



Lifelong Learning Programme



**MENUET – Mobile E- Novative Use of
E- learning Technologies**

Project No. LLP-LdV/ToI/2008/RO/010

MENUET

Mobile E- Novative Use of E- learning Technologies

W1 STUDY

W1.4

Technical specifications of Tablet PCs, networking equipments and wireless accessories to be purchased/ rented during the Design and Test stages.

Work package aims:

Continuous study on the latest developments concerning Tablet PCs and e-books (for the final edition of the Guide).

Description of activities:

Continuing the study on the latest developments concerning Tablet PCs and e-books (for the final edition of the Guide).

Description of methodological / pedagogical framework (where relevant)

Working methods and techniques:

- Studies and impact analysis
- Supervising the information provided to the partners through the website.
- Quality management tools:
- External quality control system.

Description of outputs:

Technical specifications of Tablet PCs, networking equipments and wireless accessories to be purchased/rented during the Design and Test stages.



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Technical specifications of Tablet PCs, networking equipments and wireless accessories to be purchased/rented during the Design and Test stages.

Tablet PC – overview of models and the suggested choice

Tablet PCs are one of the most important elements of this project and they are used practically during the whole project lifetime. According to the Work Plan, Tablet PCs are used in all the Design and Test stages, by partners from all the participant countries.

For several reasons (to avoid any unexpected behaviour of applications or the operating system as the result of software localisation or due to the technological and architectural differences of the hardware) the best idea is to use the same Tablet PC model with the same operating system version (even in the same language version of the operating system but localised by settings in the Regional Settings properties). Partners can either purchase or rent the Tablet PCs and that should be done from local sellers/distributors. Therefore, the final conclusion is that the chosen model should be available in all partners` countries (support, service, warranty, etc.).

Since many models, for example:

- Averatec C3500 Convertible Notebook
- ElectroVaya Scribbler SC-2000
- Viglen Exaro
- TDV Visionary V800XPT, VS1200XP
- Viewsonic V1250
- Motion Computing M1300, M1400 Tablet PC
- NEC Versa LitePad Tablet PC...

are not represented on all partners` markets – these models could not be taken into consideration (of course – they can be bought in e-shops or using other methods, however, for support/service reasons it is not recommended).

Therefore, models of the following manufacturers were taken into consideration:

- **Acer** (Travelmate C100, C110, C112tci, C300, C302XMi and others...)
- **HP Compaq** (TC1000, TC1100 and others...)
- **Fujitsu-Siemens** (Stylistic ST4110 and others...)
- **Toshiba** (Portégé M200, M205-S809, 3500, 3505 and others...)

There are also two possibilities: convertible or pure Tablet PC. Due to some practical reasons (better universality and usefulness, possibility of internal CD/DVD existence, etc.) usage of convertible Tablet PCs seems to be a better choice.



Based on the opinion of the firm specialising in the mobile computers market, Fujitsu-Siemens has the best "quotations" – among the producers listed above – (HP Compaq models have very bad reports – are in service very often, Toshiba and Acer are considered to be "moderately reliable").

To make the right choice some factors were defined:

Property	Expectations	Affect on
processor type	good performance	comfort
battery life	long	mobility
weight	low	mobility
LCD display size	big	comfort
warranty	long	safety

Of course, some of these expectations cannot be always fulfilled at the same time (a very efficient processor consumes more power which in turn decreases lifetime, long battery life means big = heavy battery and a big LCD display also impacts on the weight, etc.). Therefore, the final choice is a kind of compromise.

1. processor type
"obsolete" architectures should be avoided: Pentium III or Celeron. Pentium 4 Mobile processors have higher power consumption and performance increase comparable to the Centrino technology is not high enough to warrant their use. Centrino technology processors with value 2MB of L2 cache impact very well on performance (suggested processor clock frequency 1.8 GHz: Pentium M 745), therefore that is the best choice.
2. battery life
varies from 2 to 7 hours (according to technical specifications – which sometimes in practice is "very optimistic" value). Should be minimum 4 hours.
3. weight
varies from 1.5 kg to 2.7 kg. Should be less than 2 kg.
4. LCD display size
varies from 10.4" to 14.1". Should be minimum 12".
5. warranty
varies from 1 to 3 years. 3 years recommended.

Therefore, the following comparison can be made (some "comparable" parameters are omitted: HDD size, peripherals, WLAN, etc. – all Tablets have them and they are quite similar):

Model name	<u>Fujitsu-Siemens LIFEBOOK T4010</u>	<u>Toshiba M100</u>	<u>PortegeToshiba M200</u>	<u>Portege Toshiba Portege R100</u>	<u>Acer TravelMate C110 (C112TCi)</u>	<u>Acer TravelMate C300</u>
Processor	Intel Pentium M 725 or 745	Intel Pentium M	Intel Pentium M 735 or 745	Intel Pentium M 733	Intel Pentium M 733	Intel Pentium M 725
Centrino	Yes	Yes	Yes	Yes	Yes	Yes
L2 Cache	2 MB	1 MB	2 MB	2 MB	2 MB	2 MB
frequency	1.6 GHz or 1.8 GHz	1.2 GHz	1.7 GHz or 1.8 GHz	1.1 GHz	1.1 GHz	1.6 GHz
RAM	256 MB	256 MB	512 MB	256 MB	512 MB	512 MB
LCD display size	12.1"	12.1"	12.1"	12.1"	10.4"	14.1"
Battery life	4.5 h (6-cell battery 4800mAh)	4.5 h (6-cell battery 4000mAh)	4.3 h (6-cell battery 4400mAh)	2.2 h (6-cell battery 3600mAh)	3 h	7 h
Weight	< 2 kg	2 kg	2-2.1 kg	>1.1 kg (with battery 3-cell 1600mAh)	1.45 kg	2.7 kg
OS	Microsoft Windows XP Tablet PC Edition 2005 for versalite Mobile Computing	Microsoft Windows XP Tablet PC Edition for Mobile Computing	Microsoft Windows XP Tablet PC Edition for Mobile Computing	Microsoft Windows XP Tablet PC Edition for Mobile Computing	Microsoft Windows XP Tablet PC Edition for Mobile Computing	Microsoft Windows XP Tablet PC Edition for Mobile Computing
Warranty	3 years	3 years	3 years	3 years	1 year	1 year

(data from official technical specifications of manufacturers based on standard configuration, in red the parameters than do not fulfil the suggested requirements).

Therefore, the suggested model for the Project is Fujitsu-Siemens LIFEBOOK T4010 with the complete specifications (slightly different from the standard configuration) listed below:

- Pentium M 745 1.8 GHz
- 512 MB RAM
- WLAN Intel Pro/Wireless 2200 b/g
- HDD 80 GB
- DVD +- RW (DL+R) in modular bay

However, some minor differences (other HDD size, optical drive type, etc.) are acceptable.



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Fujitsu T4010: Impressions

HARDWARE

1. The screen latch has two positions: “laptop mode” and “tablet mode” - turn the latch (“to the lit” direction) to switch between these “modes” and in both cases the device can be latched down.
2. As in all modern computers the, interface has been replaced by USB interface (as it happened with DIM/COM interfaces previously). So we have an USB mice / keyboards now), and also other solutions based on Bluetooth, InfraRed (IrDA)...
3. WIFI - No wireless networks were found in range but the system works well with telephone on line. Wireless networks should be previously well configured and you need additional equipment (for example: Access Point). The same situation is with “standard” wired networks - you need a network switch or hub...
4. Reading CDs in Tablet mode depends on the configuration settings. The default settings for CD/DVD player is to “lock CD/DVD drive when the unit is in tablet mode”. Even then one always can “unlock” the drive by clicking the Fujitsu-Siemens Tablet Controls icon in system tray (and choosing the option “Unlock CD/DVD Drive for this tablet session”. One can change the default behaviour of the system changing the settings in the Control Panel applet Fujitsu-Siemens Tablet Controls (bookmark CD/DVD drive”), for example one can unselect “Lock CD/DVD drive when the unit is in tablet mode”
5. Windows Media Player cannot play DVDs. One needs to load in InterVideo WinDVD player. This is a typical situation - such behaviour is not connected with a malfunction of Windows Media Player... Simply DVD format (more precisely: DVD decoder) is not a part of the Windows XP operating system – so Windows Media Player does not recognize the DVD format (and cannot decode it). That is why a DVD device is usually shipped with special software (PowerDVD, WinDVD etc.) – and such software installs the required decoders – so after installation of these programs one can watch DVD movies even using Windows Media Player...
6. When closing and reopening the lid in PC mode, the system goes into standby mode – one needs to press the resume button at the right hand corner of the screen to get back to run mode. This depends on the settings of operating system. One may simply use the Control Panel “Power Options” applet to personalise them: the bookmark “Advanced” has options “When I close the lid of my portable computer:” and there are options: “Do nothing”, “Stand by” and “Hibernate” (if option “Enable hibernation” from bookmark “Hibernate” is set).
7. Fn brings up the controls on the Function Buttons – volume, print screen etc. This is typical for all types of notebooks (small size of device implies small dimensions of keyboard – so the number of keys is reduced – so finally some functions of keys have to be multiplied using other special function keys – that’s why there is the Fn key).
8. The stylus generally takes the place of the mouse.
9. It seems that we will have to provide a short tutorial for the students on how to use the hardware.
10. Any other display (projector, external monitor etc.) will work (there will be probably two modes: one “virtual” extended desktop divided between these two displays or “duplicate” mode when second display is a copy of primary one...



11. The same “tools” as for regular notebooks may be used to clean the screen – there are special “cleaning kits” for LCD monitors / notebooks displays.

SOFTWARE

1. As in every Microsoft operating system there is a “DOS box” (in Windows 95/98, Millennium, NT Workstation, 2000, XP... even in all server versions). In operating systems based on NT technology there are even two versions of such “DOS Window / Command Prompt” (the cmd.exe and command.com programs – the first one is more advanced and adapted to 32-bit operating systems, supports long path/file names). “Command Prompt” is in fact a command shell environment – simple interpreting commands given in textual form and realising functions of operating system. These programs are not even DOS “emulators” (there is no 100% compatibility) – is better to treat them as a layer between a core of operating system and set of simple programs/commands that can be used in textual interface.

The idea is:

- backward compatibility (there are still many programs running in “DOS” mode)
- many tools are a kind of standard and need a text command shell (for example many network diagnostic/configure tools have a shape of standardised commands form (ping, tracert, ipconfig...))

2. It seems that we will have to provide a short tutorial for the students on how to use the software.

3. Anywhere that a text input is required, the Tablet PC Input Panel pops up. This can accept handwriting and recognition, speech recognition or tapping with the stylus on to the little on-screen keyboard. The user has to be very neat indeed to hand-write text and expect the handwriting recognition system to interpret it properly.

The handwriting recognition software works very well. The main disadvantage is that this software accept only several languages (English, French, German, Italian, Spanish – and even after installing Microsoft Windows XP Tablet PC Edition 2005 Recognizer Pack: only Chinese, Japanese and Korean in addition...) So there is no support for example for: Polish, Bulgarian... There are commercial products of the third-party vendors (for example: PENREADER (INTERNATIONAL) - Multi-lingual handwriting recognition for Tablet PC of Paragon Software, that supports – in “28-lingual PenReader for Tablet PC” version: Albanian, Bulgarian, Catalan, Croatian, Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Icelandic, Italian, Latvian, Lithuanian, Norwegian, Polish, Portuguese, Romanian, Russian, Slovak, Slovenian, Spanish, Swedish, Turkish) – but I have not tested it yet (and I cannot say anything about usefulness, accuracy in recognition and integration with operating system).

4. Windows Journal is in the Start Menu. It is possible write and draw on a "sheet of paper" here. The Windows Journal application window can be resized to any size without any problems (the size of page “inside” of Windows Journal application window is scaled to the size of application window). Pictures may be inserted here and written over. The files are saved as Windows Journal Notes (.jnt) which can be reopened and added to, and they may be exported as Web Archive files (.mhtml) as a static web page, or as a static black and white .tif file. This tif file can be inserted into a Word, Powerpoint or Excel document but it cannot recognised by html, which is a major drawback. However, using Internet Explorer one can save an exported *.mhtml file as a *.html file. It is possible to link to a Journal Note file from html. Then when you close Windows Journal, you are back in the html file.



5. Journal follows the rules of other Windows applications and when the size of the application window is set – the size is the same after restoring window or starting this application again. It is difficult to find any easy way that the student can study an e-course and take substantial notes using Windows Journal Notes on the same screen. Even when a small window is opened in HTML and then a Journal Note is loaded into this small window, the Journal Note opens up in the whole screen - this is a major drawback of the Tablet and its software. The hard way is to open up Notepad and let it ride over the screen. When you place the stylus over Notepad, the Tablet PC input panel pops up and text may be inputted to insert into Notepad. The technique needs a great deal of ALT-TAB shuffling.

6. Coral Grafigo is in All Programs. It is possible to draw pictures and save them here. I had considerable difficulty closing this and one is forced to save a rubbish file before it would close. There are bugs in this application (for example: how to zoom out after zoom in).

7. The Paint Application allows the use of the stylus to draw to the screen.

8. Sticky Notes is in All Programs. It allows one to write little notes and record little sounds and export these as .snt files. These letter files can be heard again only in Sticky Notes.

TRIALS

1. The INNOMAT CD-ROM (a previous Leonardo da Vinci project) was loaded in and it worked surprisingly well in Tablet Mode.

2. The PC version of the ENERGY AND ENVIRONMENT COURSE was loaded into the Tablet PC. It was obvious that because the screen is 768x1024 instead of 1024x768, the pages of the EDUET courses must be carefully formatted to fit the new screen shape.

3. In Tablet Mode, the system is very much a passive device and one can forget about programming or entering much text in this mode. PC Mode with the keyboard is more active and it is possible to program here although the absence of a mouse and having to use the pen to cut and paste etc. makes things difficult – especially if you are left-handed. Although In Control Panel there is an applet called “Table and Pen Settings” – there you can personalise your system if you are left-handed (options “Handedness” and “Menu location”) this did not completely solve the problem.

So one has to programme in PC mode at 1024x768 and then view what has been programmed in Tablet mode at 768x1024 - rather like programming half-blind through a marshmallow! It is much easier to set up a window 768x1024 on a normal PC, do all the programming there, and then transfer the whole course to the Tablet.

4. On a happier note, it took 10 minutes to set up an ISP, connect to the internet and download the ppt viewer from Microsoft. Then all the Powerpoint presentations worked on the Tablet seamlessly.

5. As with all new XP versions, any DHTML and Active Content pulls up warning boxes. These must be disabled in Internet Explorer for our courses.

SELF-ASSESSMENT EXERCISES AND COMPUTER –MARKED TESTS

1. Whilst ideas for tests using the Tablet features are being generated, it is surprising how well the tests already developed fitted in to the Tablet capabilities. For, example, every time a text input is required, i.e. for the Crosswords or Fill the Gaps, the Tablet PC Input Panel pops up, making it look as if the test were designed for the Tablet.



2. The student should be excited and enthused by multimedia elements in a Tablet PC course and the whole content must be integrated seamlessly.

3. Innovation by student artists, designers and engineers has become increasingly stymied by the limitations of inputting ideas to a computer via a PC keyboard and attempting to draw with a mouse! Freeform design has become increasingly impossible. The stylus system is excellent for applications such as filling out online forms or drawing to the screen using Windows Journal Notes or also the application Paint.

The uses of charts, such as those needed for refrigeration, psychrometry and air conditioning designs, and nomograms, such as used in combustion calculations, have become defunct. By allowing the user to input drawing using the stylus, the Tablet pc rectifies these inhibitions, so renewing the possibilities of chart usage and freeform design.

Tests using the Tablet features will, in general rely on the student writing/drawing on the screen in Windows Journal Notes in response to a question and then saving the .jnt (dynamic) or .mhtml (static) file. These cannot therefore be computer-marked Tests but must become self-assessment exercises.

There is a very important feature of the Tablet PC which opens the doors to the possibility of constructing some very useful and effective self-assessment exercises, which are not possible to provide on a Tablet PC.

When the user right clicks in an application other than Windows Journal Notes, the box which includes “Print Screen” pops up. The screen is printed to Windows Journal Notes, where the student may annotate and save the page as a .jnt file or export it as an .mhtml file. This also happens in Internet Explorer.

It is interesting to see that that, if a powerpoint presentation is printed in this way, Windows Journal Notes will contain every page in the presentation, allowing annotation of each and all of these pages.

Thus any html page may be printed to Windows Journal Notes, where stylus input is accepted. In its simplest application, a white box may be provided for student notes.

This makes possible the input of drawings, annotated photographs, graphing, diagrams and networks, such as electrical circuitry, flow charts, sankey diagrams and plant layouts.

A self-assessment exercise may provide a pro-forma, which may be a diagram, a chart or a figure, together with questions, on an html page, printed to Windows Journal Notes, operated upon and then saved as a .jnt file for further modification later, or exported as a .mhtml file. The correct answer to a self-assessment exercise may be stored in the HTML course (with some clever programming) for comparison on return from Windows Journal Notes.

There is still no way that these results can be assessed/marked by the computer and this limitation is why other methods of self-assessment should be included in a Tablet PC course to give the student feedback on progress and encouragement. This is why it is important to also include games-like tests and an overall score generator, as well as a history of the tests.

MENUET

W2.3 Purchase / rent of necessary PCs



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W3.1 Rent of HW for tests

During the EDUET Project, a critical Analyses of the Strengths and Weaknesses of the learning activity involving the Tablet PC, equipped with especially designed ebooks/e-textbooks, produced the following observations:

Strengths

- SATISFACTION
- MOBILITY
- USER FRIENDLINESS
- LIGHTWEIGHT compared with Laptop PCs.
- SMALL SIZE compared with Laptop PCs
- PORTABILITY
- QUIETNESS
- COMFORT
- INTERACTIVITY USING THE PEN.
- HANDWRITING ON THE SCREEN
- DIDACTIC EFFECTIVENESS

“You can work on it very fast, and achieve more.
A quick and convenient form of learning effectively.
An Interactive medium that increases the speed of learning.
It is useful and mobile.
Students can use it instead of books/exercises/notes.
It is easy to use, doesn't take much space to keep and you can find or do whatever you need in a very quick way.”

Weaknesses

TOO EXPENSIVE
TOO HEAVY
SHORT BATTERY LIFE
HEAT GENERATION
FRAGILE KEYBOARD – Typing keeps jumping to other places in the document.
SLOW SPEED
BAD WRITING RECOGNITION
BAD VOICE RECOGNITION



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The responses to each and every question in the EDUET Questionnaire showed that the new electronic didactic technologies, Tablet PCs using E-Books and Desktop or Laptop/Notebook PCs using E-Books are clearly preferable to the traditional didactic technologies, Paper Books and Traditional lectures using a blackboard and chalk or a flip chart.

There was some slight statistically significant evidence that the respondents found that Tablet PCs using E-Books to be preferable to Desktop or Laptop/Notebook PCs using E-Books in some didactical aspects, being more stimulating and user-friendly, providing opportunities for practice and allowing learning to be measured.

Overall, however, the preference for Tablet PCs over Desktop or Laptop/Notebook PCs lay inside the standard error of the data, and therefore no certain overall conclusions could be drawn as to which electronic didactic technology was preferable.

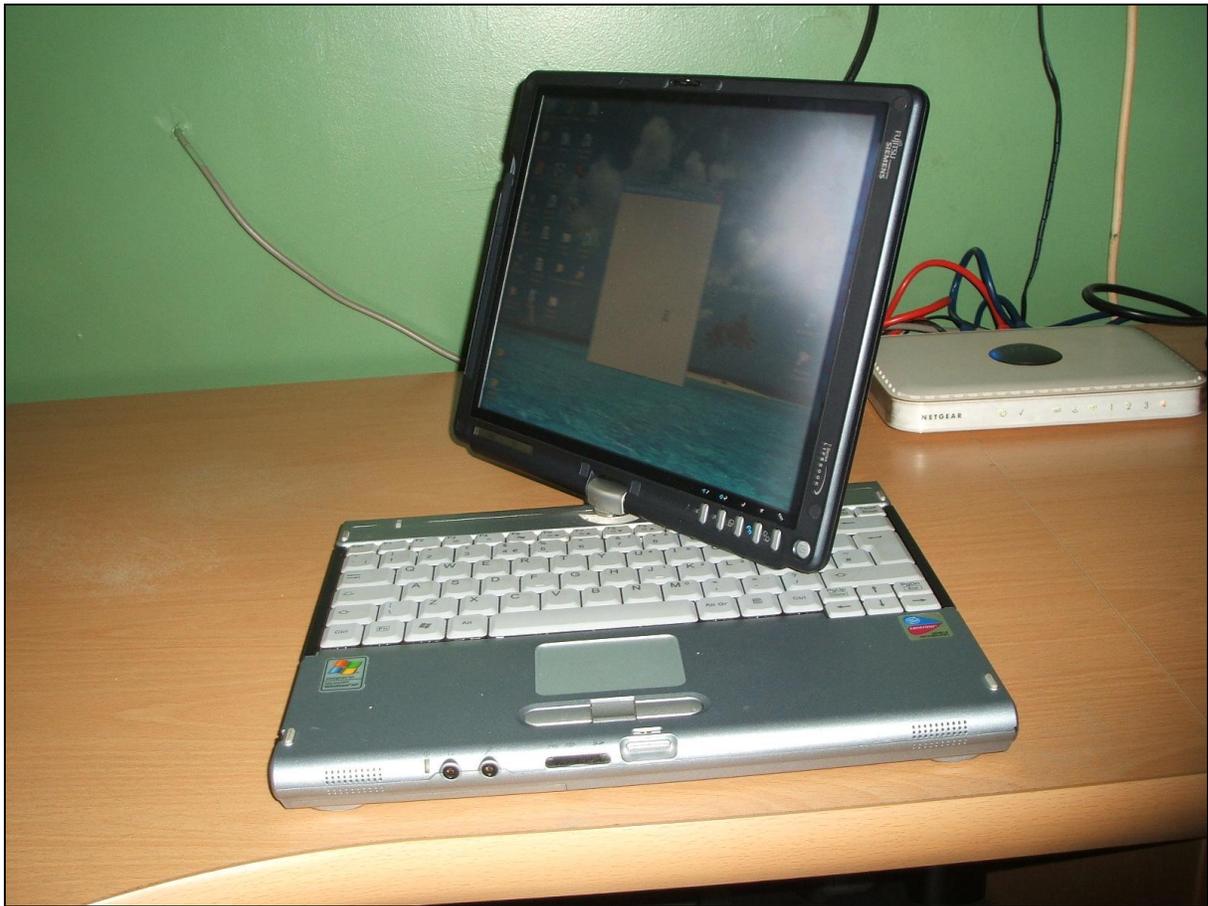


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The Weaknesses of the Tablet PC used led to its condemnation. The **Fujitsu-Siemens LIFEBOOK T4010** was heavy (2kg) and bulky (31mm x 290 mm x240mm – Volume = 2176 cm³). It had a short battery life, much less tha the 4.4m hours claimed by the manufacturers and quickly became too hot to be held on the lap.

The Weaknesses of the Windows XP Tablet Edition operating software were its bad handwriting and voice recognition and none saw the advantage of being able to draw to the screen, when a piece of paper and a pencil will do.

NETBOOKS

Since the EDUET Project, NETBOOKS have become widely available.

NETBOOKS do not have

- Floppy Disk Drives
- CD/DVD Drives
- Drawing on Screens
- Touchscreens
- Handwriting Recognition
- or Voice Recognition



The lack of Floppy Disk Drives and CD/DVD drives make starting up and operating speeds much faster and may be overcome using flash drives and passport drives. For example, to install Microsoft Office or other CD-based software – copy the CD to a flash drive and install from the setup.exe on the flash drive,

NETBOOKS all in common have Web Cams and are Internet and WiFi Enabled.

They all have the Windows XP Operating System.

Most importantly, NETBOOKS overcome the weaknesses of the Tablet PC.

They are

MUCH Cheaper £250 as opposed to £1500 for the Tablet PC.

MUCH Lighter – less than half the weight of the Tablet PC.

MUCH Smaller (1400 cm³)





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They have
Longer Battery Lives
and MUCH less HEAT GENERATION

Some of the Major Contenders

These all have:

Processor Type	Intel Atom N270 or N280
Processor Speed	1.6 GHz
Memory Size	1 GB
Screen Size	10.1-10.2" 1024x600
Hard Drive Capacity	160 GB
Height	25 - 33 mm
Width	258 - 268 mm
Depth	178 - 189 mm
Price	£229-£350

The differences are:

	No. of USB Sockets	Battery Life (up to) hours	Weight kg
Acer Aspire One 531	3	3 - 7	1
SAMSUNG N310	3	4	1.2
SONY VPCW11S1E	2	2.4	1.2
ADVENT 4214	3	N/A	1.4
DELL Inspiron Mini 10v	3	3	1.3
Asus EEEPC 1005	3	8.5	1.4
Packard Bell Dot S	3	6	1.35

The Acer Aspire 1 is the lightest and cheapest at £229.

NETBOOK TABLET PCs

These cannot yet be found in highstreet stores, but they combine the capabilities of the Tablet PC with the size and weight advantages of NETBOOK PCs.

They have Similar Specification to NETBOOKs but with with Touchscreen and Windows XP Tablet Edition allowing

- Drawing on Screens
- Touchscreens
- Handwriting Recognition
- and Voice Recognition

just like the Tablet PC.



Examples

VYE Mini V S37	£890
Asus Eee PC T91	£400
Samsung Q1EX / VIA Nano	£580

These are difficult to obtain and much more expensive than NETBOOKs, to justify the extra capabilities: Drawing on Screens, Touchscreens, Handwriting Recognition and Voice Recognition, that were so badly condemned during the EDUET testing phase.

Conclusions

W2.3 Purchase / rent of necessary PCs

W3.1 Rent of HW for tests

The recommended PC/s to be purchased/rented for the development of the website, the software, the E-Books and to conduct the tests is the **Acer Aspire One 531 NETBOOK**.



Whilst the screen sizes and capabilities of NETBOOKs and NETBOOK TABLET PCs are similar, considerations should be given during the development of the tests to the possible inclusion of the capabilities of Drawing on the Screen, Writing to the Screen, Touchscreen, Handwriting Recognition and Voice Recognition,