Australian *Flexible* Learning Framework

Supporting Flexible Learning Opportunities

New Practices in Flexible Learning

Mobile learning: handheld innovations in flexible learning

Project report

Part 2: Technology

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flexiblelearning.net.au

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The project has been developed in collaboration with relevant Indigenous persons and readers are advised that the project materials may contain images, voices and comments from Aboriginal and Torres Strait Islanders.

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Contents

Preface

This report contains references to various technology, software and hardware products and/or services. The inclusion of this material is provided under the following conditions (in addition to the general copyright statement provided at the beginning of this report):

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The following is a summary of the registered technology referred to throughout the document. Each product or service has been listed using the full compound name of the registered product/service. Throughout the body of the report, the non-compound or shorter version may be used and users are directed to the following list for full details.

Note: Product or services names are listed alphabetically.

Acer™ n30
Acrobat® 6
Acrobat® Reader®
Adobe® Reader® 6.0 Read Out Loud tool
Bluetooth®
BrailleNotes™
Brando Workshop Screen Protector
Cassiopeia®
Clearview Presenter™
Colorgraphic®
Colorgraphic® Voyager Presenter™
Colorgraphic® Voyager VGA CF™
Conduits® Pocket Slides™
Conduits® Pocket Album™
Conduits® Pocket Artist™
Dell Axim™ X30
Dell Axim™ X50
Dragon™
Freedom Scientific® PAC Mate™
Fujitsu Siemens® LOOX 410
Google™
Hewlett-Packard®
HotSync® Conduit
HP® iPAQ Image Zone™
HP® iPAQ Pocket PC®
HP® Photosmart Digital Camera
HP® Photosmart Mobile Camera
Iburst™
Intel XScale®
Intel® PXA270
JAWS®
Keysoft®
Launcher
LifeView® FlyCAM-CF™
Linux™
Mac®
Macintosh®
Macromedia® Fireworks®
Macromedia® Flash®
Macromedia® Dreamweaver®

Macromedia® Flash®
Macromedia® Flash® Player
Macromedia® Shockwave®
MAGic™
Magnifier™
Margi®
Margi® Presenter-to-Go®
Microsoft® Internet Explorer™
Microsoft®
Microsoft® Access®
Microsoft® Excel
Microsoft® FrontPage®
Microsoft® Office
Microsoft® Outlook®
Microsoft® Pocket Internet Explorer™
Microsoft® PowerPoint®
Microsoft® Reader
Microsoft® Visual Basic®
Microsoft® Windows® Mobile™
Microsoft® Word
Motion Computing® M1400
MovableType™
Narrator™
Nokia®
O2® Xda® II
Palm OS®
Palm®
PalmOne™ Zire™ 72
Pendragon® Forms™ 4.0
Plucker™
Pocket Excel
Pocket Internet Explorer
Pocket Word
Pretec SDIO™ SmartCam™
Pulse Data®
Samsung
Sensory Software International®
Spectec SD™
Tablet™ M1400
TextHelp®
Veo CF™
Veo™ Photo Traveler 130s
VisuAide®
Visual Basic®
VoiceNote™
Voyager™
Westek®ClearVue™
Windows CE Computers
Windows Media® Player
Windows Media®
Windows® SE
Windows® XP
Windows® XP Professional
Windows® XP SP2
Windows® XP Tablet PC
ZoomText®

1 Hardware / software research summaries

These summaries provide:

- an analysis of available hardware and related software applicable to the m-learning strategies identified by the present project
- recommendations as to the most effective overall m-learning technologies for the projects trial activities.

The document outlines the following areas:

- researched hardware and software types, specifications and current cost
- table of recommended m-learning technologies and criteria for their selection
- overview of sponsorship and supported provision of equipment
- analysis of equipment use in field trials.

2 Overview of sponsorship and supported provision of equipment

The emphasis of this present project has been to research the performance and use of personal digital assistants (PDAs) as the primary technology platform for the work conducted in the project. The scope of the research originally aimed at providing an analysis of the potential suitability of available PDA hardware, operating systems and additional peripheral software to meet the needs identified by the project's eight industry and community workgroups.

To obtain the required hardware, the project team began negotiations between State New Practices in Flexible Learning project management, TAFE Tasmania and Hewlett-Packard®. This resulted in the sponsorship of six Pocket PC®s as part of a Hewlett-Packard® educational loan provision. The resultant models, consisting of a cross section of Hewlett-Packard® iPAQ Pocket PC® range (see specifications), initially provided the basis of the technology available to the project team. As this was the only equipment available to the team at that stage, it did have some early influence on the project's initial direction and eventual outcomes.

In mid September 2004, the Institute of TAFE Tasmania purchased an additional six PDAs including three Hewlett-Packard® iPAQs Pocket PC®s, three PalmOne™ Zire 72™ and two Hewlett-Packard Photosmart™ Pocket PC® secure digital (SD) cameras (see specifications). Although the decision to purchase the additional PalmOne™ Zire 72™ was primarily to demonstrate an alternative platform to the Pocket PC®, it also provided the Palm OS® operating system which was necessary to run one of the identified software programs, Pendragon® Forms™.

Individuals from the various workgroups attended scheduled introductory PDA technology workshops. These workshops introduced participants to the basic functions of PDAs, the required peripheral equipment and the potential options available for their use in the workplace or other learning environments. The workshops were designed to run for two hours and participants were encouraged to contribute thoughts and ideas. This enabled the session presenters to gauge the initial interest of the participants. The sessions ended with expressions of interest being sought from participants for the development of a range of simple concept proposals based around learning and/or assessment resources. These proposals formed an initial pool of concepts from which PDA trials were developed later in the project life cycle. It was emphasised that these concept proposals should meet the specific need areas of their organisation or community group in as simple yet effective a manner as possible.

Participants were encouraged to take ownership of their particular idea and to develop the concepts into working models in conjunction with project management who provided assistance and mentorship. Overall, this resulted in a range of trial proposals including:

- four trial projects selected from the Royal Tasmanian Botanical Gardens. It was identified that the proposed product development required html-based resources, animated files and database applications
- one trial selected from the Community and Health sector that focused on the development of a resource for nursing staff at a Hobart nursing home. This resource required Microsoft® PowerPoint® and therefore a customised PowerPoint® player for PDAs
- one trial for first year bar staff within the Food and Hospitality industry. This trial required image display software

- one trial proposed for a whaling boat construction project being run by a Cape Barron Island remote Indigenous community. This proposal required image processing hardware and software
- an additional short trial using PDAs as devices for recording workplace events. This trial involved using the image processing hardware and software for electronic student/learner assessment journals and workplace assessor evidence portfolio's.

3 Hardware and Software

Once selected, the working group proposals provided the basis for an analysis of the overall project IT requirements and concluded with the identification of a number of prerequisite hardware and software needs, these included:

Hardware:

- Hewlett-Packard® iPAQ Pocket PC® in the following model series, 1940, 2210, 4100, 5500
- PalmOne™ Zire™ 72

Peripheral Hardware:

- Hewlett-Packard® Photosmart Mobile Camera plugs into the Secure Digital (SD) slot on the iPAQ Pocket PC®

PDA based software:

- Microsoft® Pocket Internet Explorer™; standard with Microsoft® Windows® Mobile™ 2003 Premium for Pocket PC®, providing a platform for the presentation of html-based resources
- Conduits® Pocket Album™; image display software, Pocket PC® only
- Conduits® Pocket Slides™; a Microsoft® PowerPoint® viewer, Pocket PC® only
- Macromedia® Flash® player for Pocket PC®s; free player software to allow Flash® files to be played on a Pocket PC®
- Pendragon® Forms™; comprehensive database software for Palm OS® based PDA models

Desktop PC based software:

- Microsoft® FrontPage®
- Microsoft® PowerPoint®
- Macromedia® Dreamweaver®
- Macromedia® Flash®

Additional items:

- protective cases
- HP® and Palm® PVC screen protectors
- secure digital memory cards
- compact flash memory card
- Margi® Presenter-to-Go™
- Colorgraphic® Voyager Presenter™

4 Technology definitions

The following information provides additional details and definitions for some of the capabilities and functions available within PDA technology. It is provided to support the technology specifications listed in this report.

Memory

The memory can be defined as the total information storage space available for use on a PDA. Most PDAs have both standard fixed memory and expandable memory options via the various expansion slot options of the devices.

The PDAs used within the project come with variable standard memory depending on the make and model. The HP® iPAQ Pocket PC® range and the PalmOne™ Zire™ 72 have:

- **standard operating memory** of either 60MB for the lower priced HP® iPAQ Pocket PC® or 128MB for the 5500 series. The PalmOne™ Zire™ 72 operates with 32MB. Because the Palm® operating system uses less space than the equivalent Pocket PC® operating system, the Palm® user has more standard memory space available than is reflected by the specifications.
- **secure digital (SD) expansion slots** allow the use of SD memory cards and multimedia memory card (MMC) as used in some camera models. The only difference between the two memory types is that secure digital cards have a write-protect switch for added data security. Currently, the memory size for these types of cards ranges from 60MB to a maximum of 512MB. This expansion slot also allows the use of input/output devices (SDIO) such as the Hewlett-Packard® Photosmart Mobile Camera.
- **compact flash (CF) slots** allow the use of Compact Flash memory cards. Only the HP® iPAQ 2210 has this expansion capability within the models used by the project. The available CF memory sizes range from 60MB through to a massive 12GB. These memory cards are often used with high quality digital cameras because of their high-speed data transfer. CF based peripheral devices (including cameras) are also available. The ones used in this project included, Margi® Presenter-to-Go™ and Colorgraphic® Voyager Presenter™.
- **processor speed**, expressed in megahertz (MHz), is based on the amount of instructions the processor can execute per second with 1 MHz being equal to 1 million cycles per second. The higher the MHz, the faster the data processing capabilities of the PDA. Fast data processing capability is very useful if you wish to use a lot of multimedia functions such as video and animation.

Wireless operating systems, Bluetooth®, WiLAN and infrared

- **Bluetooth®** is defined as a specification for short-range radio links between mobile computers with Bluetooth®, PDAs, mobile printers, mobile phones, digital cameras, and other portable devices. Bluetooth® essentially allows wireless interaction (such as sending a file or printing a document) between devices. The effective range of Bluetooth® devices are around 10 meters (30 feet).
- **WiLAN** (wireless local area network) is a communication system that transmits and receives data based on modulated electromagnetic waves implemented as

an expansion of, or as an alternative to, a standard Local Area Network. WiLANs are useful in small, close proximity environments such as a campus, office block or anywhere a traditional network cannot be deployed for logistic reasons. The HP® iPAQ 5500 series has WiLAN as a standard component of the operating system.

- **infrared (IR)** is a standard with the devices outlined in the trial. As with Bluetooth® and WiLAN, IR also allows for the transfer of information wirelessly. The only issue with IR wireless transfer is that the devices need to be in direct line of sight with one another, less than one meter apart and with the IR ports aligned. Environmental and certain artificial light conditions can also affect IR transfer. It is suggested that the owner's manual be consulted for specific advice.

General Packet Radio Service (GPRS) is essentially radio technology for the mobile phone network. GPRS allows for remote connection to the mobile network and therefore world wide web access and data transfer.

GPRS is not a standard feature of the models used within this project, however there are compact flash GPRS adaptors available. It should also be noted that the mobile network can still be available to PDAs with Bluetooth® and/or infrared if a similarly-featured mobile phone is used. The PDA can then link with the phone and therefore access the network.

The cost involved with GPRS can vary according to the supplier. Essentially, you can stay connected to the service at no cost, but you will pay for the data you transfer and receive. At a cost of upward from $0.02 a KB, costs can add up. Additionally, some GPRS providers are offering unlimited downloads with some plans as low as $49.00 per month.

Although download speed is presently restricted to around 9 kbits/s, commercial GPRS rates of 24 kbits/s and higher are available. However, when compared with a standard 56 kbits/s modem, GPRS is slow.

5 Hardware specifications and use summaries

Model 1940

The specifications for this model are:

- 266 MHz ARM Samsung processor, 56 MB of RAM
- Supports Secure Digital (SD) and MultiMediaCard (MMC) cards and SDIO, Secure Digital Input-Output devices
- Memo Record button and an infrared port
- Bluetooth® technology to connect to other wireless Bluetooth® enabled devices such as a mobile phone

Selection criteria and use of series 1940	Average cost as at October 2004
• offering the standard features of the full range of HP® iPAQ models at a very cost effective price • slimmer in size then the 2210 and with the addition of an external memo record button not available in the 2210 • expansion slot limited to an SD or MMC card. Expansion is limited to using one plugin peripheral device at a time; for example, the memory card would have to be removed to use another plug in device and with less than 60MB of main memory, users may find the need to move files from memory card to PDA and visa versa as required.	Between $350 and $590 depending on supplier
Similar available PDA models: Fujitsu Siemens® LOOX 410 Acer™ n30	

Note: At the time of writing this report the 1940 has been discontinued in Australia and has been replaced with the HP® iPAQ Pocket PC® rz1700 series at around $400

Model 2210

The specifications for this model are:

- 400MHz Intel® XScale® technology-based processor
- 53.28mm wide x 71.04mm tall (89mm diagonal)
- 64MB (56MB user accessible)
- SD/CF expansion slots

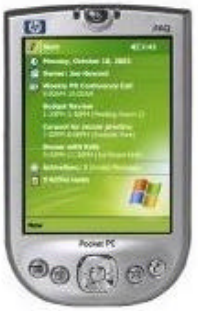
Selection criteria and use of series 2210	**Average cost as at October 2004**
• offering the standard features of the full range of HP® iPAQ models at a very cost effective price • slimmer in size then the 2210 and with the addition of an external memo record button not available in the 2210 • SD/MMC, SDIO and CF card expandability makes this model one of the most versatile and adaptive models on the market for the price • very effective model for people who wish to use their PDA for presentations such as Microsoft® PowerPoint®. Dual slots allow for presentation file storage on one memory card and a slot for the presentation hardware plugin (see *Presentation hardware* below). **Note:** All SD expandable PDAs can run peripheral presentation devices such as Margi® Presenter-to-Go™, although you are limited to one slot expansion.	Between $500 and $700 depending on supplier
Similar available PDA models: Dell Axim™ X30 624MHz, although this model does not come with CF card expansion	

Note: At the time of completing this report, the 2210 series has been discontinued and a replacement model is expected late in 2004.

Model 4100

The specifications for this model are:

- 400MHz Intel® XScale® technology-based processor
- Viewable image size of 89mm
- 64MB RAM, 32MB Flash ROM
- SD/MMC expansion slot
- WLAN 802.11b and integrated Bluetooth®



Selection criteria and use of series 4100	**Average cost as at October 2004**
• offering the standard features of the full range of HP® iPAQ • external memo button • remote printing option with Bluetooth® • expansion slot limited to an SD or MMC card. Expansion is limited to using one plugin peripheral device at a time; for example, the memory card would have to be removed to use another plugin device and with less than 60MB of main memory, users may find the need to move files from memory card to PDA and visa versa as required.	Between $650 and $750 depending on supplier
Similar available PDA models: Dell Axim™ X50 - 416MHz	

Note: A new HP® iPAQ Pocket PC® hx4700 model has recently been released with a new Intel® PXA270 624 MHz processor and dual expansion slot; cost, over $1000.

Model 5500

The specifications for this model are:

- 400MHz Intel XScale® technology-based processor
- 128MB RAM, 48MB Flash ROM
- SD/MMC expansion slot
- Viewable image size 57.6mm wide x 76.8mm tall (96mm diagonal)
- WiLAN 802.11b, integrated Bluetooth®, integrated biometric fingerprint reader

Selection criteria and use of series 5500	Average cost as at October 2004
• offering the standard features of the full range of HP® iPAQ models • increased main memory of 128MB • one of the largest screen sizes for PDAs on the market • currently the only HP® iPAQ model with WiLAN • body size is larger and heavier than most PDAs.	Between $1000 and $1250 depending on supplier

Note: At the completion of this report, the 5500 series has been removed from the Hewlett-Packard® Australia web, a new GPRS based series is expected soon; probably similar to the American released 6000 series.

See full model details at: Hewlett-Packard®
http://welcome.hp.com/country/au/en/welcome.html

Follow links from home page to 'Handheld devices'.

6 Presentation hardware

Presentation hardware allows the PDA to become a powerful presentation device for the display of Microsoft® PowerPoint® presentations, spreadsheets, and other documents through either a data projector, stand alone monitor or television.

The potential of this type of technology for learning delivery was identified in the early stages of the project. Its obvious benefits of cost-effective delivery, combined with portability of the equipment, made it a very attractive option. The combined cost of the equipment and software needed to run this system compared at around one-tenth the cost of a standard laptop and data projector.

Benefits of this system identified by the project team included:

- 'anywhere, anytime' delivery in the workplace due to the PDA being a very portable device that can be set up quickly and with little experience necessary,
- a flexible and adaptable system due to its ability to be set up through other screening equipment such as an existing television screen within the enterprise
- cost effectiveness meaning that individuals from delivery teams could have access to their own devices, therefore reducing the reliance on expensive, borrowed equipment.

Colorgraphic® Voyager VGACF™ www.colorgraphic.net/newsite/misc/home.asp

This package provides everything needed for most presentations including connector cables, remote control and Westek® ClearVue™ presentation software. Westek® ClearVue™ suite has a range of software options that can present uncompressed files. When loaded on a PDA, the files are kept as standard Microsoft® PowerPoint®, Microsoft® Excel and Microsoft® Word files. Other types of similar software tend to compress files for play on a PDA. Voyager™ also supports a number of other pocket software presentation programs including Conduits® Pocket Slides™ (featured below).

The VGA/TV cable carries connections for an external screen and video out, which allows it to be used through a monitor, data projector and a TV.

Voyager works as a compact flash card (CF) device, plugging into the CF slot on the PDA. As Colorgraphic® currently do not have plans to produce a secure digital (SD) device, use of Voyager is currently limited to PDAs with CF slots.

Voyager is also packaged with 'mirroring' software that will display the PDA screen. This can be very useful to view files that are not displayed using other presentation software or where the use of the PDA is being demonstrated for training purposes. Presently Margi® does not have this feature.

Voyager also allows the user to change the screen area, resolution and frequency.

Voyager currently retails for around $500.

Margi®, Presenter-to-Go™ www.margi.com

The Margi® package comes with everything needed for presenting shows via a PDA including adaptor cabling and software. Because the adaptor cable is limited to a plugin for an external monitor (such as a data projector or screen), Margi® cannot be used on a television.

The software that comes standard with Margi® is Presenter-to-Go™ which compresses presentations from Microsoft® PowerPoint® or other printable PC or Mac® applications into a format that can be transferred to the handheld.

Some PowerPoint® features such as hyperlinking and action settings are not currently enabled due to the compression process, although the compatible Conduits® Pocket Slides™ 2.0 (featured below) will provide those features.

The Margi® package is compatible with a wide range of handheld PCs including Palm OS®.

Margi® retails for around $480.

7 Software

Shipping software

Currently, the standard operating system for HP® iPAQ™ models is Microsoft® Windows® for Pocket PC 2003 Premium, which includes Pocket Word®, Pocket Excel™, Internet Explorer™, Windows Media Player, Microsoft® Pocket Reader™, two image viewers and various organiser presentations.

Earlier this year, Microsoft® launched a new version of its mobile operating system known as Windows Mobile 2003, Second Edition. It provides some small updates on the existing Microsoft® Windows® for Pocket PC 2003 Premium such as the option of landscape view, which is very useful for viewing web pages, documents and images. Microsoft® have also included an integrated, one-column option that allows you to view pages with only one scroll bar (up and down) rather than two (up and down, side to side). More information is available at: www.zdnet.co.uk > Reviews and Prices > Windows Mobile 2003 Second Edition.

Unfortunately Hewlett-Packard® has chosen not to provide an upgrade to the Second Edition, although it will be shipping out all new iPAQ™'s with Windows SE™.

PalmOne™ Zire™ 72 comes complete with Palm OS® 5.2.8, Palm™ Desktop for Windows® and Macintosh™ and Conduits® for synchronisation with Microsoft® Outlook™ (Windows® only).

Additional software

Other useful PDA software programs used in the project include Conduits® Pocket Slides™, Pocket Album™ and Pendragon Forms™ database software.

- **Pocket Slides™** provides a platform to show, create and edit PowerPoint® presentations from your PDA. The format is easy to use and the presentation is compatible with the Margi® and Voyager™ presentation hardware for display through a data projector or television.

  Pocket Slides™ version 2.0 has just been released and includes:

  – Microsoft® PowerPoint® conversion from desktop PC to PDA and visa versa

  – slide hyperlinks and full action settings

  – full animations, sound playback and most other standard Microsoft® PowerPoint® features, see link above.

  The project team has researched and trialed a number of other currently available Microsoft® PowerPoint® players. In our opinion, Pocket Slides™ is currently the best option.

  Microsoft® PowerPoint® presentations can be designed as self-paced resources to be used by students through the PDA with links to the web (see Project report, part 1, Attachments, Creating digital PDA resources using Microsoft® PowerPoint®).

- **PocketAlbum™** allows the user to create an album or show of still images that can have text and/or voice-over added. The software is very simple to use and has provided the project with a number of options for use including:

  – photographic student diary with voice-over (particularly useful if a camera attachment is used)

  – daily log or journal, Cape Barron boat building project journal

- virtual tour-guide to provide a photographic journey with voice-over through a particular site, feature or area
- virtual teacher/presenter providing step-by-step instruction on how to undertake a specific task
- identification resources including plant identification, tools and equipment, recipe ingredients and others.

Both of the above software can be viewed at: www.conduits.com/home.asp, follow link to 'Products'.

- **Pendragon Forms™** easily creates databases for use on a Palm OS® based PDAs. Options include bi-directional synchronisation enabling both PDA and desktop PC actions, data collection on the PDA device, image additions using the built in camera on the PalmOne™ Zire™ 72, bar-coding and global positioning system (GPS) incorporation.

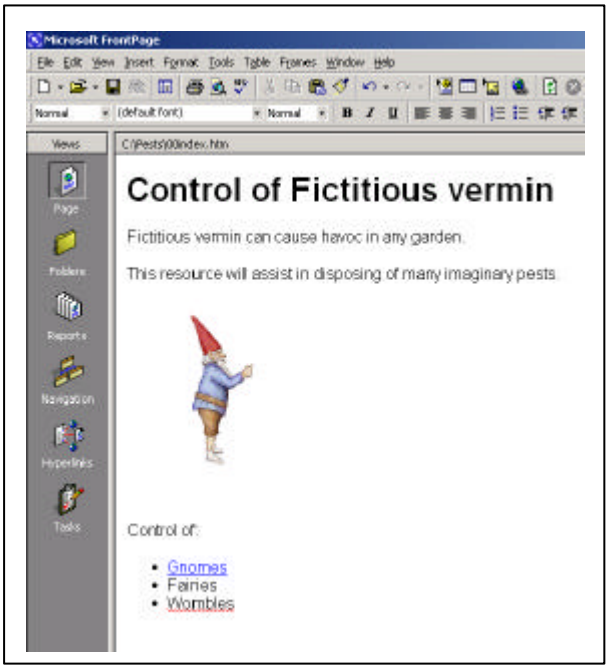
  Pendragon Forms was selected primarily for the Royal Tasmanian Botanical Gardens *Catalogue of Tree Disorders* database, which required field entry of images, locations and possible future classifications including bar coding.

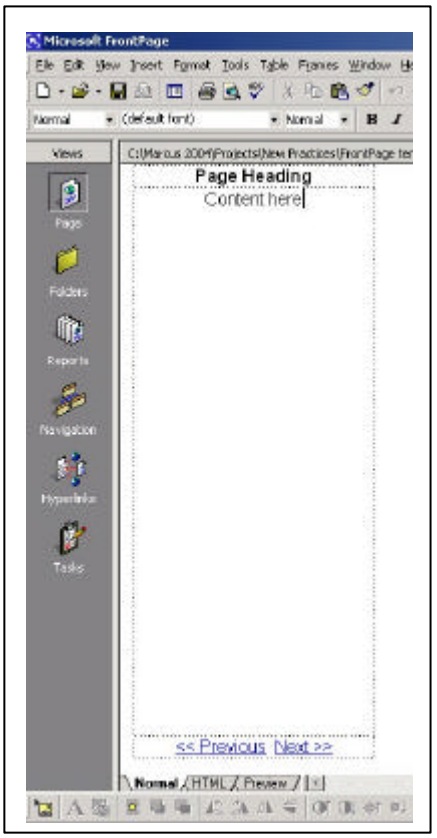
- **Internet Explorer™**. This standard web browsing software provides the PDA with an interface to the Internet. It also provides a platform for the use of html-based resources. The project has developed a number of these types of resources and has also adapted individual learning objects from existing Framework Toolboxes — these encompassing interactive exercises and formative assessments.

- **Windows® Media Player** provides the user with the opportunity to view short video presentations through the PDA. This software enables a trainer to include video files into the learning activities, thereby adding to the interaction and attractiveness of the learning. Video files can be easily adapted and saved as Windows Media Files using available video-editing software.

- **Macromedia® Flash® Player for Pocket PC®** was required to run the Flash® animations used within the adapted Toolbox resources and within *Pete's Vegie Patch*. It is available as a free download from the Macromedia® link: http://www.macromedia.com then follow the links 'Downloads' > 'Macromedia Flash Players' > 'Flash Player 6 for Pocket PC 2003'.

- **Microsoft® FrontPage®.** A PDA, Microsoft® FrontPage® four-hour workshop has been developed by Institute of TAFE Tasmania and industry staff that introduces participants to the basics of Microsoft® FrontPage® for the creation of html-based PDA learning resources.





Examples of Microsoft® FrontPage® course resource and templates

8 Digital camera

A need to include images and video files within the trial resources was identified early within the research and consultation phase. The primary issue focused on the process and the equipment required.

Some PDAs, such as the XDA 02 and some Palm® models, have fixed inbuilt cameras with resolutions to 1.3 mega pixels — which is a relatively low resolution in comparison to existing stand-alone digital cameras. However, these resolutions are often more than satisfactory for images that will be used on PDAs.

The Hewlett-Packard®iPAQ™ models that have been selected for the trials do not have inbuilt cameras and therefore peripheral plugin types were required. Alternatively, a conventional digital camera could be used. Using a conventional digital camera would involve downloading the images to a desktop PC and then active syncing them to the PDA.

Digital camera options

Plugin PDA cameras are available in two main categories; compact flash (CF) and secure digital (SD). A range of models within each category have been investigated including the following:

- **compact flash (CF)** card plugins are only suited to devices which have CF expansion slots which, in the Hewlett-Packard® Pocket PC® family, only includes the 2210 series.
  - LifeView® FlyCAM-CF™ 1.3 megapixel with in-built
  - Veo CF™ camera for Pocket PC®
- **secure digital (SD)** card option. These are available to all devices with an SD expansion capability. Most of the Hewlett-Packard® Pocket PC® series and Palm® have this option as standard.
  - Spectec SD™ camera for PPC + Palm®
  - Pretec SDIO™ Smartcam™ card

Note: Specifications for the above listed cameras can be viewed at: http://www.expansys.com.au.

Short-listed camera options

The two following SD slot cameras were short-listed as best options for the trials due to their greater flexibility of use across the range of Pocket PC® models that were available to us and due to their cost effectiveness.

- HP® Photosmart Moblie Camera
- Veo™ Photo Traveler 130s

Both of these models have similar specifications including:

- 1.3 megapixels
- still and video image options

- flexible swivel lens capabilities

Final selection

The final model selected was the Hewlett-Packard® Photosmart Mobile Camera. It was chosen as potentially the most compatible model with the HP® Pocket PC®s.

Selection criteria and use of Hewlett-Packard® Photosmart™ moblie camera	Average cost as at October 2004
• ease of use, light and portable • cost effective • still image and video options • sound record in video mode	Between $140 and $160 depending on supplier

The camera has been used in trials where images were used to document an action or process such as with the assessor's and learner's journal, where images of assessment or work tasks are taken. These images were added to a specific file using Conduits® Pocket Album™. Text or voice files were also added.

Camera useability

The camera has proven to be very straightforward to use with only a limited amount of tuition required before users felt confident. Its 1.3 megapixel resolution provided images that were of satisfactory quality for the required project purpose.

Once the camera is inserted into the SD slot of the PDA, its functions can be controlled through the PDA screen, with a range of settings available for easy modification to location. The main limitation with the camera is its lack of a built-in flash. Consequently, it requires reasonably light environments to produce a useable image, although in most cases, this was not an issue within this project.

Images can be blurred if the camera is not held still at time of shutter release. However, this can be overcome to some degree by insuring that the button is depressed using the stylus rather than a finger.

Image files are saved as standard .jpg files and can be easily transferred to other file locations, including memory cards. Basic cropping and image contrasting can be undertaken on the Pocket PC® using the standard picture viewing software in Microsoft® Windows® for Pocket PC® 2003 Premium. If more advanced image manipulation is required on the PDA, specialist software such as Conduits® Pocket Artist™ would be required.

The camera also has a video feature with sound capture. Unfortunately, sound capture is limited by the built-in microphone on the PDA, which tends to pick up only the sound

closest to it. If the user only intends to provide commentary to the video as they take it, this will not be a problem.

9 Other peripherals used

Protective cases

The PDA models currently available to the project come with standard, soft carry cases. Although these cases provide some protection when carrying and transporting the PDAs, they offer very limited protection from impact and exposure to adverse outdoor conditions.

During the project trials there was a need to use the PDAs in outdoor environments and in a range of conditions where stronger protective cases were needed. A rugged, shock-resistant outdoor case was purchased for trials at the Royal Tasmanian Botanical Gardens.

Protective Screens

The standard PVC and silicone screen protectors available for PDAs are necessary to prevent scratching and other minor damage to the screen.

There are a number of types available in disposable and reusable washable types. An example of the reusable types that have been assessed by the project can be seen at: http://shop.brando.com.hk, then follow the links to 'Brando Workshop Screen Protector'.

Protective PDA covers

During the trials at the Royal Tasmanian Botanical Gardens, one outdoor protective cover was used with favourable feedback from the trial users. It was chosen due its ruggerised structure and its water and impact resistance. For further detail regarding specifications of the protective cover used, see http://www.hp.com, then search for 'Rugged Case'.

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