group and those working at a lower professional level. Perhaps the most striking finding is that calling the helpdesk results in the greatest loss of productive time. However, it must be remembered that neither the complexity of the problem nor the quality of the solution has been taken into consideration here. The comparison relates only to the most usual sources of assistance.

2.4 Assisting colleagues to solve IT problems

Table 2.4 Time spent assisting colleagues with IT-related problems

	% respondents who assist a colleague	Average time spent helping a colleague *Hr:min.sec*	Average *total* time spent helping a colleague per day (all respondents) *Hr:min.sec*
Total	56	0:04.05	0:02.17
Gender			
Male	57	0:04.22	0:02.29
Female	52	0:03.46	0:01.58
Age			
16-33	60	0:04.19	0:02.35
34-51	61	0:03.56	0:02.24
52-67	53	0:04.12	0:02.14
Education			
Higher	61	0:03.24	0:02.04
Intermediate	55	0:04.35	0:02.31
Lower	50	0:04.25	0:02.13
Position/professional level			
Senior management	38	0:03.33	0:01.21
Middle management	67	0:03.59	0:02.40
Higher professions	63	0:03.19	0:02.05
Intermediate professions	54	0:04.37	0:02.29
Lower professions	46	0:04.32	0:02.05

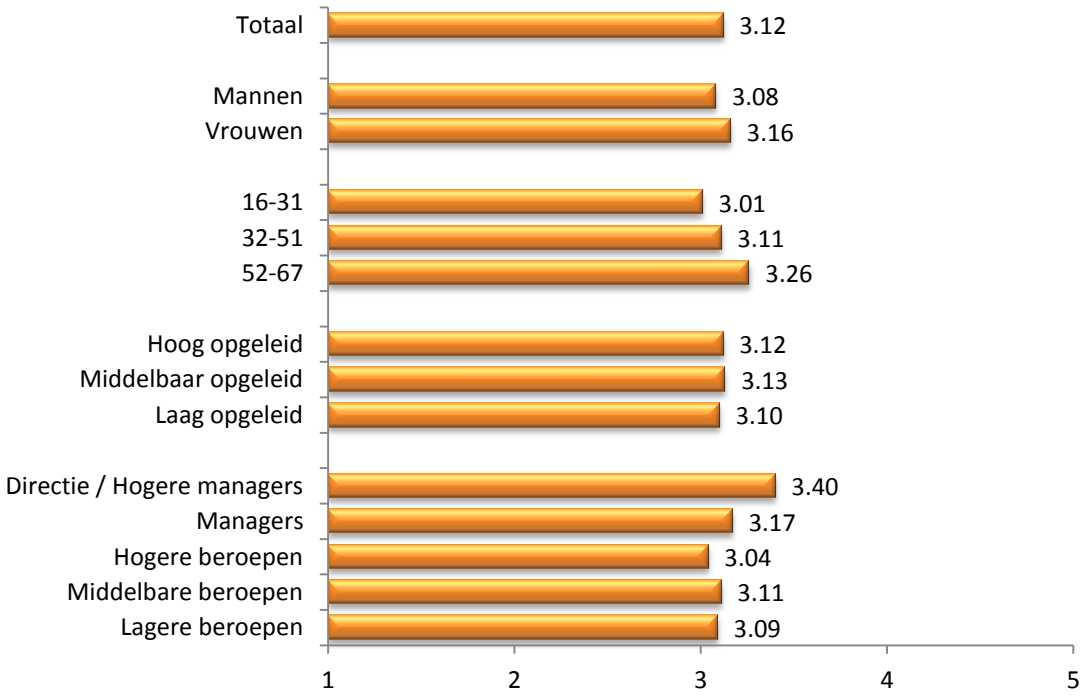
Fifty-six per cent (56%) of respondents report that they are sometimes called upon to help a colleague solve one or more of the IT-related problems discussed in this chapter. Doing so takes up an average of 20 minutes and 22 seconds of their time each week, which is the equivalent of 4 minutes and 5 seconds per day. Of the employee's reported time 'at the computer', 2 minutes and 17 seconds is therefore actually spent at someone else's computer, helping to resolve their problems.

The differences between the subgroups are not marked. Only senior managers spend significantly less time assisting their colleagues. Those in 'lower educational level' subgroup are slightly less likely to assist colleagues than others: 50% report doing so compared to 55% of the intermediate educational level group and 61% of those with higher education. We see a similar picture when examining professional level; the middle managers are most likely to help others with computer-related issues.

The correlation between the duration of the IT problems and the time spent in providing assistance is .388** (p<.01). We therefore see a positive relationship between the duration of the problems experienced by an employee and the time spent in providing assistance to others.

2.5 Respondents' assessment of the IT environment

Fig. 2.2 'All the programs I use for my work are up to date'
(1 = Strongly disagree; 5 = Strongly agree)

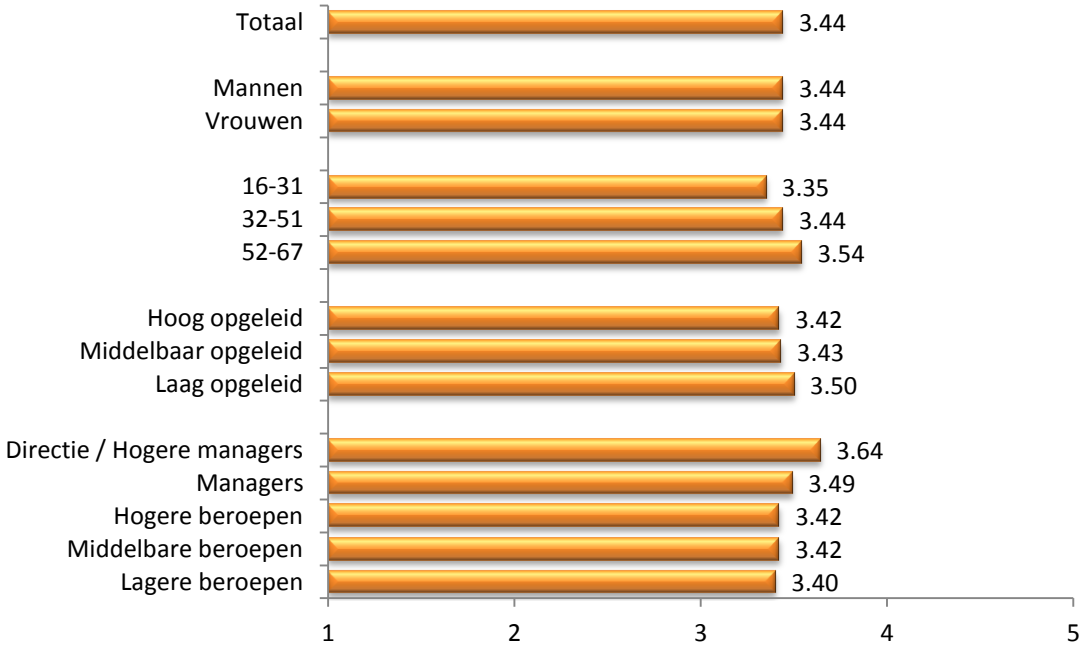


To determine the respondents' opinions of the IT environment in their workplace, the questionnaire presented three statements, the first of which was:

'All programs which I use for my work are up to date.'

Figure 2.2 shows the average ratings for this statement. The overall score is just over 3 ('neither agree nor disagree') and may therefore be seen as positive. Nevertheless, 26% of respondents disagree with the statement, assigning a score of 1 (strongly disagree) or 2 (disagree). The least favourable assessments are given by those in the youngest age group and in the higher professions subgroup. This is a significant finding, since these are the groups which make greatest use of computers during the course of the working day. Senior managers give the most favourable ratings (possibly because they themselves are responsible for the quality of the IT environment).

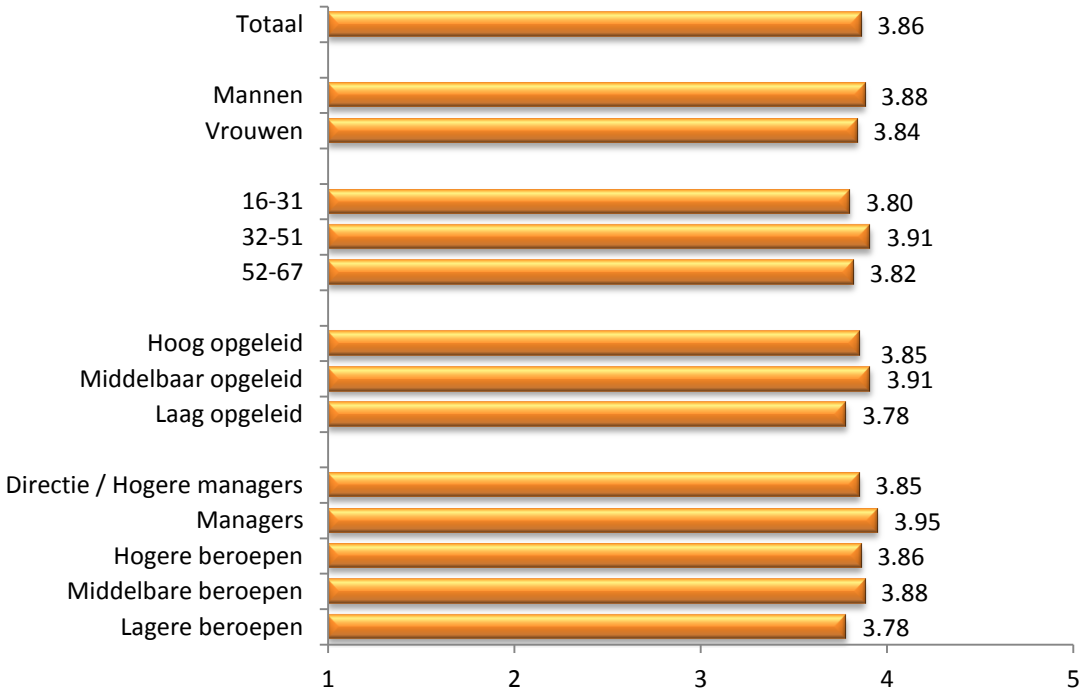
Fig. 2.3 'My company's IT environment is in order'
(1 = Strongly disagree; 5 = Strongly agree)



The second statement was 'My company's IT environment is in order'. The respondents' ratings are shown in Fig. 2.3, whereby the average score is 3.44. Here too, the overall assessment is therefore positive. Only 21% of respondents disagree with the statement, assigning a score of 1 ('strongly disagree') or 2 ('disagree'). Once again, it is the members of the youngest age group and the higher professional group who are least satisfied, while the senior managers are most satisfied.

The third and final statement was: 'The programs I use support the business processes.' The respondents' ratings are shown in Fig. 2.4, whereby the average score is 3.86. Here, it is the respondents in the lower professional group who are least satisfied, while middle management give the highest ratings.

Fig. 2.4 The programs I use support the business processes
(1 = Strongly disagree; 5 = Strongly agree)



2.6 Conclusions

Conclusion 1: IT problems account for a productivity loss of up to 4.0% per employee per day.

Table 2.5 shows the total productivity loss due to inadequate or non-functioning IT resources. The overall score represents the direct loss (the time that the employee loses due to IT-related problems) together with the indirect loss (time spent helping others).

The total time lost by the respondents in this study is approximately 14 minutes and 30 seconds per person per working day. This is the equivalent of 4.0% of the time spent working at the computer. However, because employees actually spend slightly over six hours on computer work during the course of an eight-hour working day, we may conclude that IT-related problems account for an overall productivity loss in the order of 3.0%.

This represents a significant business expense. When calculating the total costs of IT within the organisation, the financial implications of this lost productivity must be included alongside the 'traditional' costs (of hardware, software, energy consumption and support services). Given that staffing costs are by far the highest outgoing for many organisations, the value of the productivity loss identified in this study could actually exceed their total IT expenditure.

Table 2.5 Overview of productivity loss due to inadequate or non-functional IT resources

	Average time spent working at computer per day *Hr:min*	Average duration of IT problems per day *Hr:min.sec*	Average time spent assisting others per day *Hr:min.sec*	Average productivity loss (unproductive time as percentage of time spent at computer)
Total	6:02	0:12.13	0:02.17	4.0
Gender				
Male	5:56	0:12.16	0:02.29	4.1
Female	6:10	0:12.10	0:01.58	3.8
Age				
16-33	6:16	0:11.08	0:02.35	3.6
34-51	6:10	0:13.16	0:02.24	4.2
52-67	5:30	0:11.02	0:02.14	4.0
Education				
Higher	6:05	0:09.19	0:02.04	3.1
Intermediate	6:07	0:10.35	0:02.31	3.6
Lower	5:50	0:19.58	0:02.13	6.3
Position/professional level				
Senior management	5:41	0:10.25	0:01.21	3.5
Middle management	5:52	0:10.17	0:02.40	3.7
Higher professions	6:07	0:11.27	0:02.05	3.7
Intermediate professions	6:12	0:11.23	0:02.29	3.7
Lower professions	5:47	0:18.04	0:02.05	5.8

Conclusion 2: Local assistance is the most efficient approach

As can be seen from Table 2.3, the loss of productive time is smallest when colleagues help each other to solve IT-related problems. One possible explanation is that the problems concerned are of an everyday, trivial nature. However, the finding is borne out by earlier studies which conclude that attempting to solve the problem oneself, or asking for help from others nearby, is the most natural and popular approach, which not only solves the immediate problems but helps the employee to develop his or her general computer skills.[2]

Conclusion 3: Contacting the helpdesk costs most time (and the threshold is high)

Table 2.3 shows that those who immediately contact the helpdesk lose the most productive time to computer problems. This is probably due to the fact that the helpdesk is generally concerned with only the most serious problems. In most cases, they will be ongoing issues affecting the systems, hardware and networks rather than everyday problems in using the applications themselves. The helpdesk is often seen as a last resort, to be contacted only when the employee and colleagues within the department have been unable to resolve the situation themselves.

[2] Van Dijk, J. (2005). The deepening divide. Inequality in the information society. London: Sage Publications.

At the same time, helpdesk staff do not see themselves as 'IT instructors': it is not their role to help others improve their computer skills. As a result, they do not encourage staff to bring the simpler problems to the helpdesk. This is a missed opportunity, and even more remarkable in the light of a finding reported later in this study: it seems that helpdesk staff believe that many IT problems are due to inadequate computer skills within the rest of the organisation.

Conclusion 4: Staff in the lower educational and professional grades are more likely to experience IT-related problems.

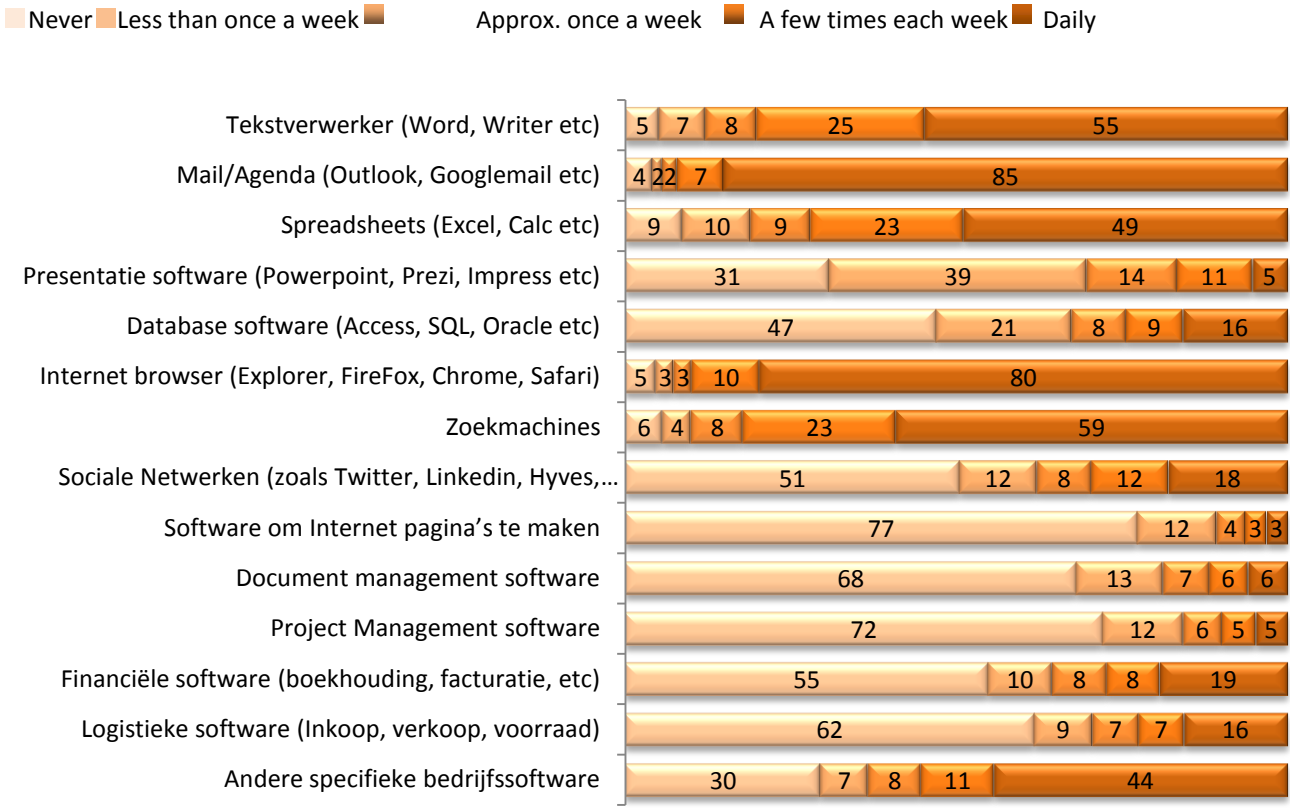
Employees with a lower level of education and/or working at the lower professional level experience a significantly greater number of IT-related problems and lose more productive time than staff with a higher level of education or working in a higher grade. It is notable that they are also the employees who are least likely to seek assistance from colleagues or attempt to solve the problem themselves. They make greatest use of the helpdesk, but usually do so having already lost a significant amount of productive time. Moreover, helpdesk staff devote more of their time to assisting this group. The most probable explanation for these findings is that the employees concerned lack the necessary general computer skills. It is also possible that the applications they are required to use are too complex for the job in hand.

3 Productivity loss caused by inadequate computer skills

3.1 Introduction

This chapter considers the productivity loss which is due to inadequate computer skills on the part of the individual employee. We use the term 'computer skills' to refer to the knowledge and know-how required to use the standard IT applications found in the workplace.

Fig. 3.1 Frequency of usage of software applications at work (in %)



Word processor (MS Word, Writer, etc.)
Mail/Agenda (Outlook, Google Mail, etc.)
Spreadsheets (Excel, Calc, etc.)
Presentation software (PowerPoint, Prezi, Impress, etc.)
Database software (Access, SQL, Oracle, etc.)
Web browsers (Explorer, Firefox, Chrome, Safari)
Search engines
Social networks (Twitter, LinkedIn, Hyves, etc.)
Web design/content management software

Document management software
Project management software
Financial software (bookkeeping, invoicing, etc.)
Logistics software (procurement, sales, inventory)
Other business-specific software

Figure 3.1 shows the frequency with which respondents are required to use various types of application in their work. The most commonly-used applications are e-mail programs (85% of respondents report that they use e-mail programs every day), internet browsers (80%), search engines (59%), word processors (55%), spreadsheet programs (49%) and specialist software specific to the sector or company concerned (44%).

The least frequently used programs (in the workplace) are website creation and content management software (77% of respondents report that they are *never* required to use such programs), project management software (72%), document management programs (68%), database software (54%) and social networks (51%).

For the sake of simplicity, we have opted to examine computer usage and the relevant computer skills under three headings:

- Use of applications other than internet and e-mail programs
- Use of internet
- Use of e-mail.

The following sections consider the productive time lost by employees due to a lack of the necessary skills in using these applications. We also examine the time lost in helping others who lack those skills. Respondents were asked to assess their own level of skill in using the various types of IT application. Their self-reported scores are discussed in §3.6.

3.2 Skills required to use IT applications other than internet and e-mail programs

To determine the productivity loss due to inadequate computer skills when using applications other than internet or e-mail programs, the questionnaire asked respondents to consider various hypothetical problems, all of which can be attributed to poor user skills. Examples include losing data due to not saving a file correctly, being unable to locate a file, and failure to use the various features, functions and shortcuts which the program includes in the interests of speed and efficiency.

Table 3.1 Productive time lost when using computer applications (other than internet and e-mail programs)

	Use of applications	Average time per day	Average lost time		Average lost time (total)
	%	*Hr:min.sec*	*Hr:min.sec*	*%*	*Hr:min.sec*
Total	100	3:29.33	0:05.13	2.5	0:05.13
Gender					
Male	100	3:24.37	0:06.18	3.1	0:06.18
Female	100	3:34.53	0:04.02	1.9	0:04.02
Age					
16-33	100	3:23.53	0:04.50	2.4	0:04.50
34-51	100	3:33.13	0:05.29	2.6	0:05.29
52-67	100	3:27.37	0:05.05	2.4	0:05.05
Education					
Higher	100	3:19.52	0:04.13	2.1	0:04.13
Intermediate	100	3:36.38	0:05.41	2.6	0:05.41
Lower	100	3:33.37	0:05.56	2.8	0:05.56
Position/professional level					
Senior management	100	2:15.30	0:05.10	3.8	0:05.10
Middle management	100	3:20.14	0:03.45	1.9	0:03.45
Higher professions	100	3:33.33	0:04.20	2.0	0:04.20
Intermediate professions	100	3:44.33	0:05.47	2.6	0:05.47
Lower professions	100	3:32.05	0:06.08	2.9	0:06.08

Table 3.1 presents a summary of the productivity loss attributable to the lack of the skills required to use this category of applications effectively. Because all respondents are required to use this type of application in their work, the 'total lost time' (shown in the right-hand column) is equal to the 'average lost time' (in column four).

The respondents in this study are required to use applications other than internet and e-mail programs for an average of 3 hours, 29 minutes and 33 seconds a day. On average, they lose 5 minutes and 13 seconds of productive time due to a lack of the relevant computer skills. The overall productivity loss is therefore 2.5%.

As may be expected, the productivity loss is greatest (2.8%) among the group with a lower level of education. Respondents in the intermediate education group account for a productivity loss of 2.6% while those with higher education account for a loss of 2.1%.

It is interesting to note that the productivity loss is significantly greater among male respondents: 3.1% compared to 1.9% among the female respondents.

Another interesting finding is that the differences between the age groups are small, and that younger respondents do not show any significantly greater degree of computer literacy than their more senior counterparts.

However, the most striking finding is that the senior management subgroup accounts for by far the greatest productivity loss: 3.8%. Although these respondents use the applications on a very infrequent basis, it seems that much of the time they spend doing so is entirely unproductive.

3.3 Skills required to use the internet

To determine how much productive working time is lost each day due to poor internet skills, the questionnaire once again presented various hypothetical problems: not being able to find a website, not being able to upload or download files, not being able to find information (perhaps due to poor formulation of the search query) and relying on inaccurate or outdated information found on the internet.

As shown in Table 3.2, the average employee spends 3 minutes and 54 seconds longer than necessary using the internet every day, due to inadequate knowledge and online skills. Overall, this represents a productivity loss of 5.3%.

The productivity loss is greater amongst female respondents (5.6%) than among their male counterparts (5.0%).

The figures further show that the members of the youngest age group spend significantly more time using the internet than those in the other two groups. (Their 1 hour and forty minutes 'online' each day exceeds the usage of the most senior group by almost 35 minutes.) The average productivity loss is also greatest among the youngest age group: 5.5% compared to just 4.9% among the most senior group.

There are clear differences in terms of educational level. While those with a higher level of education have an overall productivity loss of 3.6%, the figure for the intermediate group is 6.5% and that for the lower group is 5.7%. Respondents with a lower level of education spend approximately twenty minutes less on the internet than those in the higher education group.

The average productivity loss is smallest among the senior management group, at just 3.6%. This is particularly interesting given that this group accounts for the greatest productivity loss when using general applications (as described above). One possible explanation is that respondents in this group spend considerably more time online - over one hour per day - than those in the other professional grades.

Finally, it is interesting to note that the productivity loss of the lower professional group is smaller than in the intermediate and higher groups. This may be because the members of this group use the internet only for relatively simple matters.

Table 3.2 Time lost due to inadequate internet skills

	Internet usage	Average time spent online each day	Average unproductive time		Average unproductive time (total)
	%	*Hr:min.sec*	*Hr:min.sec*	*%*	*Hr:min.sec*
Total	87.0	1:25.14	0:04.29	5.3	0:03.54

Gender						
	Male	86.5	1:29.48	0:04.29	5.0	0:03.53
	Female	87.5	1:20.11	0:04.30	5.6	0:03.54
Age						
	16-33	85.7	1:40.23	0:05.59	5.5	0:04.42
	34-51	88.1	1:26.55	0:04.22	5.0	0:03.51
	52-67	85.9	1:04.31	0:03.08	4.9	0:02.41
Educational level						
	Higher	92.7	1:29.12	0:03.14	3.6	0:03.00
	Intermediate	86.5	1:24.27	0:05.28	6.5	0:04.44
	Lower	78.9	1:19.35	0:04.31	5.7	0:03.34
Position/professional level						
	Senior management	94.0	2:21.01	0:05.01	3.6	0:04.43
	Middle management	89.3	1:19.53	0:03.38	4.5	0:03.15
	Higher professions	92.9	1:19.45	0:04.35	5.7	0:04.15
	Intermediate professions	85.5	1:20.05	0:04.46	6.0	0:04.05
	Lower professions	76.3	1:21.19	0:03.51	4.7	0:02.56

3.4 Skills required for e-mail usage

The questionnaire also included various hypothetical problems regarding the use of e-mail and e-mail programs: being unable to attach files to an outgoing mail, forgetting to include the promised attachment, sending e-mails to the wrong people, being unable to find e-mail addresses, or other types of user error.

Table 3.3 shows that 94% of respondents are required to use e-mail as part of their work, and 85% do so on a daily basis (see Fig. 3.1). Overall, the average employee loses 57 seconds of productive time due to e-mail-related problems.

Here, in contrast to internet use, the productivity loss is greater among the male respondents at 2.0%, compared to their female counterparts with 1.3%.

The 16 to 33 age group includes a somewhat smaller percentage (90.1%) of respondents who are required to use e-mail as part of their work: 90.1% compared to 93.1% of the 34 to 51 age group and 93.6 of those aged 52 to 67. However, those members of the youngest group who do use e-mail spend by far the most time doing so: 1 hour and 12 minutes a day, compared to under 56 minutes for the senior group.

Respondents with a lower education level have the lowest rate of e-mail usage: just 86%, compared to 97% of those with a higher education. However, it is the respondents in the 'intermediate educational level' subgroup who account for the greatest productivity loss: 1.9%.

Finally, we note that respondents with a higher education, those in higher professions, and the members of the senior and middle management subgroups show an extremely high rate of e-mail usage, averaging 96.9%.

Table 3.3 Time lost due to inadequate e-mail skills

	E-mail usage	Average time spent using e-mail per day	Average unproductive time		Average unproductive time (total)
	%	*Hr:min.sec*	*Hr:min.sec*	*%*	*Hr:min.sec*
Total	94.2	1:05.20	0:01.01	1.6	0:00.57
Gender					
Male	91.8	0:59.01	0:01.10	2.0	0:01.04
Female	93.1	1:10.05	0:00.53	1.3	0:00.49
Age					
16-33	90.1	1:12.25	0:01.04	1.5	0:00.58
34-51	93.1	1:06.11	0:00.55	1.4	0:00.51
52-67	93.6	0:55.50	0:01.14	2.2	0:01.09
Education					
Higher	97.2	1:07.45	0:00.52	1.3	0:00.51
Intermediate	91.6	1:05.03	0:01.13	1.9	0:01.07
Lower	86.4	1:01.40	0:00.57	1.5	0:00.49
Position/professional level					
Senior management	97.0	1:06.46	0:01.04	1.6	0:01.02
Middle management	96.3	1:11.23	0:00.57	1.3	0:00.55
Higher professions	97.2	1:02.10	0:00.44	1.2	0:00.43
Intermediate professions	91.5	1:05.37	0:01.13	1.9	0:01.07
Lower professions	82.4	1:04.59	0:00.59	1.5	0:00.49

A comparison of Tables 3.1, 3.2 and 3.3 would suggest that e-mail usage accounts for only a very small productivity loss: only 1.6% of the total time spent using e-mail applications is unproductive, compared to 2.5% in the case of internet usage and 5.3% for other (business) applications.

Fig. 3.2 When the e-mail program is used

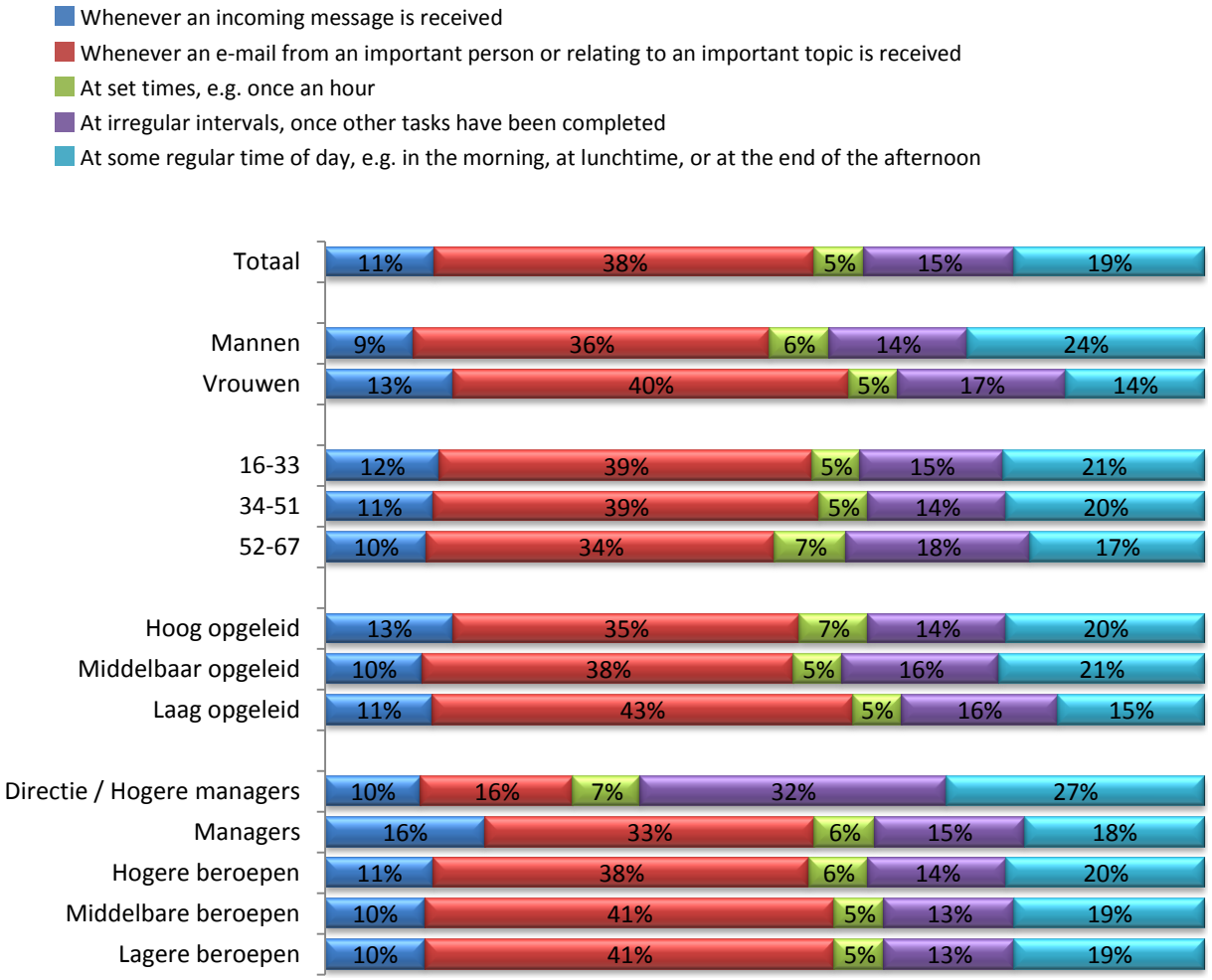


Figure 3.2 shows respondents' usual practice with regard to reading and responding to incoming e-mails. It suggests that further productivity gains can be made over and above those which will result from improving e-mail skills and resolving any technical problems.

As can be seen from the above figure, 52% of those who use e-mail as part of their work read and respond to an incoming message as soon as it arrives. This is the least efficient way of using e-mail. The most efficient is to reserve a set time for reading and replying to incoming mails, something that only 8% of respondents do at present. There are alternative approaches which are also more efficient than the immediate response, such as dealing with e-mail correspondence once some other task has been completed (currently adopted by 12% of respondents), at a set time of day (13%), or only when an e-mail is received from an important person (15%).

If we examine the differences between the subgroups, we see a small disparity between the female respondents, 53% of whom will read an e-mail as soon as it is received, and the men, of whom 50% report doing so. However, this difference is not statistically significant.

Turning to the three age groups, we find more significant differences. Some 61% of respondents aged 16 to 33 deal with their e-mail immediately on receipt, compared to 54% of those aged 34 to 51 and

only 45% of the most senior employees, aged 52 to 67. This latter group is more likely to conduct their e-mail correspondence at a set time of day: morning, lunchtime or (late) afternoon.

We see a similar situation when comparing respondents with a lower level of education and those with intermediate or higher qualifications. The first group is more inclined to read all e-mail on receipt, while those with a higher level of education will prioritise messages from certain important people, leaving the remainder until a more convenient moment. A comparison based on professional level reveals a similar pattern.

The productive time lost to dealing with 'spam' and other unsolicited e-mail falls outside the scope of this study, although inadequate computer skills do play a part in the sense that users should know how to install and configure an effective spam filter.

3.5 Helping colleagues with inadequate computer skills

Inadequate computer skills account for a direct loss of productivity by the employee concerned. However, there is also an indirect productivity loss in that others must spend otherwise productive time helping their colleagues.

Table 3.4 Time spent providing assistance to colleagues with inadequate computer skills

	Respondents providing assistance *%*	Average time spent helping others per day *Hr:min.sec*	Average unproductive time (*total*) *Hr:min.sec*
Total	63.6	0:04.48	0:03.03
Gender			
Male	63.2	0:05.04	0:03.12
Female	64.2	0:04.29	0:02.53
Age			
16-33	58.1	0:05.01	0:02.55
34-51	67.7	0:04.44	0:03.12
52-67	61.0	0:04.43	0:02.53
Education			
Higher	66.7	0:04.23	0:02.55
Intermediate	64.1	0:05.09	0:03.18
Lower	58.0	0:04.47	0:02.46
Position/professional level			
Senior management	36.6	0:04.44	0:01.44
Middle management	67.4	0:04.26	0:02.59
Higher professions	68.6	0:04.38	0:03.11
Intermediate professions	66.3	0:05.02	0:03.20
Lower professions	59.9	0:04.40	0:02.48

From Table 3.4 we see that 64% of respondents report that they are called upon to help colleagues solve IT-related problems which are due to inadequate computer skills. Doing so takes up an average of 23 minutes and 58 seconds of their time each week, or 4 minutes and 48 seconds per day.

The study reveals that female respondents are very slightly more likely to offer assistance than their male counterparts, although the difference is only one per cent. Those men who do help their colleagues spend more time doing so: an average of 35 seconds extra per day.

Interestingly, the youngest age group has the smallest percentage of respondents who report helping others: 58% compared to 68% in the 34 tot 51 age group and 61% of those aged 52 to 67. Once again, however, those members of the youngest group who do help others spend more time doing so: an average of 5 minutes and 1 seconds per day.

A comparison based on educational level reveals that those in the lowest category are least likely to offer help (or perhaps be asked to do so). Only 58% of this group assist their colleagues, compared to 64% of those with an intermediate level education and 67% of those with higher education.

In terms of professional level, it appears that senior managers are least likely to offer assistance to colleagues (or be asked to do so). A similar situation is seen in the lower professional grades. It is the respondents in the 'intermediate professions' category who spend most time helping others: an average of 5 minutes and 2 seconds per day.

3.6 Self-evaluation of use of IT applications in the workplace

To determine whether employees believe that they are skilled enough to use all the IT resources their work demands, respondents were asked to award themselves a score (out of 10) in respect of their knowledge and ability in using various types of application. They were also asked to suggest a score (on the same scale) which would indicate an adequate mastery of the application concerned. Both sets of scores are shown in Table 3.5. The self-assessment score (personal skill) is shown in column I and the target score (adequate knowledge of the application) in column II. Note that this table includes only the average scores of those people who actually use the application concerned in their work.

Self-evaluation is not regarded as a particularly valid method of assessing knowledge or skills. This limitation certainly applies to the scores shown in column I of Table 3.5. For example, we see an average score of 8.3 for 'use of search engines'. However, several objective performance tests conducted in recent years reveal that the vast majority of people fall somewhat short of this level. The self-assessment scores must be regarded as nothing more than an indication. Of considerably more value are the differences between the scores in column I and those in column II. They allow us to draw two important conclusions:

- With only one exception, the scores in column I are higher than those in column II. This means that almost all respondents consider their knowledge and skills to exceed the required minimum level. The sole exception is the use of spreadsheets by respondents aged

51 to 67. Even here, the difference between the two figures is extremely small (7.2 against 7.3).

- Some respondents award themselves a 'barely adequate' score for their use of certain applications. For example, those who are called upon to use project management software in their work (and only those who do) give themselves a score of 5.5. It seems that the ability to use this type of software is not regarded as particularly important, since respondents set the minimum score for 'adequate knowledge and skills' at just 5.1.

Table 3.5 Average scores for the use of IT applications: self-assessment of personal skills (Column I) and minimum required level of skills (Column II)

			Gender				Age					
	Total		Male		Female		16-33		34-51		52-67	
	I*	II**	I	II	I	II	I	II	I	II	I	II
Word processor	8.0	7.6	7.9	7.5	8.2	7.7	8.3	7.5	8.0	7.6	7.8	7.8
Mail/Agenda	8.3	7.8	8.2	7.7	8.4	7.9	8.3	7.6	8.3	7.8	8.3	8.0
Spreadsheets	7.4	7.3	7.5	7.3	7.3	7.2	7.6	7.1	7.4	7.4	7.2	7.3
Presentation software	6.7	6.1	6.7	6.1	6.6	6.1	7.0	6.2	6.6	6.1	6.4	6.1
Database software	5.9	5.5	5.9	5.5	6.0	5.6	6.1	5.7	5.9	5.5	5.7	5.4
Internet browser	8.2	7.1	8.2	7.0	8.2	7.2	8.4	7.0	8.2	7.1	8.1	7.2
Search engines	8.3	7.1	8.2	7.0	8.4	7.2	8.3	7.0	8.3	7.1	8.3	7.3
Social networks	7.4	4.8	7.2	4.7	7.9	5.1	7.9	4.8	7.5	5.0	7.0	4.6
Web creation software	6.1	5.4	6.2	5.3	5.9	5.8	6.6	5.6	6.0	5.3	5.8	5.6
Document management software (DMS)	5.9	5.3	6.0	5.3	5.7	5.2	6.2	5.4	5.8	5.1	5.7	5.5
Project management software (PMS)	5.8	5.6	5.9	5.5	5.8	5.7	5.9	5.7	5.9	5.4	5.6	5.6
Financial software	6.8	6.3	6.6	6.2	7.0	6.4	7.1	6.3	7.0	6.5	6.3	6.0
Logistics software	6.8	6.3	6.8	6.3	6.8	6.3	6.8	6.3	6.8	6.3	6.9	6.3

	Education						Position/professional level									
	Lower		Intermediate		Higher		Senior management		Middle management		Higher		Intermediate		Lower	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Word processor	7.8	7.6	8.0	7.6	8.2	7.6	8.1	7.8	8.2	7.7	8.1	7.7	8.0	7.6	7.8	7.4
Mail/Agenda	8.2	7.8	8.4	7.9	8.3	7.7	8.4	7.9	8.4	7.9	8.2	7.8	8.4	7.9	8.1	7.7
Spreadsheets	7.2	7.1	7.4	7.4	7.5	7.3	7.5	7.4	7.7	7.5	7.5	7.3	7.4	7.3	6.9	6.9
Presentation software	6.3	5.8	6.4	5.9	7.1	6.5	7.0	6.6	7.0	6.4	7.0	6.4	6.4	5.8	6.0	5.7
Database software	5.8	5.5	6.0	5.6	5.9	5.5	6.1	5.6	6.3	6.0	6.0	5.4	5.9	5.5	5.7	5.4
Internet browser	7.9	6.9	8.2	7.1	8.4	7.2	8.3	7.5	8.2	7.2	8.3	7.2	8.2	7.0	7.9	6.8
Search engines	8.0	7.1	8.3	7.2	8.4	7.1	8.1	7.4	8.5	7.3	8.4	7.1	8.3	7.1	8.1	7.0
Social networks	7.3	4.6	7.5	5.1	7.6	4.9	7.4	5.8	7.8	5.0	7.6	4.6	7.5	4.8	7.4	4.6

Web page creation software	5.7	5.1	5.9	5.5	6.4	5.6	6.4	5.9	6.3	5.7	6.4	5.3	6.0	5.5	5.3	5.0
DMS	5.8	5.1	6.0	5.4	5.8	5.2	6.4	6.1	5.9	5.9	5.9	4.9	6.0	5.3	5.1	4.7
PMS	5.5	5.2	5.9	5.8	5.9	5.5	6.2	5.9	6.1	6.5	5.9	5.0	5.7	5.6	5.3	5.0
Financial software	6.6	6.2	7.0	6.5	6.8	6.2	7.2	7.0	7.2	6.8	6.7	5.9	6.8	6.4	6.6	5.8
Logistics software	7.0	6.5	6.9	6.4	6.5	5.9	6.9	6.9	7.3	6.7	6.5	5.6	6.8	6.3	6.8	6.4

The overall impression created by Table 3.5 is confirmed by a further self-assessment, in which the respondents' were asked to score the statement 'My computer skills are good' on a five-point Likert scale. As we see from Figure 3.3, the average score was 4.07.

The scores reported by the senior age group (52 to 67), those with a lower level of education and those in the lower professional grades are somewhat lower, although positive overall. This may indicate that respondents in these groups acknowledge that some improvement is possible.

Fig. 3.3 My computer skills are good'

(1 = Strongly disagree; 5 = Strongly agree)

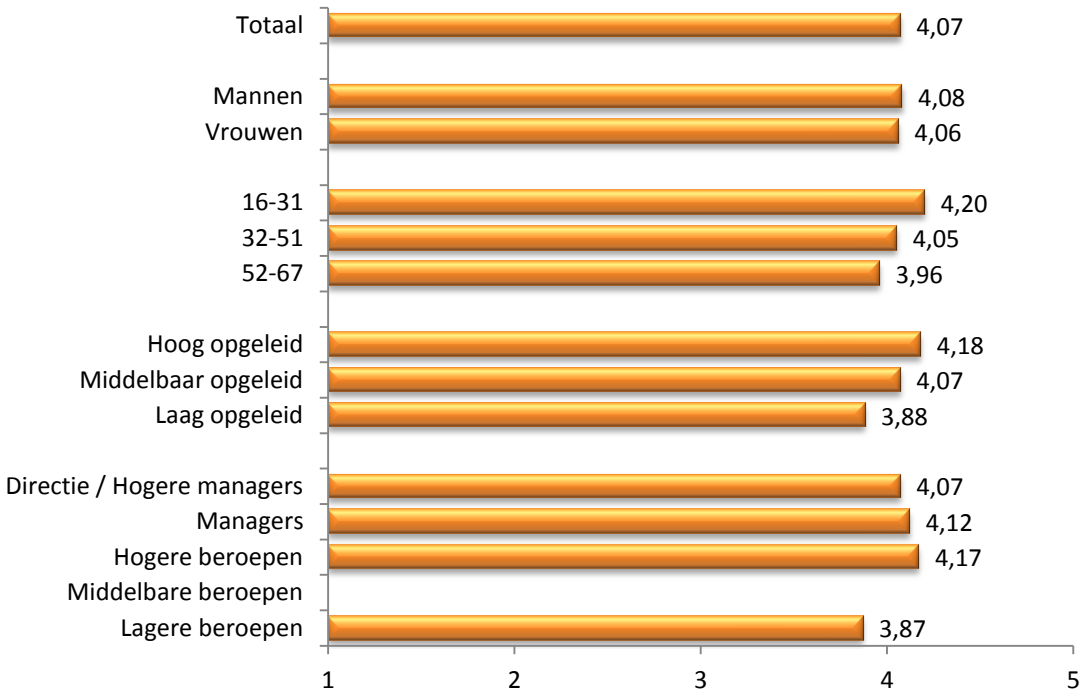
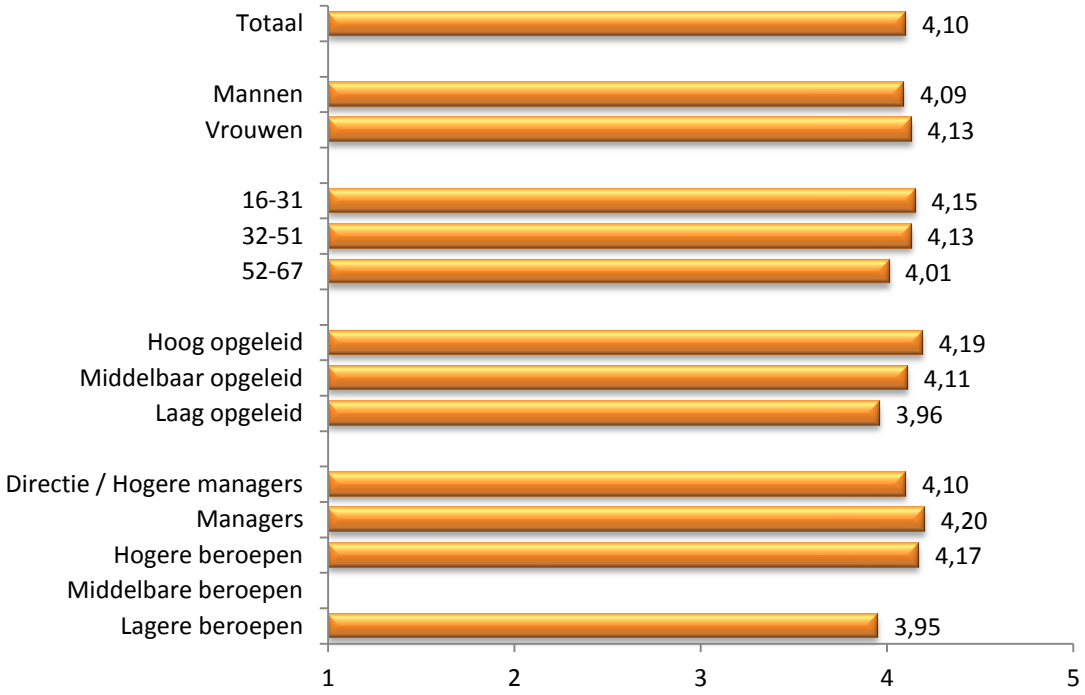


Fig. 3.4 'I have considerable experience with the programs I use for my work'
(1= Strongly disagree; 5 = Strongly agree)



A similar picture is given by Figure 3.4 which presents the ratings for the statement 'I have considerable experience with the programs I use in my work'. In general, respondents believe that they do indeed have considerable experience in using those programs. Middle managers and those with a higher level of education claim the most experience.

3.7 Conclusions

Conclusion 5: Internet skills are a major cause for concern

Table 3.6 Productivity loss due to inadequate computer skills

	Average time at computer per day	Lost time when using computer applications	Lost time when using internet	Lost time when using e-mail	Lost time when offering assistance to others	Average productivity loss (unproductive time as percentage of daily working hours at computer)
	Hr:min	*Hr:min.sec*	*Hr:min.sec*	*Hr:min.sec*	*Hr:min.sec*	*%*
Total	6:02	0:05.13	0:03.54	0:00.57	0:03.03	3.6
Gender						
Male	5:56	0:06.18	0:03.53	0:01.04	0:03.12	4.1
Female	6:10	0:04.02	0:03.54	0:00.49	0:02.53	3.1
Age						
16-33	6:16	0:04.50	0:04.42	0:00.58	0:02.55	3.6
34-51	6:10	0:05.29	0:03.51	0:00.51	0:03.12	3.6
52-67	5:30	0:05.05	0:02.41	0:01.09	0:02.53	3.6

Education						
	Higher	6:05	0:04.13	0:03.00	0:00.51	0:02.55	3.0
	Intermediate	6:07	0:05.41	0:04.44	0:01.07	0:03.18	4.0
	Lower	5:50	0:05.56	0:03.34	0:00.49	0:02.46	3.7
Position/professional level							
	Senior management	5:41	0:05.10	0:04.43	0:01.02	0:01.44	3.7
	Middle management	5:52	0:03.45	0:03.15	0:00.55	0:02.59	3.1
	Higher professions	6:07	0:04.20	0:04.15	0:00.43	0:03.11	3.4
	Intermediate	6:12	0:05.47	0:04.05	0:01.07	0:03.20	3.8
	Lower professions	5:47	0:06.08	0:02.56	0:00.49	0:02.48	3.7

Table 3.6 shows the overall productivity loss which can be attributed to inadequate computer skills when using various applications. On average, employees lose 13 minutes and 7 seconds of productive time, being 3.6% of the total time spent at the computer.

Although it is the 'miscellaneous' applications which account for most lost time in absolute terms (an average of 5 minutes and 13 seconds), internet use represents the greatest productivity loss in relative terms: 5.3% of the time spent on the internet is non-productive. This may be because the internet is a more recent introduction to the workplace than applications such as word processors, whereupon employees are less familiar with its use. Or perhaps it is because 'surfing' the internet is a less structured activity than other forms of computer use: there is considerable room for personal choice and there are countless alternative ways of finding information. Last but not least, there are far fewer training opportunities which would help staff learn how to use the internet more effectively.

Conclusion 6: Young employees lose most productive time due to a lack of internet skills

It is clear that younger staff account for the greatest loss of productive time (in both relative and absolute terms) when using the internet, due to inadequate computer skills. This is not what one would expect of the 'digital generation'. In previous performance tests conducted by University of Twente researchers, young people were found to be relatively strong in operational and formal internet skills (using a browser, navigating and general orientation), but much less adept in terms of their strategic and information skills. One aspect of these skills which is particularly relevant in the work setting is the ability to select appropriate and accurate sources of information from among the thousands of alternatives which can be found online. The selected source must of course be relevant to the work in hand: it must provide some added value. It is possible that young employees are overwhelmed by the sheer number of alternative sources, and can be distracted by those which are less relevant – or completely irrelevant – to the work itself.

Conclusion 7: Senior managers lose five minutes of productive time a day due to poor internet skills

Internet use by the senior management subgroup accounts for only a minor productivity loss in relative terms. However, because these respondents spend so much time online, the loss in absolute terms is the greatest of all subgroups at just under 5 minutes per week.

Conclusion 8: The male/female stereotypes do not hold true

When using general business applications, men lose considerably more productive time due to a lack of adequate computer skills than women. However, the opposite applies in terms of internet usage, whereby women lose relatively more productive time than men. In fact, this finding is not borne out by the University of Twente's previous performance tests, the results of which suggest that there is very little difference between the genders in terms of computer skills. In the real-world context of the workplace, we can only speculate about the cause of the differences noted in the current study. It may be a question of false perceptions, whereby gender stereotypes play a part. Perhaps men enjoy (or claim) greater freedom when working with computer applications. Perhaps they have greater self-confidence and tend to be more tenacious, not giving up when things do not go entirely as expected. Women, on the other hand, tend to follow the 'rules' more closely. It is often said that only women read user manuals! Moreover, women are more likely to have attended a formal training course (see Chapter 5) and may be quicker to realise that help is needed (which can be more efficient). As we saw in Figure 2.1, women do approach the helpdesk more readily.

Conclusion 9: Users overestimate their e-mail skills

The amount of productive time lost due to inadequate e-mail skills is extremely small, according to the respondents themselves. At first sight, it would appear that less than one minute (57 seconds) of the 1 hour and 5 minutes spent dealing with e-mail each day is unproductive. However, the responses to the question about when incoming e-mail is read and answered suggest that the actual productivity loss is far greater. Over 50% of respondents read all e-mail messages as soon as they arrive. This is extremely inefficient. Moreover, even if someone believes that he (or she) is good at 'multitasking', dealing with e-mail will inevitably distract from any other job in hand. Other causes of inefficiency and productivity loss, such as excessive use of the Cc function, failure to exclude spam and other unsolicited mail, or poor use of address books and circulation lists, fall outside the scope of this study.

Conclusion 10: Colleagues are an important source of assistance

This study confirms that much productive time is lost when helping others with their IT-related problems. Assisting colleagues whose computer skills are inadequate claims an average of almost 24 minutes a week. This equates to approximately 18 hours a year, or almost half a working week for a full-time employee. It is likely that those receiving the assistance lose just as much time, if not more. An entire working week is therefore lost each year. Two thirds of respondents provide such

assistance when asked. Those with a higher level of education do so more often than those with a lower level of education. It is by no means certain that the assistance is actually effective.

Conclusion 11: Employees overestimate their own computer skills

We can conclude – with a degree of probability bordering on absolute certainty – that employees vastly overestimate their own computer skills. The best evidence for this is the significant difference noted in Chapter 5 between the productivity gains which employees believe would result from formal IT training, and the actual gains seen in practice. Another indication is the fact that employees consistently rate their own computer skills to be higher than the minimum level needed to use the application concerned efficiently and effectively. Moreover, they award themselves a higher score for the use of applications which they consider important and which they use frequently than they do for those which they consider less important and use less often. Frequent use may indeed help to develop better computer skills: practice makes perfect, after all. However, there is no guarantee. Asked to assess their competence in using search engines, respondents awarded themselves an average score of 8.3. However, recent studies by the University of Twente show that the Dutch public are not entirely adept at using Google and other online search engines. They often fail to formulate a good search query, tend to look at only the first few 'hits' on the list, and rarely evaluate the reliability of the information they find with the required objectivity.

4 Problems with smartphones and tablets

4.1 Introductions

Thus far we have considered the problems affecting 'mainstream' IT resources such as desktop PCs and laptops, as well as those which are due to inadequate computer skills on the part of the user. We have specifically excluded the use of the smartphone (a mobile telephone with some computer functionality) and the tablet (a handheld computer contained in a single panel: a large PDA or a small laptop, depending on which way you look at it). Because these devices are becoming increasingly popular in the Netherlands, our study examined the productivity loss attributable to their use in the workplace.

In this chapter we consider the penetration and usage of these devices in the business setting, the problems which their use can entail, and the assistance which may be provided by colleagues to someone who experiences such problems. The term 'penetration' refers to the percentage of respondents who use a particular device for business purposes, while 'usage' refers to the amount of time they spend using that device.

We do not distinguish between problems caused by technical faults or dysfunctional equipment and those due to a lack of the relevant skills on the part of the user.

4.2 The use of smartphones and tablets in the workplace

Fig. 4.1 Penetration (%) and usage (hr:min.sec) of smartphones in the workplace

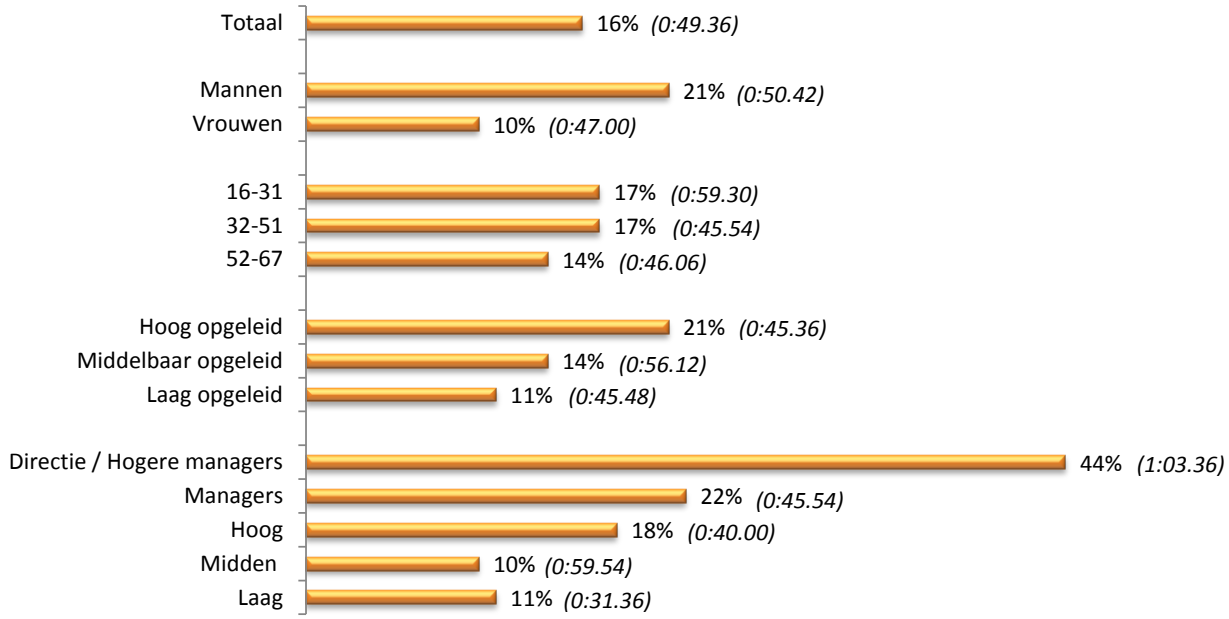


Figure 4.1 shows the percentage of respondents in each subgroup who use a smartphone for business purposes. The overall figure remains relatively low at 15.9%. Those respondents who do use a smartphone at work spend an average of 49 minutes and 36 seconds per day doing so.

There are significant differences between the subgroups in terms of smartphone usage for business purposes.

First, there are twice as many male respondents who use a smartphone than there are female respondents.

If we then compare the three age groups, we find somewhat smaller differences in percentage of respondents who use a smartphone at work, although the members of the youngest group spend considerably more time (approximately 14 minutes a day) doing so than those in the other two groups.

In terms of educational level, the higher education subgroup shows a higher penetration of smartphone usage (21%) than both the intermediate group (14%) and respondents with a lower level of education (11%). However, it is the members of the intermediate subgroup who spend most time using a smartphone.

Finally, we note that the senior management subgroup lead the field in terms of both penetration and usage: 44% use a smartphone for business purposes, and do so for over one hour a day.

Fig. 4.2 Penetration (%) and usage (hr:min.sec) of tablet computers in the workplace

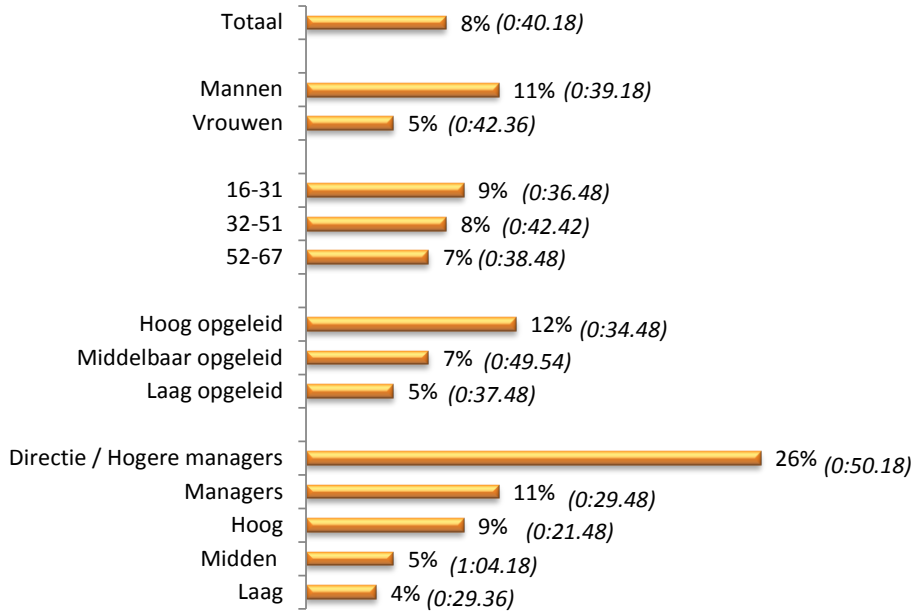


Figure 4.2 provides shows the penetration and usage (for business purposes) of tablet computers.

Overall penetration (the proportion of respondents who use a tablet computer for business purposes) is 8%. These respondents report average usage of 40 minutes and 18 seconds per day.

Here too, we see that over twice as many men use a tablet than women. However, those women who do use a tablet spend longer doing so: an average of 42 minutes and 36 seconds a day compared to 39 minutes and 18 seconds for the men.

The differences between the age groups are small.

In terms of educational level, we see that those with a higher education are most likely to use a tablet computer at work. However, the members of the intermediate group have greater average usage, exceeding that of the other two groups by approximately 10 minutes a day.

Finally, once again we see penetration is highest in the senior management subgroup at 26%. Their usage is also relatively high at 50 minutes and 18 seconds. However, average usage is highest among the members of the intermediate professions subgroup, at just over one hour a day.

4.3 Problems with smartphones and tablet computers in the work setting

To gain an impression of the productivity loss due to the use of smartphones and tablet computers in the workplace, the questionnaire asked respondents to consider a number of hypothetical problems: being unable to send an e-mail from the smartphone, losing notes made on the tablet, being unable to 'sync' (transfer) data such as agenda appointments to and from another device (PC or laptop), or not knowing how to perform a certain action using the smartphone or tablet. Once again, no distinction was made between problems due to technical faults and those attributable to poor user skills.

Table 4.1 Loss of productive time when using smartphones and tablet computers

	Penetration	Average daily usage	Average productive time lost		Average productive time lost (total)
	%	*Hr:min.sec*	*Hr:min.sec*	*%*	*Hr:min.sec*
Total	17.5	0:58.11	0:02.38	4.5	0:00.28
Gender					
Male	22.3	1:04.37	0:02.54	3.8	0:00.33
Female	12.2	0:44.58	0:02.06	5.6	0:00.18
Age					
16-33	18.9	0:59.38	0:03.29	5.8	0:00.40
34-51	18.6	0:56.04	0:02.19	4.2	0:00.26
52-67	13.6	1:02.11	0:03.20	5.0	0:00.26
Education					
Higher	23.1	0:53.39	0:02.22	4.2	0:00.31
Intermediate	15.2	1:07.54	0:03.09	5.1	0:00.32
Lower	13.1	0:49.47	0:02.17	5.1	0:00.20
Position/professional level					
Senior management	44.8	1:29.12	0:03.19	3.7	0:01.29
Middle management	26.7	0:46.58	0:03.01	6.4	0:00.48
Higher professions	19.0	0:38.00	0:01.48	4.7	0:00.21
Intermediate professions	10.8	1:12.47	0:01.26	2.0	0:00.09
Lower professions	12.9	0:37.47	0:05.28	14.5	0:00.42

Column 3 of Table 4.1 shows the average loss of productive time further to the use of a smartphone or tablet computer to be 2 minutes and 38 seconds. This equates to a productivity loss of 4.5% (as

shown in the right-hand column). Overall, the Dutch employee therefore loses 28 seconds as a result of these problems.

Notably, the productivity loss is highest by some margin among the members of the lower professions subgroup: 14.5%. Although this group has the lowest usage rate (37 minutes and 47 seconds a day), it accounts for the greatest proportion of lost or unproductive time.

Almost the opposite picture is seen among the senior management subgroup, which has the highest rate of usage (just over 89 minutes a day) but accounts for a low productivity loss of just 3.7%.

Examining the other subgroups, we find that female respondents account for a slightly higher productivity loss than the men: 5.6% versus 3.8%.

It is interesting to note that the productivity loss of the youngest age group (5.8%) is higher than in both the 34 to 51 age group (4.2%) and the 52 to 67 age group (5.0%). In all probability, this is because the youngest respondents have yet to rise to the professional level at which the use of these devices is more commonplace, whereby they lack the necessary skills and experience.

4.4 Assisting colleagues with smartphone and tablet problems

Table 4.2 Time spent helping colleagues whose problems are due to inadequate knowledge and skills

	No. respondents providing assistance	Average time spent providing assistance per day	Average productive time lost (total)
	%	*Hr:min.sec*	*Hr:min.sec*
Total	5.2	0:03.33	0:00.11
Gender			
Male	7.2	0:03.28	0:00.15
Female	2.8	0:03.49	0:00.06
Age			
16-33	4.1	0:07.26	0:00.18
34-51	6.2	0:02.35	0:00.10
52-67	4.0	0:02.24	0:00.06
Education			
Higher	6.6	0:02.06	0:00.08
Intermediate	5.0	0:05.12	0:00.16
Lower	3.2	0:03.32	0:00.08
Position/professional level			
Senior management	12.7	0:01.55	0:00.15
Middle management	5.6	0:02.25	0:00.08
Higher professions	6.1	0:03.04	0:00.11
Intermediate professions	3.9	0:05.54	0:00.14
Lower professions	3.1	0:01.55	0:00.04

Table 4.2 shows that 5.2% of respondents report that they are called upon to help colleagues experiencing problems with a smartphone or tablet computer. Providing this assistance takes up an

average of 3 minutes and 33 seconds a day. Overall, the productive time lost in this way is therefore negligible at just 11 seconds a day.

Men are significantly more likely than women to help their colleagues: 7.2% of male respondents report doing so compared to 2.8% of the female respondents. The productive time lost by the men is approximately twice that lost by the women.

In terms of the age groups, those respondents aged between 16 and 31 who are asked to provide help spend approximately three times as much time doing so than those in the other two groups.

4.5 Conclusions

Conclusion 12: Penetration and usage of handheld devices are greatest among men with a higher level of education in (senior) management positions

Table 4.3 Productivity loss further to the use of smartphones and tablet computers (all respondents)

	Average daily usage during working hours (all respondents)	Average duration of problems per day	Average loss of productive time when providing assistance	Average productivity loss (lost time as percentage of daily usage)
	Hr:min.sec	*Hr:min.sec*	*Hr:min.sec*	*%*
Total	0:10.11	0:00.28	0:00.11	6.4
Gender				
Male	0:14.25	0:00.33	0:00.15	5.6
Female	0:05.29	0:00.18	0:00.06	7.3
Age				
16-33	0:11.16	0:00.40	0:00.18	8.6
34-51	0:10.26	0:00.26	0:00.10	5.8
52-67	0:08.28	0:00.26	0:00.06	6.3
Education				
Higher	0:12.58	0:00.31	0:00.08	5.2
Intermediate	0:10.19	0:00.32	0:00.16	7.8
Lower	0:06.31	0:00.20	0:00.08	7.2
Position/professional level				
Senior management	0:39.58	0:01.29	0:00.15	4.3
Middle management	0:12.32	0:00.48	0:00.08	7.4
Higher professions	0:07.13	0:00.21	0:00.11	7.4
Intermediate professions	0:07.52	0:00.09	0:00.14	4.9
Lower professions	0:04.52	0:00.42	0:00.04	15.7

As we see from Table 4.3, the use of handheld devices such as smartphones and tablet computers in the workplace or for business purposes is not yet common practice. Overall, the average employee uses such devices for only ten minutes a day. Men are three times more likely to do so than women, and young employees three times more likely to do so than more senior staff. Those with a higher level of education use handheld devices twice as much as those with a lower education. Senior

managers are by far the most significant user group to date, with penetration almost ten times greater than in the lower professions. In short: smartphones and tablets are primarily used by young, well-qualified men in the higher professional grades.

Conclusion 13: Limited use of smartphones and tablets precludes development of the relevant skills

In almost all subgroups, those who use smartphones and tablets least often are those who lose the greatest amount of productive time when they do. (The sole exception is the youngest age group, in which both usage and lost productive time are high.) At the same time, both male respondents and younger employees spend a relatively high proportion of their time helping colleagues to use these devices. These findings suggest that the majority of users are not yet entirely *au fait* with handheld devices and are unaware of how they can be used effectively and efficiently in the interests of the organisation. Hundreds of new applications ('apps') are released every week, and many have yet to reach maturity or prove their value. The devices and apps have so many features and possibilities that users are easily overwhelmed and perhaps a little confused. They install and uninstall various applications, by no means all of which will be useful or relevant to their work. It is (too) easy to lose sight of the distinction between business use and private use.

5 Formal training in computer skills

5.1 Introduction

Formal training, in the form of courses given in the workplace or arranged by the employer, could play an important part in reducing the number of IT problems which are attributable to inadequate computer skills. This chapter is concerned with such courses.

First, we examine where employees currently gain their computer skills and knowledge. We then examine the reasons for attending a formal training course, as given by those employees who have done so. Respondents who have not had any form of formal training in the last three years were asked to explain why not, and to state what would prompt them to do so in future.

The respondents who have undertaken formal training were also asked to assess the productivity gain they have achieved as a result. Those who have not taken a course were asked to estimate how doing so would affect their productivity: how much additional productive time would they gain?

5.2 Learning to work with computers

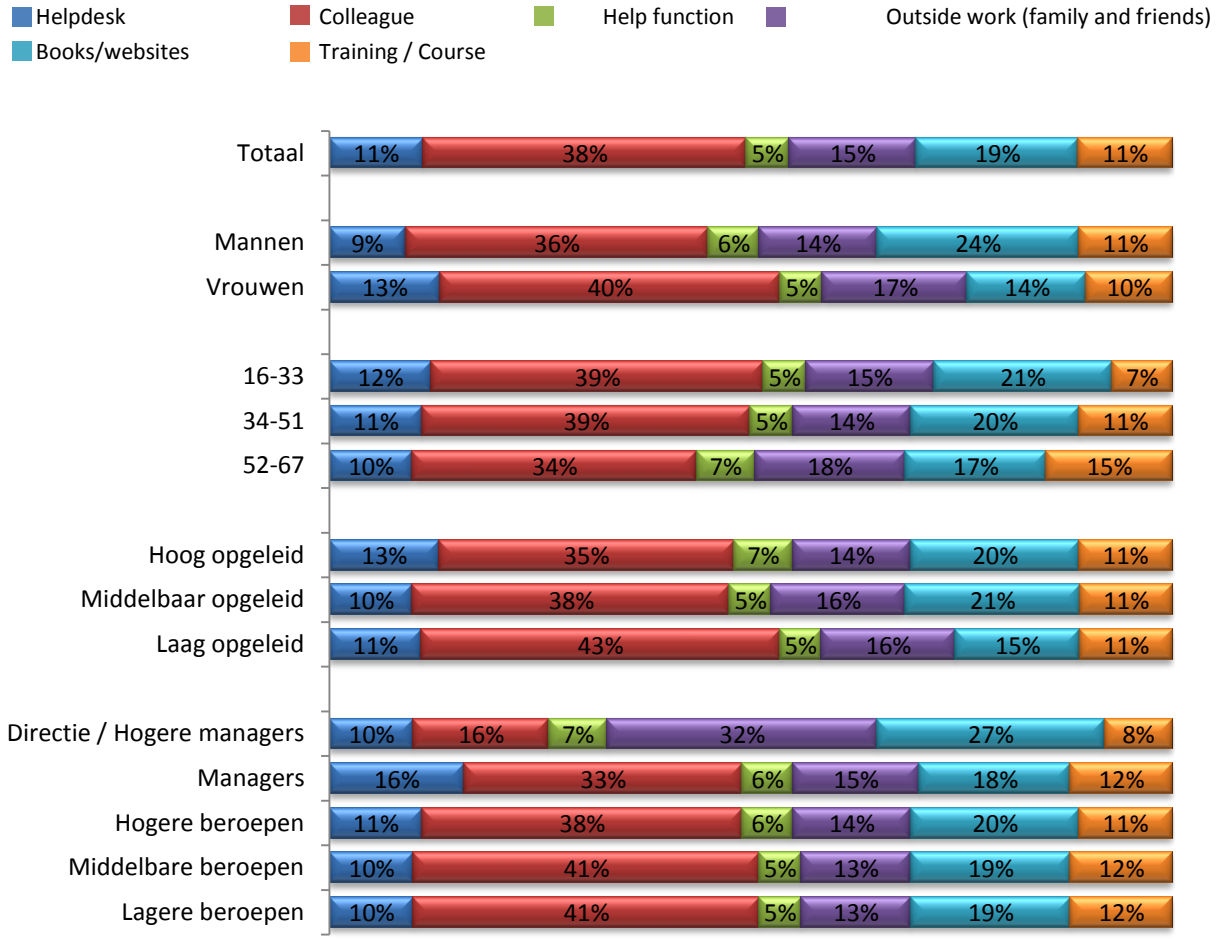
Figure 5.1 shows the sources of employees' computer knowledge and skills: from whom have they learned most? It would seem that most people learn from their colleagues, this being the source reported by 38% of respondents. Books and websites are in second place with 19%. For 15% of respondents, the main source of knowledge is, or has been, someone outside the workplace, such as a friend or family member. A further 15% cite the helpdesk. The 'Help' function on the computer itself is the least popular answer, given by only 5% of respondents.

Female respondents are slightly more likely than their male counterparts to have gained their computer knowledge from colleagues, while the number of men who cite books and websites as their main source of information is relatively high.

Members of the most senior age group are slightly more likely to seek information beyond the workplace itself (18% have done so, compared to an average of 14.5% in the other two age groups). Similarly, the number of respondents in the senior group who cite formal training as their main source of information is higher: 15% compared to just 7% of respondents aged 16 to 33.

In terms of educational level, we see that those with lower qualifications are more likely to cite a colleague (or colleagues) as their main source of information. Websites and books are less important to this group. The only group of respondents for whom colleagues are not the primary source of information are the senior managers, who are more likely to have gained their computer knowledge from people outside the workplace (32%) or from books and websites (27%).

Fig. 5.1 From whom have you learned most about using computers in your work?



5.3 Formal IT training: experience and attitudes

Figure 5.1 shows the percentage of respondents in each subgroup who have taken an IT course or some other formal computer skills training during the preceding three years. Overall, 22% of respondents attended a course organised or approved by their employer during that period.

Men are slightly more likely to have had formal training than women, the figures being 23% and 21% respectively.

We also see that 24% of respondents in the 16 to 33 age group have had some formal training in the past three years, compared to 22% of respondents aged 34 to 51 and 20% of those aged between 52 and 67.

A comparison by educational level reveals that 18% of respondents in the 'lower education' category have had formal training, compared to 24% of respondents with intermediate qualifications and 23% of those who have completed higher education.

It is the senior management subgroup which makes least use of formal IT training opportunities. At the time of the study, only 11% of respondents in this group had attended a course in the preceding three years.

Fig. 5.1 Percentage of respondents who have attended an IT skills training course

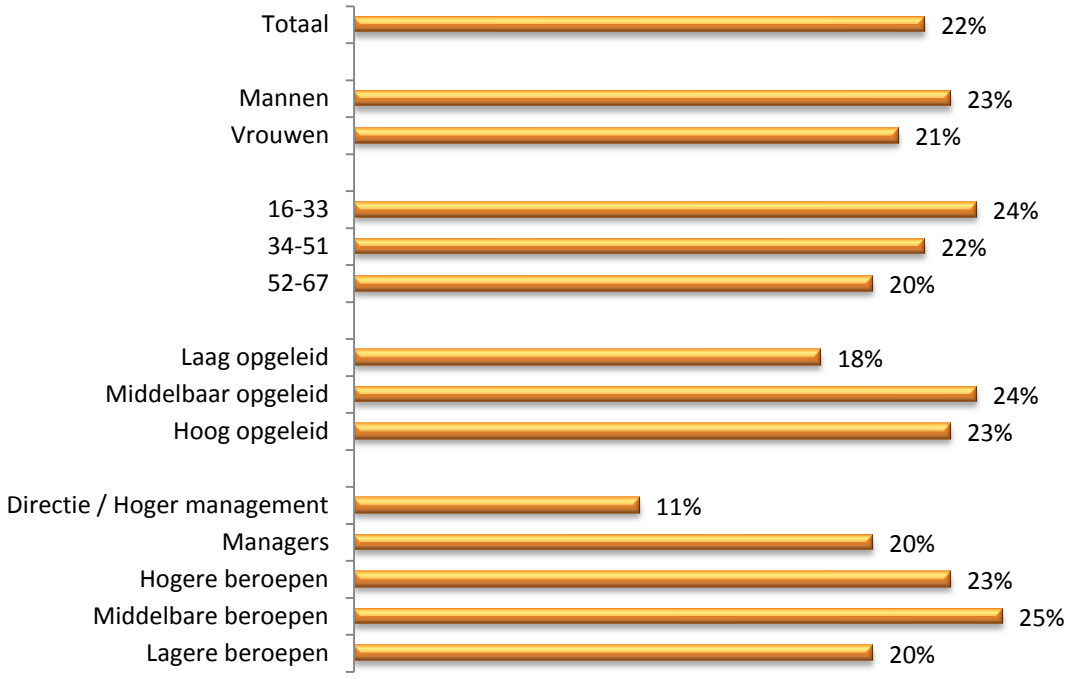
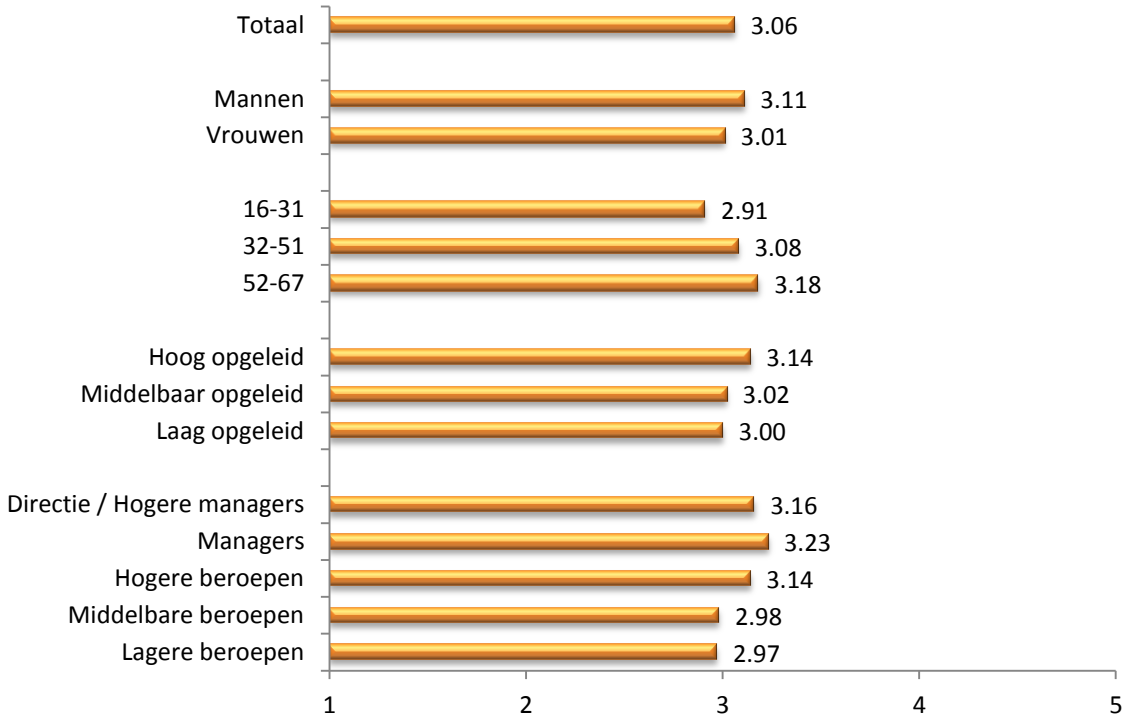


Fig. 5.2 'My company offers ample opportunity for IT training'

(1 = Strongly disagree 5 = Strongly agree)


Totaal
3.06
Mannen
3.11
Vrouwen
3.01
16-31
2.91
32-51
3.08
52-67
3.18
Hoog opgeleid
3.14
Middelbaar opgeleid
3.02
Laag opgeleid
3.00
Directie / Hogere managers
3.16
Managers
3.23
Hogere beroepen
3.14
Middelbare beroepen
2.98
Lagere beroepen
2.97
1
2
3
4
5

Respondents were also asked to indicate their agreement (or otherwise) with the statement 'My company offers ample opportunity for IT training' on a five-point Likert scale.

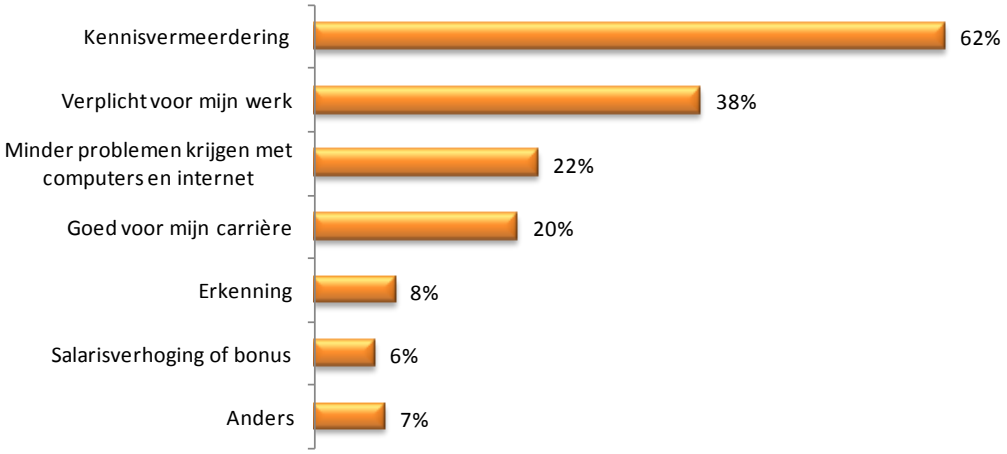
The results are shown in Figure 5.2, from which we see that the overall score is slightly over 3 ('neither agree nor disagree') and is therefore positive without evincing overwhelming enthusiasm.

There are three groups who consider IT training opportunities to be inadequate: the 16 to 31 age group, the intermediate professions and the lower professions.

The highest score is given by respondents in the middle management subgroup, although their rating of 3.23 is once again only just on the positive side of neutral.

5.4 Arguments for and against taking a formal IT training course

Fig. 5.3 Reasons for taking an IT training course (% of respondents who have done so)



To increase my knowledge
Required for my work
Fewer problems with computers and the internet
Good for my career
Personal recognition
Pay rise or bonus
Other

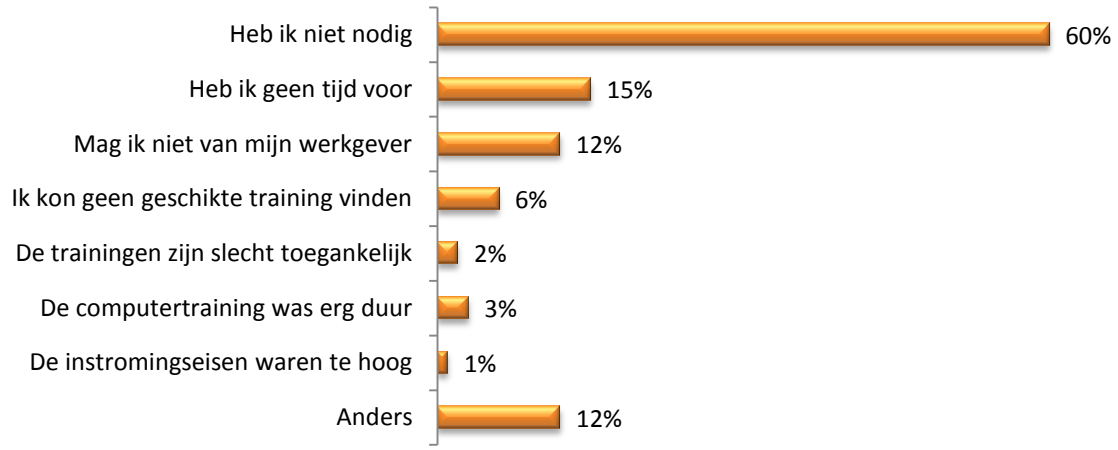
The respondents who have attended a course in the past three years were asked to state their main reasons for doing so. The results are summarised in Figure 5.3.

By far the most frequently cited reason was 'to increase my knowledge' (62%) followed at some distance by 'because it is required for my work' (38%). Almost a quarter (22%) of respondents opted to attend a course because it would reduce the number of problems they experience in using computers or the internet, while 20% did so in order to advance their careers. Other, less popular, reasons were personal recognition (8%) and to gain some form of financial benefit such as a pay rise or bonus (6%).

Those respondents who have *not* had any form of IT training in the past three years were asked why this was the case. Their responses are summarised in Figure 5.4.

The most frequently cited reason given is that the employee concerned did not feel a need for any further training (60%). This is followed at some distance by 'I didn't have the time' (15%), 'my employer will not let me go on a course' (12%) and 'I was unable to find a suitable course' (6%). A very small number of respondents stated that a course would be too expensive, that they would be unable to meet the admission criteria, or that they were unable to travel to the training location.

Fig. 5.4 Reasons for not attending an IT training course



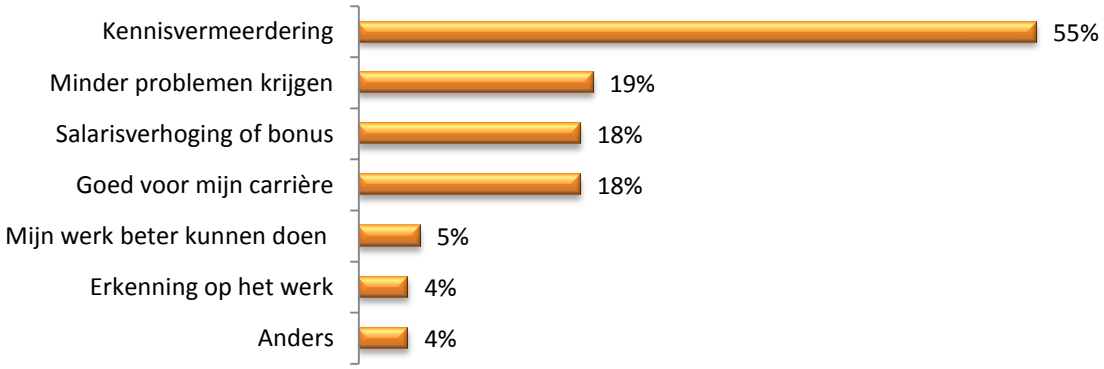
I don't need it
I don't have the time
My employer won't let me
I couldn't find a suitable course
Accessibility (the course location is too far away)
The course was too expensive
The admission criteria were too high
Other

Respondents who have not attended a course in the past three years were then asked to give possible reasons for doing so in the future. The results are shown in Figure 5.5.

The majority of respondents (55%) would be prepared to consider further training if it would increase their knowledge. Avoiding problems with computers and internet is cited by 19% and the prospect of a pay rise by 18% of respondents. Career advancement also scores 18%. Only 5% of those respondents who have not received any form of IT training in the past three years would consider doing so in order to improve their effectiveness at work.

Fig. 5.5 Reasons to take an IT course in future (% of respondents who have not done so in the past three years)

I

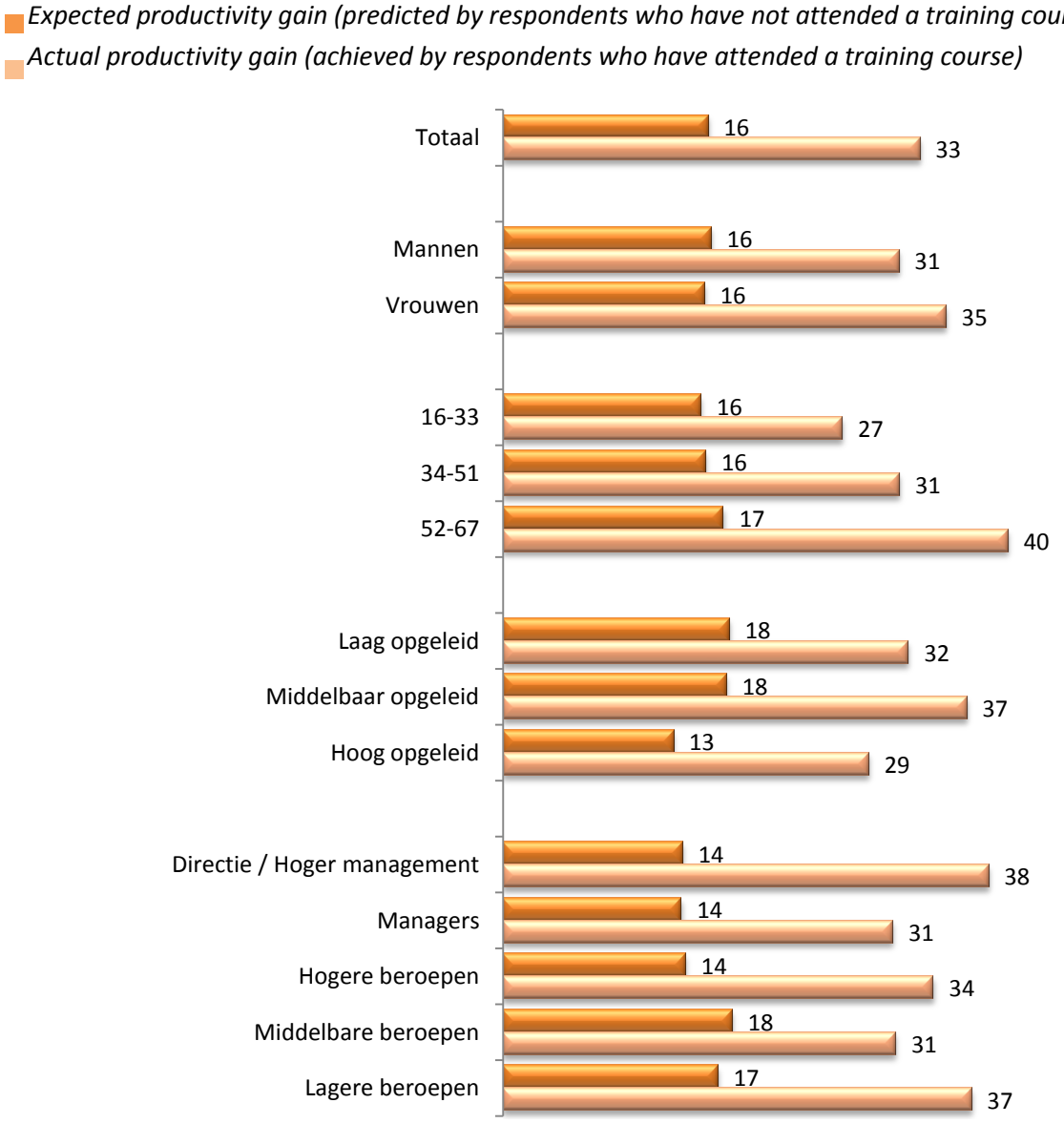


To increase my knowledge
Fewer problems with computers and the internet
Pay rise or bonus
Good for my career
To enhance my effectiveness at work
Personal recognition
Other

5.5 Expected and actual productivity gain achieved further to IT training

Figure 5.6 shows the productivity gain that respondents who have not taken an IT course expect to achieve were they to do so, compared to the actual gain made by those who have received formal training in the past three years.

Fig. 5.6 Expected and actual productivity gain further to IT training (in minutes per day)



Respondents who have not had formal IT training believe that it would enable them to save an average of 16 minutes and 12 seconds a day. The respondents who have had formal training state that the productivity gain is actually far greater, an average of 33 minutes and 2 seconds. All subgroups show a marked disparity between the predicted gain and the actual gain.

In the case of female respondents, the actual productivity gain is 35 minutes, which is four minutes more than that achieved by the men, although both male and female respondents who have not had formal IT training predict a productivity gain of 16 minutes.

Examining the three age groups, we see a particularly marked difference between the predicted and actual productivity gains, especially in the 52 to 67 group. This is because the actual productivity gain achieved by respondents in this group is no less than 40 minutes.

In terms of educational level, we see that respondents with a higher education are especially conservative when predicting the possible productivity gain. They expect to save 13 minutes a day, whereas the actual gain achieved in practice is over twice that figure at 29 minutes.

Finally, we note that the senior management subgroup could achieve a very significant productivity gain.

5.6 Conclusions

Conclusion 14: Organisations do little to develop the IT skills of their employees

Although employees gain approximately half of their computer and internet skills at work, the resources provided by the organisation itself (e.g. the helpdesk and training courses) play only a minor role in the process. Only 23% of respondents cite these resources as their primary source of information. The fact that so many staff do develop computer skills in the workplace is largely due to the assistance they receive from their colleagues. This form of assistance is rarely formalised within the organisation; it remains an ad hoc, spontaneous undertaking. Although there is less reliance on local support from colleagues at the level of senior management, here too the arrangements are extremely fluid. This group tends to seek help outside the organisation, from friends and family for example. The sum result is that organisations are not proactive enough in helping their staff develop the skills which are essential to their work, and hence to the success and wellbeing of the organisation itself.

Conclusion 15: Formal IT training has a major impact (but its effects are seriously underestimated).

This study confirms that organisations do indeed have the means at their disposal to direct and support the development of IT skills. As we have seen, employees who have received formal IT training in the past three years are more productive to the tune of 33 minutes per day, a colossal gain when set against the eight-hour working day. It is therefore all the more harrowing that this potential gain is not fully acknowledged by those staff who have never received any IT training. It also goes largely unremarked by the senior managers who are responsible for policy. One of the most striking findings of this study is the enormous discrepancy between the expected productivity gain and the actual gain, as demonstrated by those employees who have undergone training. The productivity gain to be seen in practice is likely to exceed expectations by a factor of two to one.

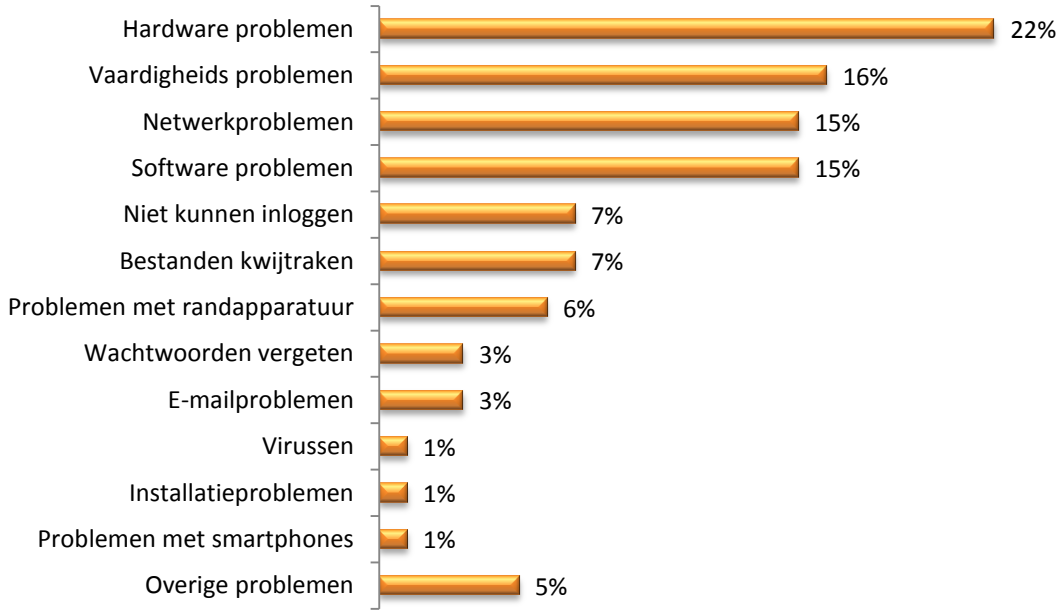
6 The helpdesk

6.1 Introduction

This chapter is concerned with the role of the IT helpdesk. The study sample included 235 respondents who are either helpdesk staff or are otherwise responsible for their organisation's IT infrastructure. They were asked to state the problems they encounter most often and to suggest the probable causes of these problems.

6.2 Most common problems

Fig. 6.1 Problems referred to the IT helpdesk



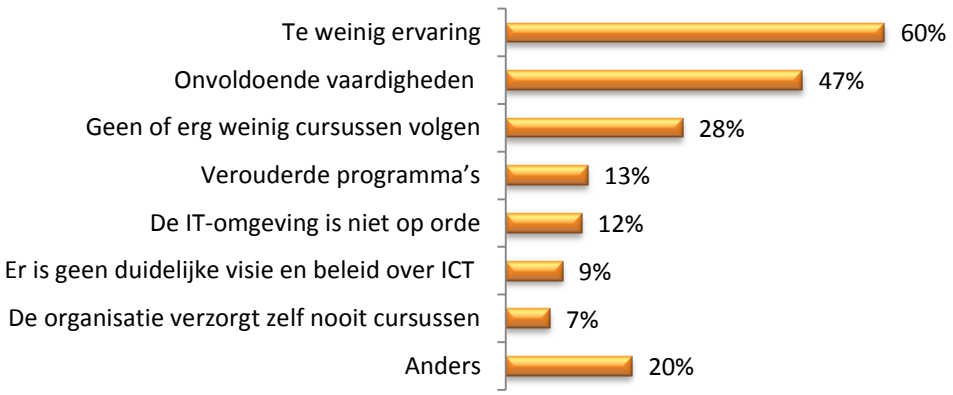
Hardware problems
Skills
Network problems
Software problems
'Lockout' (user can't log on)
Lost files or data
Problems with peripherals
Forgotten password
E-mail problems
Viruses
Installation problems
Smartphone problems
Other

The respondents were asked to identify the three main types of problem which the helpdesk encounters; this was an open question with no alternative responses given. A total of 573 problems were named. They were then classified into categories, as shown in Figure 6.1.

The foremost type of problem relates to hardware: computers which fail to boot, 'hang', become very slow or show other technical faults. In second place we see problems which are due to the user's level of skill (often indicated using comments such as 'people don't know how to...'). In third place are problems affecting networks and connectivity: defective servers, inaccessible wireless networks, slow internet connections and difficulties in opening remote network applications. Software problems are of equal significance: problems relating to specific applications, error messages, or non-functioning software (possibly because the user is trying to do something that the program does not support). 'Lockout', whereby the user cannot log in to the computer or network, is cited in 7% of cases, as is loss of data or files. Next, with a score of 6%, come problems with peripherals, particularly printers. A forgotten password is mentioned by 3% of respondents, as are e-mail problems. Viruses appear to be a less serious issue, representing only 1% of the total. Installation problems and difficulties in using smartphones also account for only 1% each. The problems cited by respondents which did not fall into the above categories were grouped under 'Other'. These problems are extremely varied: spam, breaches of the organisation's IT policy, issues with product development and connecting new users.

6.3 Causes

Fig. 6.2 The primary causes of problems



Insufficient experience
Inadequate skills
Inadequate (or no) training
Outdated software
Poorly structured IT environment
Lack of clear IT vision and policy
Failure to provide proper training
Other

The respondents who work at an IT helpdesk or are otherwise responsible for the organisation's IT structure were then asked to suggest the most likely causes of the problems they encounter. The results are summarised in Figure 6.2.

At the top of the list comes 'insufficient experience' on the part of users, cited by 60% of the helpdesk respondents. This is followed by 'inadequate skills' with 47%. Inadequate training is in third place with 28%. Outdated software is cited by 13% of respondents, closely followed by 'poorly structured IT environment' with 12%. The lack of a clear IT vision or policy is seen as a major cause of problems by 9% of respondents, while 7% blame the organisation's failure to provide proper training.

6.4 Conclusions

Conclusion 16: Although most problems referred to the helpdesk are technical in nature they are often attributed to a lack of computer skills on the part of users

The main problems seen by the helpdesk are entirely technical (see Figure 6.1): hardware and network problems, software problems, 'lockout', problems with peripherals, viruses and installation problems. Given the technical nature of such problems, it is all the more noteworthy that helpdesk staff so frequently blame them on inadequate user experience or skills, lack of training, or the organisation's failure to apply a clear IT policy.

7 Recommendations

Based on the research findings and the input of the review group, this concluding chapter presents recommendations which will help organisations to reduce the productivity loss identified. Of course, it will be impossible to reduce the loss to zero, if only because the rapid rate of technological development will call for ongoing investment – in both time and money – to assimilate new devices and new applications. However, we are able to present ten firm recommendations which we believe will go some way towards resolving the problem.

Recommendation 1: Identify the exact causes of lost productivity

It will be extremely useful to determine precisely which system(s) or application(s) account for the greatest loss of productive time within the organisation. This is something that the average employee already knows. However, it is rare for the problems to be expressly stated or quantified (as in this study).

Recommendation 2: Formalise support by colleagues

Because the assistance provided by colleagues is largely ad hoc, it is difficult for the organisation to exert any influence over its form or frequency. In some cases, however, it is possible to formalise support to some degree by designating a person within the department or unit who will then be responsible for all 'first-line support'. He or she will then develop a network which acts as an adjunct and extension to the existing helpdesk function. Some organisations assign an 'IT buddy' to their (new) employees.

Recommendation 3: Review the scope of the helpdesk function

It is not only a good idea to identify the various sorts of problems which affect (or are caused by) the existing applications and systems, but to identify the person or department which is best placed to resolve them. This may be the individual user (perhaps by means of training), the user's colleagues, the internal helpdesk, or some external service provider (outsourcing). Having done so, it becomes possible to redefine the roles and responsibilities of the helpdesk itself, whereby the scope of its activities is made either broader or narrower. In some organisations, the helpdesk has only a technical support function. In others, it is also responsible for general user support and training. The results of this study suggest that the latter role is more appropriate.

Recommendation 4: Devote particular attention to lower-grade staff

Identify the IT-related problems experienced by employees in the lower grades, and determine whether they are due to unnecessarily complex technology, inadequate computer skills, or the nature of the work itself. This particular group of staff may well require closer supervision, more support from managers or the helpdesk, and more training than those in the higher grades (who may generally be assumed to have a higher level of education and qualifications).

Recommendation 5: Devote greater attention to internet and other online skills (by means of training)

Organisations should formulate a policy governing the use of the internet in the workplace. This policy will identify the online applications which are of value and significance to the organisation, and those which are not. It should also establish clear rules for private internet use at work. There is a role for IT training organisations, which should adapt and expand their services accordingly. The current range of internet and online communication training courses is rather limited.

Recommendation 6: Assess computer skills as part of the recruitment process and monitor computer usage over time

Employers should not automatically assume that all young people are computer literate. Their computer skills should be assessed as part of the recruitment process. It will also be appropriate to monitor internet usage by young employees and other new recruits. To what extent is it necessary for their work? That said, it can be undesirable to apply overly rigid restrictions; there are internet sites which, although not directly work-related, will help employees to develop innovative insight and creative ability.

Recommendation 7: Establish an effective policy covering the use of smartphones and tablets

Smartphones and tablet computers are gradually becoming standard business resources. Such devices have many advantages: they enable the employee to work virtually anywhere and at any time. However, there are also disadvantages, one of which is the huge range of 'apps' which bring the risk of non-productive (private) usage during working hours. The organisation should therefore try to determine which applications are useful and permissible, and which are not. It will be useful to have a set of rules governing work-related use of personal devices, and the applications which may be installed on a device provided by the organisation itself.

Recommendation 8: Establish guidelines for efficient e-mail use

It will be useful to offer staff tips and guidelines for efficient e-mail use. These will include a small number of general rules on matters such as how often to check incoming e-mail (which may vary according to the employee's function), the use of the CC button, and so forth. Such rules can increase productivity by avoiding unnecessary distractions.

Recommendation 9: Devote attention to training and certification

It is important to assess the computer skills of all staff, regardless of level or position, in order to identify any shortcomings which can then be resolved by means of training. Ideally, a training course should lead to a recognised certificate. This will increase both motivation and effectiveness. The current study reveals a significant staff training requirement. Provided training has the desired effect of increasing productivity, the costs will quickly be recouped.

Recommendation 10: Examine employees' own solutions to IT-related problems

It will be useful to examine how the organisations' staff solve the IT-related problems they encounter (other than helping each other or calling the helpdesk). There may be books or internet sites which have proven particularly useful to some staff and which should be brought to the attention of others. Similarly, solutions may be found in an application's own 'Help' file. Where staff have been unable to find their own solutions, the organisation should determine the requirement for further training.