



Chapter 15

The Student Learning Organiser

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Context and background

Mobile organisers, including an electronic diary, notebook and to do list, have been successful in providing employees with a range of tools to manage their activities outside the office. The aim of the Student Learning Organiser project was to explore whether university students need a similar set of tools to help them manage their studies and to assist their learning.

Surveys indicate that over 95 per cent of university students in the UK own a mobile phone (Dundee University 2003) and over 30 per cent own a laptop computer (University of Leeds 2003). Many students also have mobile devices for entertainment, such as MP3 players and handheld games machines. Thus, a secondary aim of the study was to explore how students would manage a further device, a wireless personal digital assistant (PDA), alongside their other mobile technology.

From an activity theory perspective (Engeström *et al.* 1999), students are embedded in complex activity systems within the university and beyond. Students attempt to organise their studies through the mediation of tools that have been created for them, such as course notes, study plans and timetables, and those they create themselves, such as revision notes. A difficulty many students experience is that the tools are constantly being created and transformed, so they must search for study material in many places (departmental office, lectures, library) and they are in a perpetual state of uncertainty as to whether they have the latest versions.

Students participate in many overlapping communities with different rules and divisions of labour. These include the formal activity system of university study and examination with its regulations and academic awards; the communities of practice into which they are being apprenticed, including academia and the professions; and also their social and family communities. Each of these has different modes of communication and collaboration. So, for example, many university students tend to use e-mail for communication with academics and for maintaining more ephemeral contacts, but mobile phone texting for organising their social life (Longmate and Baber 2002).



Rationale and problem statement

This analysis raises many questions for the design of mobile technology to help students organise their activities, including:

- Which software tools are of value to students in organising their studies?
- Do students need specialised tools to manage their learning, or would they benefit more from using standard office management tools?
- If students are provided with a broad set of organiser and communication tools, what patterns of activity and technology usage emerge?
- What institutional support is needed to help the students make good use of the technology?

The aim of the study was to provide some initial answers to these questions. The intention was not to measure learning gains, but to investigate how the technology altered the patterns of study and communication activity among students, and to assess the users' attitudes towards the new technology in a context where the students were already heavy users of information technology.

The study was carried out during the academic session 2002/3 in the Department of Electronic, Electrical and Computer Engineering at the University of Birmingham. Seventeen students on the Human Centred Systems MSc course were recruited to the trial, together with a number of their lecturers. One student dropped out after a few weeks, but another joined about halfway through. All the students were familiar with computer technology and they had access to the university web Outlook software, including e-mail and calendar, accessible from a web browser. Most students had limited personal information management tools available on their mobile phones.

Technology and infrastructure

The seventeen participants of the study were each loaned a Compaq iPAQ 3760 handheld computer, running Pocket PC 2002, with 64MB memory. The students were allowed to use the machine within the university and outside it, and they were provided with a 'docking station' to synchronise their data with their home PC. Each iPAQ was supplied with an expansion sleeve and an 802.11b wireless network card, able to transmit data at up to 11MB/sec. When attached, the sleeve and card roughly double both the size and weight of the device.

The Pocket PC 2002 includes cut-down versions of Windows Word, Excel, Outlook, Internet Explorer and Media Player. In addition the students were provided with a custom-designed Learning Organiser. Developed at the University of Birmingham, the Learning Organiser provides an integrated suite of tools for students to access course materials and organise their studies, consisting of a Time Manager, Course Manager, Communications Manager and Concept Mapper. The students could also download any other applications or documents they wanted for their study or entertainment.

The Time Manager tool (Figure 15.1) allows the students to create, delete and view timetable events and deadlines. Software on a desktop PC enables lecturers to create a folder of course materials and a timetable of events and deadlines that the students can import to their iPAQs. The front screen of the iPAQ is also customised to show a strip with the events for the day (in red) arranged in timetable slots as well as a note of the time and location of the next scheduled teaching event (Figure 15.2). The Time Manager is integrated with Microsoft Outlook, so that any events or to do items created in Outlook appear as timetable events and deadlines.

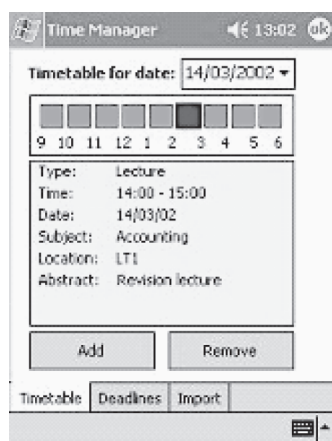


Figure 15.1 Learning Organiser screen showing the Time Manager

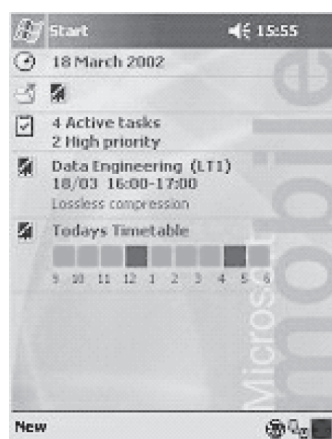


Figure 15.2 Learning Organiser front screen with timetable strip and next teaching session

The Course Manager (Figure 15.3) allows a student to download and view packages of course material via the wireless network. The packages can be created by academic staff using the complementary tool, called Course Builder, that runs on a Windows PC. The Course Manager tool allows students to browse locally stored course material as well as providing a seamless link to remotely stored data. It can show Microsoft Word and PowerPoint files as well documents in PDF, Microsoft Reader and HTML format.

The Communications Manager just provides a screen with buttons to launch standard e-mail, instant messaging and contacts tools.

Two concept-mapping tools were designed at the University of Birmingham for the Learning Organiser. Both enable students to create and browse information by following topic links, but they differ significantly in design and operation. Map-It! (Figure 15.4) uses a logical tree structure whereby the current topic node is shown in the centre of the screen with linked surrounding nodes. The user navigates by clicking on one of the outer nodes which brings it to the centre, displaying the topics related to it. Clicking on the centre node displays any document associated with that node. The user adds a new node by selecting a document from the file list, which attaches it to the central node.

Concise Concept Mapper (Figure 15.5) provides a free-form concept map based on user-positioned nodes and links. Interaction is by pen gestures: a node is moved around the map by dragging it with the pen, scrolling the map as necessary (by dragging into the eight 'arrows'). Nodes may also be grouped for dragging. To add a new node at an unoccupied place on the map the user taps at that place, opening an input area for the node's text. Nodes may subsequently be linked by dragging one node on top of the other. The dragged node then snaps back to its original position with the link attached.

Engaging with students

The students were given an induction session on using the iPAQ and its tools including the Learning Organiser, but were left to decide for themselves how and where they wanted to use the technology, and for what purposes. They were encouraged to use the devices for their own personal activities and to install any software they wished.

Not surprisingly, amongst the most popular downloads were various games and an additional media player. Several different Personal Information Manager (PIM) applications were tried as alternatives to the ones included with Pocket PC or the integrated Learning Organiser. Other installations included a money manager and a photo album.

Two students used Microsoft Portrait (a Pocket PC equivalent of NetMeeting). One of these students reported to have used this to contact his family living on another continent. He received audio and video of them, and was able to speak to them, using the iPAQ as a mobile internet phone.

Several of the students installed Chinese character support for their communication with one another and their friends and family at home. Only two on-line

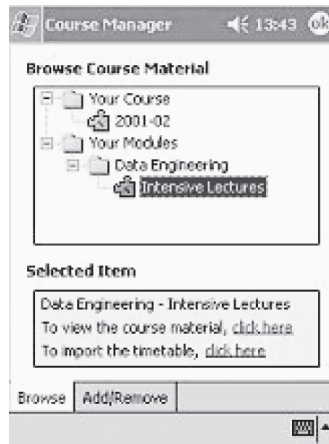


Figure 15.3 Learning Organiser screen showing the Course Manager

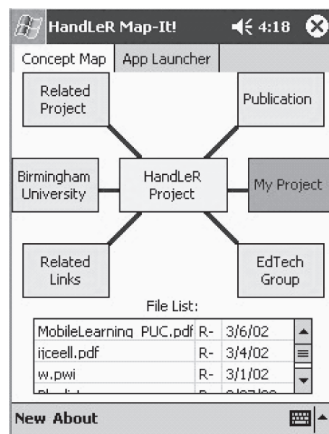


Figure 15.4 Screen display of Map-It!

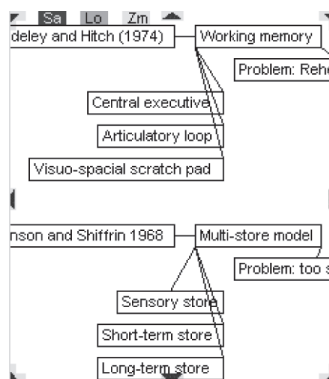


Figure 15.5 Screen display of Concise Concept Mapper

services were accessed by any students. Three students used AvantGo on a regular basis to synchronise web content including news.

Only eight students installed additional software, eighteen pieces of software in total. This was explored further in the final focus group, and two reasons became apparent:

- Most students saw the value of the iPAQs as being either in time management or in e-mail/messaging. These were already catered for with the standard software.
- Since the devices had to be returned within the year, participants were reluctant to invest much of their own money or time in personalisation.

Evaluation and outcomes

Data were collected in three different ways:

- Questionnaires at 1, 4, 16 weeks and 10 months.
- Logbooks during the early stages of the trial, where students were requested to record each use of the iPAQ, the activity, time spent on task and the tools used.
- Focus groups to coincide with each of the questionnaires.

These aimed to uncover answers to the questions posed in the 'Rationale' section, by exploring:

- students' attitudes to the technology;
- students' attitudes towards the Learning Organiser;
- patterns of usage of the technology and the software applications (including any they had downloaded themselves);
- ease of use issues;
- issues relating to institutional support for mobile learning devices.

Usability

One of the most reported issues was the usability of the hardware. At the final focus group the students were unanimous in expressing discontent about the form-factor, memory size and battery life.

The sleeve and wireless PC card made the iPAQ too heavy and too large for comfortable use and the ability to store in a pocket. But within the department, the wireless sleeve was indispensable since it provided valuable communications functions.

The iPAQ memory was considered to be too small to hold the course resources, additional PDF and media files and any added software, whilst leaving any space for games and music files. As the participants were required to return the iPAQs at the end of the year, they were not willing to invest in additional memory modules.

The battery of a recharged unit would generally perform adequately for one day, but if left uncharged for a number of days, the unit lost all data and programs added by the user since these were stored in volatile memory. On a few occasions (generally during the vacations) students unwittingly left their devices disconnected from mains power for longer than a week, and as a result had to reinstall all their software and data that had not been synchronised with a PC.

All of these problems are being addressed in a new generation of PDA devices, with integrated wireless communication, larger internal memory, and removable memory cards that can be transferred to other devices. Battery life remains a significant problem, with the improvement in battery technology being offset by the power drain of larger screens and wireless connectivity.

Usefulness

No single tool stood out as being likely to revolutionise the students' learning or personal organisation. Table 15.1 shows the perceived usefulness of the various tools at the 4 week, 16 week and 10 month stages of the trial. Communications tools and the timetabling features were consistently amongst the most useful. Course content and the concept mapper show a trend of decreasing usefulness over time. It should be noted, however, that the students were provided with less course content and materials later in the course, and at the 10-month survey most students were involved more heavily with project work.

The participants were also asked to name the applications or tools that made the greatest impact on their learning, personal organisation and entertainment. The answers to this free-response question were collected under generic headings. Table 15.2 shows that, for learning, course materials are regarded as having the most impact, despite the lower perceived overall usefulness. Concept mapping was not considered of greatest importance by anyone in any category.

Other responses to the questionnaires and at the focus group sessions indicated that:

- the Student Learning Organiser software frequently ran too slowly to be usable;
- much of the content made available by lecturing staff over the web was not optimised for Pocket Explorer, making it difficult to read;
- the concept mapping tools were difficult to use without further instruction. The free-format concept map appeared to be better for note taking and for experienced users, while the tree structure was better for highly structured information and novice users;
- participants were reluctant to use the concept mapping software since its content could not be transferred to other applications.

Patterns of usage

As can be seen in Figure 15.6, use of the iPAQs overall declined over time. However, the number of participants using the devices many times per day stayed much the

Table 15.1 Perceived usefulness of tools ('useful' or 'very useful') after 4 weeks (n = 17), 16 weeks (n = 14) and 10 months (n = 17)

	4 Weeks	16 Weeks	10 Months
Timetable	59% (10)	64% (9)	82% (14)
Web browser	65% (11)	64% (9)	71% (12)
Instant messaging	59% (10)	50% (7)	71% (12)
E-mail	76% (13)	79% (11)	65% (11)
Course materials	59% (10)	43% (6)	41% (7)
Supplementary materials	53% (9)	43% (6)	24% (4)
Concept mapper	35% (5)	14% (2)	0% (0)

Table 15.2 Perceived impact of tools on learning, personal organisation and entertainment; number of students after 10 months, who named the tool as having greatest impact (not all participants answered all three questions)

Learning	Personal Organisation	Entertainment
Course materials (6)	Timetable and deadlines (6)	Media player (7)
Browser (3)	Calendar (5)	Games (3)
Timetable and deadlines (2)	Writing/note taking (2)	Messenger (2)
Writing/note taking (1)	E-mail (2)	Browser (1)
Calendar (1)	Task manager (1)	Writing/note taking (1)
		Reader (1)

same. Starting with a more even spread, usage became more polarised between those who used them very frequently and those using them very infrequently.

Participants were asked to say how frequently they used the iPAQs in four different locations, and whether this was for MSc-related work or other activities. Table 15.3 shows the rank order of these locations during the study.

Early in the study, students used the iPAQs at home and in the Department for MSc and other activities. By the end, 'travelling' was a more frequent location than the department for other activities. It is worth noting again that more project work is carried out towards the end of the course, so it is likely that students will spend less time in the university. Alternatively, this result may also suggest that the students were finding more uses for the devices and beginning to see their value as mobile tools.

Students were invited to describe their own patterns of use. Some interesting observations include the following:

- Although e-mail is synchronised to the device for off-line use, students only tended to use e-mail when connected by the wireless LAN.
- E-mail and instant messaging were frequently mentioned together as if they were complementary tasks.
- Participants used the calendar and timetabling in all locations.
- In the 4-week survey, there were many references to using the device for listening to music and playing games. By the 16-week survey, these activities had been largely replaced by e-mail and instant messaging.

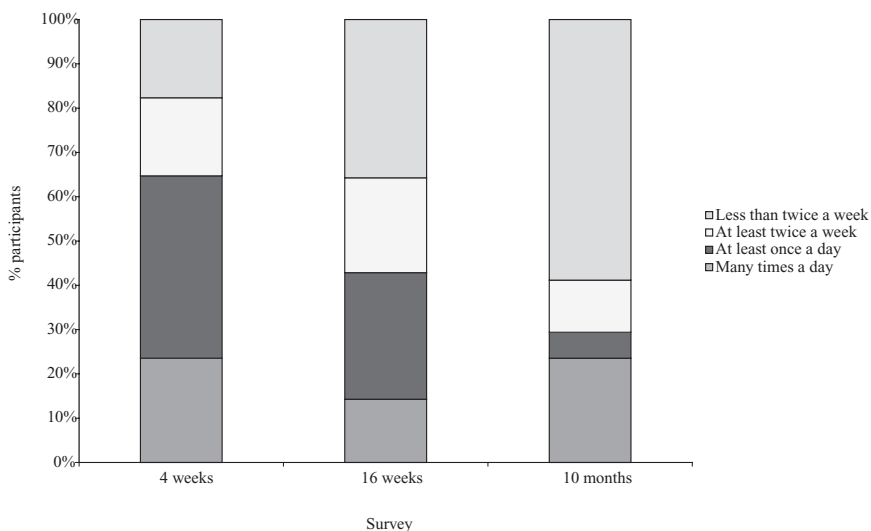


Figure 15.6 Frequency of use of the iPAQ during the trial

Table 15.3 Rank order of frequency of use at four locations, for work and, in parentheses, other activities

	4 Weeks	16 Weeks	10 Months
Home	1 = (1)	2 (1)	2 (1)
Department	1 = (2)	1 (2)	1 (3)
University (elsewhere)	3 (4)	4 (4)	3 (4)
Travelling	4 (3)	3 (3)	4 (2)

- A number of students reported regularly reading course materials, off-line web content and e-books when at home. This was surprising, since all the participants had their own desktop or laptop computers in their homes.
- For a few students, this was the first time they had kept their personal organisation information in an electronic format. Among those, some only made use of this information through the PDA, even though it was synchronised and available on their laptops or desktops.

A separate question on how their use of the iPAQs had changed over the course of the year did not yield any noticeable trends. Some students attempted to use it for everything in the early stages before accepting that some tasks were better done on a normal PC. Others who were sceptical at first, later became frequent users of the devices. Either way, after ten months, students had evaluated the capabilities of the PDAs, adapted them to their needs and settled into a personal pattern of use.

An attitude survey was conducted as part of the final questionnaire. Students were asked to rate statements on a five-point Likert scale from 'Strongly Agree' to 'Strongly Disagree'. Four statements were associated with significant results:

- Using the iPAQ did not hinder learning.
- Battery life was a significant problem.
- Students were not put off using the devices through difficulties in knowing how to use them.
- The perceived advantages of having a PDA outweighed the disadvantages of taking part in the trial.

The study was never intended to explore learning gains brought about by using mobile technology. However, the surveys clearly showed that although the technology had been useful to them, it had not transformed or greatly enhanced their learning. It would appear that the Learning Organiser was just another resource amongst many.

For some students, the PDA complemented their use of desktop computers, providing a convenient means of viewing course material. But there is no evidence that it replaced other communications or entertainment devices such as mobile phones and MP3 players. Though it entered the activity space of communication and entertainment, the PDA was neither as convenient nor as powerful as their other mobile technology.

Institutional aspects

The questionnaires highlighted issues relating to institutional support for the Learning Organiser and these were explored further in the final focus group. An important impediment was that the course information was not complete, nor was it updated throughout the year. Thus, instead of providing students with a definitive source of information, the Learning Organiser created a further source of uncertainty, to be reconciled with printed course material and the departmental website. Birmingham, like most UK universities, already supports an institutional Virtual Learning Environment (VLE). It is currently not possible to access this VLE from mobile devices. Even if it were possible, it is not clear how much of the content would need to be re-formatted for the small screen. The fact that some students read course materials on their iPAQs suggests that giving mobile access to current VLE content could be of benefit.

The Learning Organiser also created another activity system, with a new community of practice and modes of communication between the department and among the students. Some students were eager to enter this community, for example by using the instant messaging tool to discover whether other students were available, or to engage in more frequent e-mail communication. But for wider adoption to take place, the students indicated that it would be necessary to be given more training on using and extending the devices. In particular, concept-

mapping should be taught as a skill before students could be expected to use the mapping tools.

This raises important issues for institutions concerning training and support. How should the institutions enter the space of informal technology-mediated communication? It would be tempting, for example, to use instant messaging to contact students. But would this just add another unreliable means of communication, would it be accepted by staff, and would it impinge on students' social space? Similarly, most universities already teach study skills to their students, but should these be extended to skills for studying on mobile technology? These questions can probably only be answered by trials to investigate the benefits and costs to the institution.

What next?

A trial is now underway with third-year undergraduate students using pen tablet computers. These devices fit a different activity space to PDAs, combining many of the properties of a laptop computer with the affordances of direct pen input. The focus of the research, supported by Microsoft, Toshiba and Viglen, is on the benefits of tablet technology for collaborative learning and mentoring. Student teams equipped with tablet computers are encouraged to explore new ways of recording their learning experiences and sharing these with each other and their mentors. They will use a range of tools including portals, Internet messaging and video conferencing.

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