Easy PC?

Windows is supposed to become more intuitive with each new version, but can you really pick it up just like that? A recent study in India suggests that young children can, so Will Head rounded up some guinea pigs of his own to see how they performed

It's a fact of life that just to get by at work most of us have to use computers. There's no choice in the matter – we simply couldn't do our jobs without them. It'd be nice to think that we weren't tied to technology and we could survive without it, but the reality is different.

Imagine having a sales meeting unaided by the helpful whizz-bang pizzazz of PowerPoint slides; or communicating with people on the other side of the world solely via snail mail; or working out expenses and forecasts using a pencil, large sheet of paper and plenty of mental arithmetic. It's not just that you wouldn't choose to do these things manually – you simply couldn't.

So these days, everyone knows how to carry out at least a few operations using a computer. How did that happen? Do we really know what we're doing with these machines? And if we do, how do we actually obtain this knowledge?

On the job

If you sit in front of a PC for seven hours a day week in, week out you're probably fairly adept at operating it. Even if you don't consider yourself an IT expert, the amount of information you've picked up along the way is no doubt quite considerable.

Think back to a time when you'd never touched a PC and compare how much you actually know now to what you did back then. But where have these magic computing powers come from?

Some of them come through organised training courses with names along the lines of 'Using Microsoft Word for Effective Communication'. But structured training can only go so far. If we relied entirely on training, we'd spend all our time learning and have no time left for doing.

Informal knowledge sharing also adds to our bulk of IT knowledge. Not sure how to do something? Go ask John in accounts, he's pretty good with PCs. While training can prepare us with the theory, it can only go so far and is unlikely to be that tailored to our specific work needs. When it comes to solving the IT problems we encounter day to day, asking others is usually more effective.

Even if your office doesn't have an IT department, there's usually a colleague with enough savvy to solve 90 percent of the problems that arise. And even in companies with dedicated IT support co-workers can sometimes be quicker and friendlier, not to mention better groomed, than the official tech guys.

We learn a lot from exploration and discovery, too, whether conscious or not. Just using applications and discovering what they can do makes it easier to use them in the future. There are also those times when, in the middle of the task at hand, you discover some nifty new feature or utility quite by accident.

Early Windows: the origins of an operating system

The origins of your PC's operating system can be traced back to 1980 when two keen young tech-heads, Microsoft founders Bill Gates and Paul Allan, struck a deal to supply the software to run on IBM's forthcoming PC. The only slight problem was they didn't have the software to sell – or sufficient time to develop any. Undeterred, Gates negotiated with Seattle Computer Products to purchase QDOS (later renamed MS-DOS) for the princely sum of $30,000. The investment is probably one of the best ever made.

After five years of command prompts, Microsoft had a stab at a GUI (graphical user interface), pronounced 'gooey', and brought out Windows version 1.0. It wasn't a huge success and Windows 2.0 was only a marginal improvement.

Two years later Microsoft and IBM worked together to produce the operating system of the future. They eventually fell out, resulting in IBM taking its bits and launching OS/2 and Microsoft using the rest to produce its own operating systems, Windows 3.0 and NT, which would eventually merge to become XP.

But it was third time lucky for Microsoft with the launch of Windows 3.0 in 1990. This time round the software company managed to convince a significant number of people to use the product and ensured its own applications, later to become MS Office, worked well with the new OS.

For next five years, the Microsoft elves worked hard on the successor to Windows 3.x – the eagerly awaited Windows 95. Microsoft clearly thought it was important, shelling out $8m (around £5m) to use the Rolling Stones' *Start Me Up* in its adverts.

October 01 hailed the final death knell for the Windows 95/98 product line with the introduction of Windows XP, based on Microsoft's NT (new technology) product line which stemmed from its work with IBM. After six years of supporting two products lines, the software giant has finally managed to combine them.

Extensions

B
Be Brave

Puzzled?

P
Play Time

Internet Explorer

D-r-a-g and

Drop

Replace File?

Basic Shortcuts

Ctrl + P

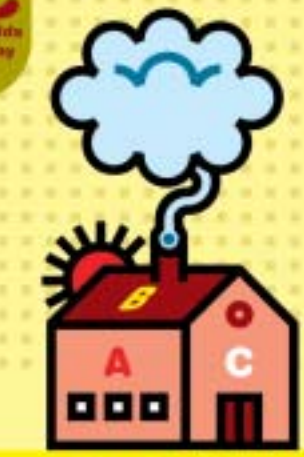
Print

Defrag?

D
Drives

LOGIC

C
Childs Play



Brain Box

Mr Know-It-All*

*Well, almost!

"Can you help?"

P
MS Paint

"Plug-in trouble"

Experiment

The hole-in-the-wall experiment

The fact that we now eat, sleep, live and breathe in a world of technology makes it hard to say exactly how our computing abilities are developed and at what point a certain level of PC knowledge becomes second nature. The work of Sugata Mitra at the Centre for Research in Cognitive Systems NIIT Limited in India, however, gives a refreshing and interesting perspective on the use and usability of computers and how we go about acquiring our PC skills.

Internet usage is on the increase in India, as it is everywhere else in the world, but the cost of the equipment means it's beyond the reach of the average worker's income. Only the very wealthiest citizens can afford to hone their computing skills at home. This produces two problems: how do you provide computer access for the majority of people, and how do you train them to use the equipment supplied? The quality of training that can sensibly be provided to so many people will surely hinder mass adoption of IT and use of the internet.

Keyhole learning

Mitra argues these issues can be resolved by applying his theory for 'minimally invasive' education, a phrase borrowed from the medical term for keyhole surgery. He suggests that structured learning is not only unnecessary when it comes to computer use, but that unsupervised learning can actually accelerate the process.

In a paper presented at the Cridala 2000 (Centre for Research on Distance & Adult Learning) conference in Hong Kong, Mitra proposed the following hypothesis: "The acquisition of basic computing skills by any set of children can be achieved through incidental learning, provided the learners are given access to a suitable computing facility, with entertaining and motivating content and some minimal [human] guidance."

According to Mitra, all teaching-learning interactions can be classified as one of the following:

- those where the teacher or external resource determines the learning content and methodology;
- those where the teacher or external resource determines the learning, in consultation with the learners;
- those where the learners determine their own learning outcomes and how they will go about it.

It is the third area (generally termed constructivist) that interested Mitra, and he setup an experiment to investigate it in Kalkaji, New Delhi.

The basic idea was to provide computer access to the community, but with no training or instruction supplied, and see how people got on with it and what they achieved.

When it comes to assessing computer literacy, traditional learning methods would create a list of tasks the learner should be able to perform and then assess how well these objectives had been achieved. However, Mitra argues that creating such a list does not measure the skill level attained since rapid changes in technology mean the criteria has to be changed too rapidly for any meaningful measurement to be recorded.

Mitra proposed a task-oriented method for assessment and initially defines a computer literate child as one who can:

- turn on a PC;
- use MS Paint to create a picture;
- move objects using folders, shortcuts, cut-and-paste, drag-and-drop, copy and delete methods;
- move from one web page to another and back;
- send and receive email via a preconfigured PC.

The aim of the Kalkaji experiment was to assess whether anyone would use a PC-based outdoor internet kiosk in India without any instruction, and whether such a kiosk could operate without supervision in an outdoor location in India.

Surfing in the slums

The kiosk was accessible through a window in the wall of the NIIT headquarters in New Delhi. The project thus earned its nickname 'the hole-in-the-wall experiment'. In addition to the window there was a touchpad so users could interact, but there was no keyboard and the machine was hooked up to NIIT's internet connection. The low-cost, low-maintenance design of the kiosk means that they can be easily deployed and remain functional.

The kiosk was situated near a slum inhabited by a large number of children, many of whom didn't attend school. The introduction of the kiosk wasn't announced and no instructions were provided. Mitra's results show that the first users of the booth were children and they were able to start browsing the web within four hours.

Mitra found that the regular users of the kiosk were children aged six to 12 who lived in the slum. Boys of all ages used it, but girls tended to be older and none of the adults appeared to use the kiosk. None of the users, bar one, had ever had any prior exposure to computers and most spent an hour or more on it, taking it in turns.

The most commonly used applications were the web browser (the Disney website, Hindi news sites and games were favourite online pastimes), Microsoft Paint and listening to MP3s. Some children even made web pages in FrontPage and to get around the lack of keyboard they use a combination of the character map and cut and pasting characters from other web pages.

Learning was generally a trial-and-error affair; kids weren't afraid to try things and they had a lot of patience. Peer tutoring also took place, although the main tutor was the one with previous computer experience.

A video filmed by the Ellie Runcie, development manager of business for the Design Council, describes Mitra's work and shows that the children can learn by themselves and organise their time on the kiosks without any need for formal or structured tuition.

In one example, a child with no previous computer experience who was using the kiosk for the first time made his first click within five minutes and was surfing the web eight minutes later. In another example, users broke into the kiosk so they could use the keyboard and even managed to disable the software used to monitor their interactions.

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Child's play

The hole-in-the-wall experiment, left, shows how easy it is for kids to learn to use PCs without any help at all. So how does that compare to our interactions and learning processes when it comes to PCs? We thought we'd find out by testing the usability of the different versions of the Windows operating system.

As it releases new editions of Windows, Microsoft claims each is the easiest to use yet, so we challenged this theory by getting four people with varying degrees of PC experience to perform tasks in Windows 3.1, 95, 98 and XP.

Our volunteers were: teaching assistant Catherine Potter; her husband, education support consultant Richard Potter; our editorial assistant Nel Staveley-Dick; and staff writer Ben Camm-Jones.

Richard, who bought is first PC in 1988, has the most experience, having used DOS, Windows 3.1 and Windows 98. Catherine has the least knowledge of computers. Three years ago she went on an introductory course organised by the school at which she works, but she doesn't use PCs day-to-day and by her own admission generally tries to avoid them.

Ben has been using PCs for around eight years, both at home and in the office and, given the nature of his job, has a very good understanding of computers. Nel has been using PCs for about four years and uses one during the course of her daily work. At home she uses her computer mainly for internet access.

Back to basics

Starting with DOS and Windows 3.1, the tasks we set were to start up Windows, install an application, write a letter and set up a printer. The uninviting DOS prompt probably showed the biggest skills gap between our guinea pigs who remembered you had to type 'WIN' to start Windows and those who had never encountered it.

Richard remembered immediately and Ben knew you had to enter something, but couldn't immediately remember what it was. Catherine and Nel also knew that you needed to enter a command, but weren't sure what it was.

Installing Word proved unintuitive, requiring users to locate the Run command from a not obviously accessible menu and then choose the floppy disk we'd inserted. The procedure even vexed Richard for a while, and even though he's a lifelong fan of DOS and Windows 3.1 he admitted, "Windows 3.1 is hard work. Life could be easier."

Installing the printer also proved an elusive challenge. The only task that was universally achieved by everyone was writing the letter.

We then switched to Windows 95 for the same set of operations. Of course, getting into Windows was no problem at all, as there are no commands to type – it simply starts itself. Installing the application was also easy; insert the CD and it runs automatically, asking you if you want to install the software.

Catherine felt far more at home with Windows 95 as it was what she knew from her previous experience. The Start button proved elusive at first, but then she remember to use it to access applications – although she initially observed it looked like a badge rather than a button and it was tucked away in the corner. For Richard, Ben and Nel, who have lots of experience of using Word, writing the letter proved no problem.

Interestingly, though, they all went down into the Programs menus and started Word from there, avoiding the New Office Document on the first menu that Catherine opted for.

Installing the printer under Windows 95 proved much easier for everyone, with Catherine commenting that it was much quicker to do than in Windows 3.1.

Moving on to Windows XP, reactions were mixed. Catherine and Richard hadn't used it before. Catherine liked the look and thought it was friendlier, whereas Richard felt that he just wanted to get on with the task at hand and didn't really care for the appearance. Ben and Nel both use Windows XP daily and Nel preferred the look of XP while Ben thought it was no easier or harder than Windows 95, simply different.

Installing Office XP was slightly quicker for everyone, and generally easier as it asked fewer questions. Catherine felt a bit thrown installing the printer, but eventually found the Control Panel.

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Richard didn't like the restricted Control Panel view, instead preferring the more detailed Classic view. Ben immediately switched to Classic view before installing and Nel thought that the procedure was simpler under Windows 95.

Finally, we asked which of the three operating systems they'd used was, in their opinion, the easiest. Richard was still a fan of Windows 3.1 but thought the jump to Windows 95 was a step in the right direction. He still wasn't convinced by Windows XP, but there were features he was impressed by such as the changing list of recently used applications on the Start menu.

Ben instantly went for XP, stating it looked better and was the easiest to use overall. Some things are different, but you can get used to it. Nel and Catherine, however, both chose Windows 95.

Catherine felt it was slightly familiar and she found it the easiest OS to complete the tasks in whereas Nel liked 95 because it was what she was used to.

Microsoft Usability Group

Microsoft produces significant advancements to its product line with increasing regularity. When it comes to ease of use you can thank (or curse, depending on your viewpoint) the Microsoft Usability Group, a special department aimed at improving the usability of its products.

Microsoft's Usability Group is an integral part of the software company's product design process. Created in 1988, the group consists of over 120 usability engineers with a variety of different backgrounds from psychology to industrial engineering to computer science.

Its research consists of observing real users as they interact and try to accomplish tasks with prerelease software. The results of the research are then fed back into the design process, with the aim of improving the usability of the final product.

In addition to observational research, the work covered includes field research, heuristic evaluation, focus group research, competitive product research, children's product research, hardware research, paper prototype research, and product support research.

Participants in its research spend time at the group's labs working with products that are being developed. Since they're looking at the software, not the people, participants range from non-users to experts.

With something as complicated as human/computer interaction it's hard to draw hard and fast conclusions, but in general it would seem that a lot of computer knowledge is based on previous computer use.

The willingness and motivation to try, as in the case of Mitra's work (see *The hole-in-the-wall experiment* on page 104), also contributes, although children seemed to be more predisposed to this type of learning. Familiarity also seems to be useful, which creates a problem moving forward since technological advances will change the way we are used to using computers. ■