

University of Leeds

IN33: People-centred Information Systems development

Computers, users and experts

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1 Introduction

The days are over when everybody who used a computer was seen as an expert. The change in Information Systems (IS) over the last decades has led to affordable computers with interfaces that are relatively easy to use by the broad masses but nevertheless there are people who are more sophisticated in the use of Information Systems than others – at least somebody has to design the systems. This wide range of knowledge and skill led to the need of classification systems to distinguish between the different types of users, of which the one introduced by Willcocks and Mason in 1987 will be discussed below.

2 Categorisation of users

The term ‘user’ is defined in a variety of publications. The Health and Safety Executive Regulations for example define users of computer systems as ‘people who rely on the computer for their work (and who will have no alternative means of performing the job)’ (Noyes and Baber, 1999: 18).

For their classification of users of Information Systems Willcocks and Mason define the term ‘user’ as a ‘stakeholder who relates actively and/or is part of the computer-based system’ (Willcocks and Mason, 1987: 79). The grade of involvement is then split up into four groups of users as follows.

The first group, the *primary users* being ‘systems professionals dealing directly with and able to modify the system and its technology’ like analysts, developers and programmers – for instance software developers implementing in programming languages such as Java and C++, but also web-designers writing plain HTML or using specific software applications as their tools.

The *secondary users* are people who interact with the system to ‘provide input [and] receive output but as part of another job’, i.e. their work is not limited to a system development process. The computer might be used for tasks such as text-processing.

The *tertiary users* usually do not have direct contact with the system: they just receive ‘some output’; they are senior managers and sign responsible for overall objectives. It is the overview of the work in progress they might be informed of

by receiving reports for example.

The *quaternary users*, 'user type 4', do not have any direct contact with the system at all. It is information *about* these people that is stored in the system – such as statistical/demographic data for instance.¹

Sometimes the secondary users are also referred to as 'end-users' as noted by Noyes and Baber (1999: 18). In comparison to the people who use the system during its development, 'the end-users are [. . .] more likely to have direct contact with (a final version of) the technology on a day-to-day basis.'

To further illustrate the classification the following relationship should serve as an example: A software company hosts a range of programmers, the primary users, who are implementing a database-driven system for a clinic. The project is documented by another person, the secondary user, who types reports such as minutes of meetings that are handed to the manager, the tertiary user, who might not only be responsible for this project but also for others concerning goals involving budget and human resources. The finished product is to serve as a Information System holding confident pieces of information of patients such as addresses and medical treatments. The patients then are quaternary users.

3 Emergence of Internet and Web

When Tim Berners-Lee 'invented the World Wide Web in late 1990 while working at CERN, the European Particle Physics Laboratory in Geneva, Switzerland' (W3C, 2002) there were hardly any users online to browse the sparse repository of hyperlinked documents. Even seven years later in 1997 the quantity of Internet users was very low in Europe, the continent having today the highest number of Internet users: Up to two thirds of the population are online (Nua.com, 2002).

3.1 'Group dynamics'

When the categorisation of users was introduced 1987 by Willcocks and Mason the demographic data of computer and Internet users was a very different one compared to today's figures. Considering the mentioned statistics of Internet

¹Without actively using a system it seems odd to name these people 'users'.

users it is obvious that there are only few people in Europe not being able to use the services the World Wide Web has to offer.

Quaternary or secondary?

These services people are sometimes even demanded to use and thus reduce the work of others. Companies move the responsibility of correct customer data such as address information to the customers themselves who have to enter any changes in online forms on the companies' websites. It is data that is stored about these people but providing input themselves they cannot be referred to quaternary users anymore; in this scenario they have to be seen as secondary users.

Not all companies or institutions are able to offer these services to their advantage, though. In the medical field for instance information about patients is considered confidentially. Data about the patient such as postal address, injuries or treatments are still entered by employees in hospitals and clinics. Also there is still one third of the population – probably the elderly – not using online systems. These numbers may not be overlooked in classifying users although the quaternary users seem to become less every 'Internet year'.

Secondary or primary?

With or even without special software applications for web-design like Adobe's GoLive, Macromedia's Dreamweaver or Microsoft's Frontpage, to name only the most prominent ones, the secondary users are not dependant on experts to build their own online Information Systems. Developing systems themselves the users advance into the primary group. Compilations of online-scripts for public use makes it easy to set-up interactive bulletin boards for example – even solutions for e-commerce systems are ready to be implemented without being professional in that area.

Secondary towards tertiary...

Having one's own e-commerce website built and running the user might be concerned about managerial issues thinking of the quality and quantity of products

she/he wants to sell under which conditions. The user therefore also gets properties of the tertiary user type.

...and vice versa

The manager on the other hand could rely solely on business software to decide upon her/his work, which would result in a shift from tertiary to secondary user group.

3.2 Internet and Web defy classification

To summarise the above illustrations there are shifts in the user types from quaternary to secondary, secondary to primary, primary to tertiary and tertiary to secondary – but none towards the quaternary type of user!

As being a place of chaos itself, the Internet, especially the Web, disturbs this classification of users into four types as introduced by Willcocks and Mason 15 years ago. Borders between the different types are blurred; one single user can act as a user of multiple types.

On the other hand professional web-designer are still looked for and get jobs. This might be due to their proficiency in a broad scale of fields like graphic design and the design of intuitive navigation structures within a website or knowledge within a very specific field such as database design or scripting languages – Perl, PHP and JavaScript for instance – and last but not least the skill to build websites that operate and look alike among all web browsers.

A simple classification into the two groups of users and end-users like anticipated by Noyes and Barber seems to be more convenient and true for today's needs.

4 Change in organisations

Concerning current trends in restructuring organisation F. Stickland points out that organisation structure is perhaps one of the most common targets for change

(Stickland, 1998: 86). According to Y. Chan it is a fact that 21st century organizational structures are changing: 'Organizations are arguably more "human," not merely systems of rigid and artificial regulations and responses. They emphasize principles of interdependence, flexibility and partnership' (Chan, 2002: 99).

4.1 Current trends

Greater partnership comes into play when hierarchical structures are delayed and teams are built. The members of a team are highly interdependent to succeed in their work. Coming from different backgrounds the employees have much knowledge to share in very flexible surroundings.

'Teamocracy'

The increased democratic structure is very important for a company to survive as judged by Y. Chan: '[T]he formal IS structure matters less than we expected, and the informal structure [is] gaining greater importance' with informal structure being 'the structure that emerges rather than is mandated' (Chan, 2002: 99–110). Modern organisational structures emphasize on work-groups with lower management costs by stripping out middle-managers and thus increasing span of control of fewer managers. The latter on the other hand have new computational means to execute this control over more people on one level: 'Improved computational capabilities allow larger organizational entities to be managed and permit management to span more complex portfolios' (Clarke and Clegg, 1998: 147). This does not comply with the described user classification since the managers now use computers *directly* for their work and therefore the tertiary users gain properties of the secondary type.

Wherever whenever

Employees are much more free in terms of when and how long they want to be in the office for work than they used to be some years ago. Not only that the employees demand this flexibility, also new (Internet) technology allows to loose up strict schedules. Using modern means of communication such as Mo-

mobile Phones, Personal Digital Assistance (PDAs), Instant Messaging (IM) Services and Groupware applications, it is possible to work from home or other distant places without losing the vital reachability by co-workers and managers. 'Work becomes portable' as Clarke and Clegg (1998: 151) put it.

These communication methods allow for easy access to the employees' knowledge – even in her/his leisure time and holiday which are more and more interwoven with work (Bullinger, 2002: 10). When using the communication technology solely to answer inquiries the primary user tends to become a secondary one.

Contract workers

A current trend can be seen in the rising number of contract workers compared to the permanent workers, whereby the contracts usually go over one to two years. Organisations seem to employ more contract workers than ever. For example the Fraunhofer Institute IAO (Institute for Work and Organisation) in Stuttgart, Germany employed 260 permanent workers and 350 working students in the year 2001 (Bullinger, 2002: vi).

There can be differences among these two groups concerning work attitudes, behaviours and performance (Ang and Slaughter, 2001: 1). The contract workers or working students are assigned very specific work tasks stating what and even how to do it, i.e. they do not have much autonomy and responsibility. They 'perform at a lower level than permanent professionals' (Ang and Slaughter, 2001: 17–22). According to Vandenbosch and Avital (2000: 1212) these employees would be called 'Order-Takers' since their business ownership is fairly low but their IT ownership can be considered high. The permanent workers on the contrary are assigned 'enlarged job scopes' (Ang and Slaughter, 2001: 1) and get more managerial tasks with every contract worker they take care of: Compared to the contractors who primarily do programming tasks the permanent workers act in a variety of fields including analysis, design, administration but also mentoring the contract professionals increasing their own authority and responsibility which may not always be rewarded, though (Ang and Slaughter, 2001: 22–24). Thinking of the user classification the permanent workers, formerly seen as pri-

mary users, shift towards the tertiary user group now dealing with managerial issues.

4.2 Restructuring squared

To introduce group work, hire contract workers, offer flexible working hours and decrease hierarchies are just some examples to stay successful in the competitive market. However, these changes also alter the view on users of Information Systems. It is hard to put them into specific groups; one user is very likely to have characteristics of more than one group. The manager that uses the linked PC to control, the communicating developer as end-user or the permanent worker taking authority over contract workers: they all do not fit solely into one user group. With the restructuring of organisations the classification needs to be restructured, too.

5 Conclusion

The classification of users into four groups as defined by Willcocks and Mason 15 years ago does not match to users of Information Systems as we now know them. The differentiation into user and end-user as proposed by Noyes and Barber is a more stable one: there always will be users that develop systems and others that use them at the end. Today basically everybody has direct contact to computers so that the tertiary and especially the quaternary group of users seem to be superfluous.

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