Bridging the digital divide
with an off-line e-learning and
e-assessment platform

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TransformingExams.com
Acknowledgement Office of Learning and Teaching
Global Digital Divide

Quick stats
Global Digital Divide

Households with Internet at home

Developed Nations: 81%
Developing Nations: 38%

International Telecommunications Union
Global Digital Divide

Households with Internet at home catching up but still a way to go.

International Telecommunications Union
Global Digital Divide

2015
Internet users per 100 people

- 1.1 : 18
- 18 : 40.7
- 40.7 : 58.2
- 58.2 : 77
- 77 : 98.3

Source: World Development Indicators
33% of the poorest 20% of households are offline. Only 2% of the richest 20% are offline.
21% of outer regional and remote households are offline. 12% of major city households are offline.
Australia wide 14% of households don’t have Internet access at home.
Ideas

BRIDGE THE GAP

Leveraging Open Tools
## Current Solutions – offline or online?

There are trade-offs for any distance e-learning solution.

<table>
<thead>
<tr>
<th>Online (net)</th>
<th>Offline</th>
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</table>
| • Long way to travel.  
• Efficient system management.  
• Equipment: need to supply equipment or facilities for BYOD  
• **Help at hand** and spaces can be supervised, live request.  
• Needs reliable network at site. | • No longer applicable. (CD ROM) |

<table>
<thead>
<tr>
<th>On Campus / learning hub</th>
<th>Distance learning at home</th>
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</table>
| • No travel.  
• Efficient system management.  
• Students supply equipment.  
• **Help via live chat**.  
• Large media files problematic.  
• Network **connectivity can be lacking and costly** at home. | • No travel.  
• **Less efficient system management** – requires Post.  
• Students supply equipment.  
• **Help via phone or delayed**.  
• Large media files not an issue.  
• Network **reliability not an issue** reduced data usage charges. |

Hybrid system?
Hybrid solution - leveraging existing work

Transforming Exams Across Australia
Australian Government Office for Learning and Teaching
National Grant ID15-4747: AU$500K over 3 Years + 100K Monash

>> Authentic assessment in exams using secured BYOD <<

<table>
<thead>
<tr>
<th>Name</th>
<th>University/Position</th>
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<tbody>
<tr>
<td>Dr Mathew Hillier</td>
<td>Monash University, Leader OLT national project, Seed leader</td>
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<td>Dr Andrew Fluck</td>
<td>University of Tasmania, Originator of USB e-exam concept, Seed partner</td>
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<td>Dr Michael Cowling, Mr Kenneth Howah</td>
<td>Central Queensland University, Seed trial site</td>
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<td>Dr Kim Blackmore</td>
<td>Australian National University</td>
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<td>Assoc. Prof. Paul Newhouse</td>
<td>Edith Cowan University</td>
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<td>Dr Matthew Bower, Prof. Dominic Verity</td>
<td>Macquarie University</td>
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<td>Prof. Marilyn Baird (H), Mr Scott Grant (A)</td>
<td>Monash University</td>
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<td>Assoc. Prof. Shona Leitch</td>
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<td>Dr Ruth Geer, Mr Bruce White</td>
<td>University of South Australia</td>
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<tr>
<td>Mr Dominic McGrath</td>
<td>University of Queensland</td>
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Based on open components

<table>
<thead>
<tr>
<th>Component</th>
<th>Status</th>
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<tbody>
<tr>
<td>Ubuntu</td>
<td>Mature open source</td>
</tr>
<tr>
<td>Moodle</td>
<td>Mature open source</td>
</tr>
<tr>
<td>AMP stack</td>
<td>Mature open source</td>
</tr>
<tr>
<td>USB sync scripts</td>
<td>Custom - TBA</td>
</tr>
<tr>
<td>USB system configuration scripts</td>
<td>Custom - Bash</td>
</tr>
<tr>
<td>USB admin scripts</td>
<td>Custom - Bash</td>
</tr>
<tr>
<td>USB sticks</td>
<td>Commodity h’ware</td>
</tr>
<tr>
<td>USB Hubs</td>
<td>Commodity h’ware</td>
</tr>
<tr>
<td>Home base server</td>
<td>Custom - TBA</td>
</tr>
</tbody>
</table>
USB Preloaded with interactive tools

Simulations, tools, virtual experiments, serious games...
Business, history, language/communication, science labs...

'Windows' software via WINE. E.g. CAD / 3D modeling, Celestia.

Moodle LMS with media.
Preloading with interactive tools

Linked documents – Assignment document with links to launch local apps and resources: graphics, Scratch programming tools, presentation slides, PDFs. All on-board the USB stick.

*No downloads!*

Scratch SDK
Moodle and OpenSim Working Together

Undertaking an assessment activity in the VW initiates data transfers to the LMS.

Set up Quiz in the LMS. Results are stored in the in grade book.

A set of scripts for Moodle and VW that acts as a bridge.

Student undertakes assessment in the virtual world.

Data flows as if the student was doing the activity in the LMS.

Videos: Transforming Assessment Youtube Channel
System use workflow – remote student

**Institution:** prepare learning materials

1. Teacher creates course, media, Moodle content, etc

2. Create master USB (load course, configure and test)

3. USBs duplicated

4. USBs sent to students

**Ubuntu**
Live USB. Libre Office, Moodle etc

5. Computer started from USB.

6. study:
   a. Boot laptop.
   b. Do lessons.
   c. Sync/submit.
   d. Shutdown.
   e. Repeat.

7A Return USB by post

OR

7B Use Internet sync

7A.2. Work retrieved from USBs.

8. Files synced to server

9. Collated work sent to teacher.

10A. Post Feedback to student

10B. e-Feedback via sync

USBs can be recycled next semester.
Teacher prepares a semester of materials. 
USB per student created.
USB sent to student.

Sync USBs when online:
Update content/submit responses or Export.
Home base server at institution.

Student uses a laptop booted from USB to undertake their work offline.
They use learning resources, do LMS activities, use software tools and type/create responses that are saved to the USB stick.
When a network is available the sync offers to update content and responses can be submitted.
Manual also possible by export or by returning the USB.

Base system disk image file.
Burn to create MOLEAP USB stick.

System components

Bootable MOLEAP USB
System: OS, AMP stack, Office Suite, graphics, media tools, Moodle, sync.
Materials: LMS materials, multimedia, PDFs, small apps.

Student's Computer
Computer: HDD, network interfaces (IP, Bluetooth, infrared etc) can be restricted or open as needed (controlled by USB)
Interface components: Keyboard, screen, pointing device, mic and speakers.

Database / backup.
Student responses
Marking (auto or manual) by teacher.
Admin tools
Prototype using commodity components.

Using an old laptop it can handle 98 USBs at once.

Helper scripts to

• Initial ‘burn’ OS to each USB
• Place lesson materials.
• Retrieve lesson responses.
• Set-up for the next lesson.

User friendly interface planned.
System Walk Through (v6)

Refer to ‘quick start guide’.
Walk Through: Starting from USB

1. Start with the computer turned **OFF**. Then insert USB stick.

2. Hold down **ALT** then power on.

- **Apple**
  - Hold down
  - Press and release power
  - Keep holding ALT until you see...

- **Other/Windows***
  - Power on while tapping ‘boot key’ (e.g. F12 or... )
  - Tap tap tap...
  - Press and release power
  - Keep tapping until you see...(or similar)

* Note Win 8/10: may need to use **SHIFT>Restart** to access a USB boot option.
Walk Through: Starting from USB

Apple

3. Select a yellow icon. EFI boot or ‘Windows’

Could be either one! So just try.

If you get Boot error

Try the other one!

Other/Windows*

3. Select USB device.

It might be labeled something else and probably won’t be first.

Win 8/10 users will need to select ‘use a device’, then choose the USB.
Walk Through: System start

4A. Some system messages may appear, if so just wait.

```
ata_id[292]: NDIO_GET_IDENTITY failed for '/dev/sdb': Invalid argument
```

4B. System starts.

5. Arrive at system desktop.
6. Student now types in their student ID number and name* (can be disabled). Click Start. (what happens next dependent upon chosen mode)
7. Exam file opens ready to enter details and responses.  

Note: original file copied and student number prefixed to file name.
Walk Through: Document mode

8. Read questions and type responses into areas indicated.
8.1 in ‘post-paper’ assessment: Make resources available (PDFs, Videos, images) and use specialist software tools to construct responses. Launched via links in the

[there is a 2 min ‘auto recovery’ save]
on-board LMS Mode

Start laptop with USB. Launches a web browser to login to an on-board Moodle. Moodle account created-on-the-fly. Network connections NOT needed.
Non-quiz related modules and menus have been removed. Large multimedia is possible due on-board storage.
10. Shut down the system.
Cite this resource

http://ta.vu/offline-elearning

More information OLT e-Exams project
http://transformingexams.com

Demo videos and downloads