



Digital Creativity Bus

'on the road to digital creativity'



INTRODUCTION

A London Routemaster bus has been purchased for use by both Stepping Stones and the National Hemiplegia Organisation. The intention is to refurbish the bus so that it will be used by children and provide them with opportunities to be creative with a range of tools, from digital video and animation to powerful computer modeling applications. This will require the bus to be fitted with 'state-of-the-art' technology. The bus' interior will also need to be designed with children of all abilities in mind. This paper places some detail on the design of bus, what the technology demands will be, how the bus will be used including some suggested activities, and how the bus will be deployed in a variety of ways.

THE DESIGN

First and fore-most, the bus will need to accommodate children of all abilities if we are offering equal opportunities to all pupils wherever the bus visits. This includes providing appropriate access points to wheelchair users, though this probably precludes them from using the upper deck almost immediately. For this reason, we should be aware not to place some equipment exclusively in the upper deck. A wheelchair access point is essential (see below for more)

Inside, the bus will need to accommodate children sitting at portable computers, who might be working both collaboratively and individually. The seating arrangement is quite complex, but essentially must maximise the available space.

Half moon tables slightly staggered down each side of the bus will facilitate collaborative working, allowing maximum of four children working together. Table size should allow for two laptops to be situated comfortably with space for additional keyboard and mouse operation too. Ideally, the table should be collapsed to the sides of the bus, using some hinge mechanism between the bus wall and far edge of table, when not required or some other working arrangement is desirable. See pages 8 & 9 or diagram.

Adjustable, swivel stools that aren't fixed might offer the most flexible option with regard to seating. Thought must be given to how these are fixed / stored during transportation. Could these be somehow fixed to the floor using some quick release mechanism?

accessibility

A wheelchair access point will be located in the middle of the bus, as illustrated in the diagram on pages 8 & 9. The ramp needs to be quick and easily to setup. Sufficient space for wheelchair turning once on board the bus is an absolute must.

branding

The bus will be displaying logos of partner organisations. Those who have and continue to support the digital creativity project. There is no doubt the bus will have huge visibility and gain media interest, so branding and appropriate signage is important.

TECHNOLOGY

The bus will be fitted with state-of-the-art computer technology. It needs to be exciting, engaging and flexible to suit a range of different working arrangements. The technology needs to take into account the children who will use them and therefore must be suitable for children between 5-16 and with a range of physical needs.

For this reason, portable laptop computers would be most suitable for their size, weight and portability. They allow the bus to be used in a wide variety of different modes.

Apple iBook computers will be the computer of choice. They offer the best in terms of performance, robustness / reliability, longevity, and crucially, low maintenance operation. Not only that, but Apple's own software, its iLife suite is geared towards children becoming creative individuals and the software packages (iPhoto, iMovie, iTunes, iDVD), integrate well together.

For accessibility reasons, each iBook should have an optional wireless, optical mouse. Every computer should have a wireless keyboard.

There will be 6 digital video cameras, offering both DV in and out. 3 digital still cameras, a scanner or two. A MIDI keyboard with USB interface for iBook computer.

An LCD projector and screen is an essential addition. Careful thought would need to be given to finding a suitable projection point. Children can easily swivel to face the screen, but we'd need to consider how bright light shining from outside on the screen, could be avoided.

When the bus is stationary, and the projector is not being used for demonstration inside, the thought is that the projector could swivel to rear-project onto a window for exhibition to those outside the bus.

software

iMovie, iPhoto, iTunes, iDVD, GarageBand, SketchUp, iWork (Pages & Keynote), iStopMotion, Photoshop, Macromedia Flash, Macromedia Dreamweaver, Live Channel, Comic Life

SECURITY

Given the amount of equipment on board, security is paramount. Where possible, fixed devices should be well secured to the body of the bus. A securing bar and padlock would be an appropriate mechanism which would allow the device to be serviced if the need arises.

External doors and windows should also be secure, choosing locks appropriately. An alarm could be considered as a suitable deterrent. A possibility might be to install webcams on the upper and lower decks to monitor and record motion.

SERVICES

electrical power

We'll need to think carefully about how the bus is powered. A generator would be most effective if we are building a bus which isn't reliant on being 'plugged in'. It would be interesting to consider whether the generator would need to be run constantly if there were ample battery supply that could be charged whilst the bus is in motion. The output from the generator / batteries would need to be protected against lightning strikes, current surges or spikes and smoothed appropriately. The location of the generator would need careful thought. All general purpose generators are noisy, even with considerable quantities of sound proofing, and therefore this couldn't intrude on the activities taking place on board. A marine generator offers quiet operation with minimal vibration.

www.mastervolt.com/whispergenset/index.asp

In locations where power is already provided / accessible, it would be useful to be able to 'plug-in' using one or two 13Amp plugs with RCD circuit breakers fitted at the plug end. This cable could be a trip hazard. Some kind of cable sheath needs to be sourced.



The power requirements are likely to be.....

10 iBook computers, rated @ 65W	650W per unit
1 scanner	60W
1 printer	50W
6 digital video camera chargers @10W	60W
1 MIDI keyboard	50W
networking equipment	100W max
sound equipment	100W max
1 LCD projector	200W
Lighting 30 x 10W downlights	300W
TOTAL	1570W = 1.5kW

We should accommodate additional capacity upto about 1kW. Therefore, I believe a 2.5kW / 3kW generator is sufficient.

Plug sockets need to be in abundance and accessible to both adults and children. At least four switched sockets surface mounted to the rear section of the half moon tables would suffice.

lighting

Downlighting upstairs and downstairs. These could be achieved with low voltage surface mounted halogen down-lighters.

An exterior light near the door / ramp mechanism is essential.

heating and cooling

Could be achieved using two methods...

1. Use the generator to supply approx 3kW to three electric heaters.
2. using a marine diesel heating system which circulates hot water through the bus's existing heating pipe network. Means smaller generator.



<http://www.eberspacher.com/airheating.php?section=airheating>

Our preference would be to use the marine diesel heating system for its efficiency, size and making use of the existing water pipe heating system.

Existing bus windows would continue to open for ventilation and cooling. Thought needs to be given to adequate cooling strategies in the the height of summer. Air conditioning unit?

internet

This would need to be an entirely independent connection to the Internet. The current technology in place to deliver high bandwidth, mobile connections is 3G. An antenna would be mounted on the bus, feeding into a 3G router and then into a wireless hub / switch device. The wireless range should extend 50 metres or more outside the perimeter of the bus so that children could be engaged in field studies close by, yet still be within range of the server and Internet.

EXTERNAL SPACE

Additional outside workspaces / Routemaster foyer / lunch space

Inflatable buildings



<http://www.theartofair.com/item118.htm>

http://www.shape.com.cn/html_en/inflatable_building.htm

WHO MIGHT BENEFIT?

initially:

- Primary and Secondary schools, including Special schools

...but could also include:

- Youth Centres, Scouts, Guides,
- Young offenders institutions
- Hospitals

ACTIVITIES

This is a bus which will accommodate a whole of different activities involving technology. From running drama workshops to science field studies, this bus must have equipment and software to cover the broad curriculum.

Here are a selection of suggested activities prospective children might be involved in...

'inside the cab'

This could be an introductory or closing activity where children are given the opportunity to talk about their experience of climbing aboard the bus for the first time. Or they might be explaining something they have achieved and feel proud of from their work on the bus.

'the driving seat'

The cab becomes a diary room allowing participants to record moments of their work at anytime. Simple start / stop button video recording equipment as prototyped by Ultralab's Every Object Tells A Story cab.

'digital creativity'

Children are set a challenge for producing a narrative based on a given theme. Some examples include...

- the romance between two shoes,
- IF THEN,
- Points of View²,
- Transformation,
- 5 minutes of television,
- 'A day in the life of a minibeast'
- animation
- design a house, set some criteria

All children will be given a printed certificate (in the style and shape of a bus ticket) in recognition of their participation / achievements on board the digital creativity bus. This acts a little like a 'bus pass'. The unique number printed on each certificate becomes their login ID for the online community that they belong to, see below.

WEBSITE & ONLINE COMMUNITY

A website will be a crucial mechanism for publishing the work of children. The website needs to detail the opportunities the bus provides for young people, and how organisations can book the bus for themselves.

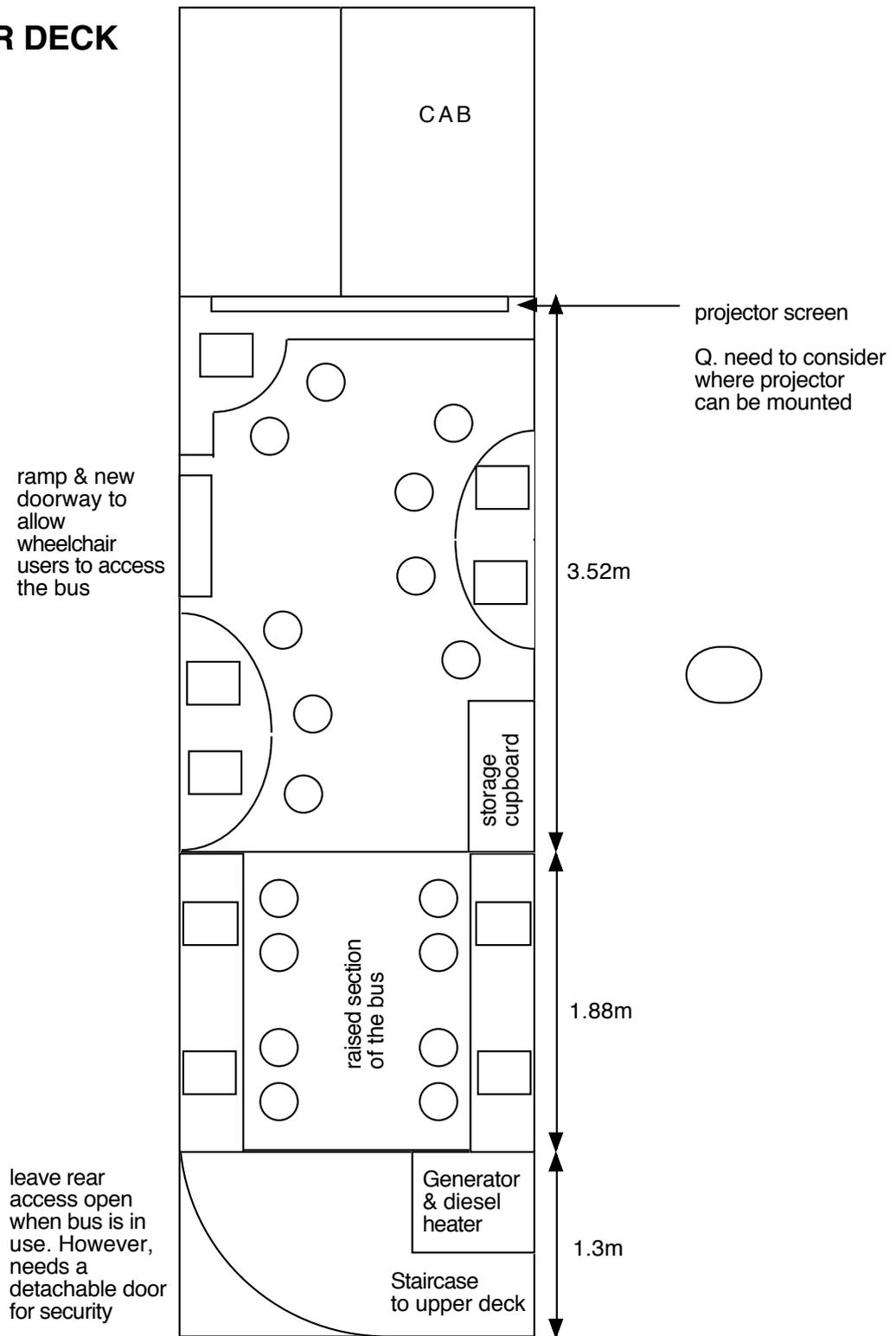
A section of the website will be devoted to an online calendar / diary / map shows where the bus has been, and people able to see what events have taken place.

One further thought is to establish an online community of children who have used the bus, where they can talk online to other past bus users / share their work.

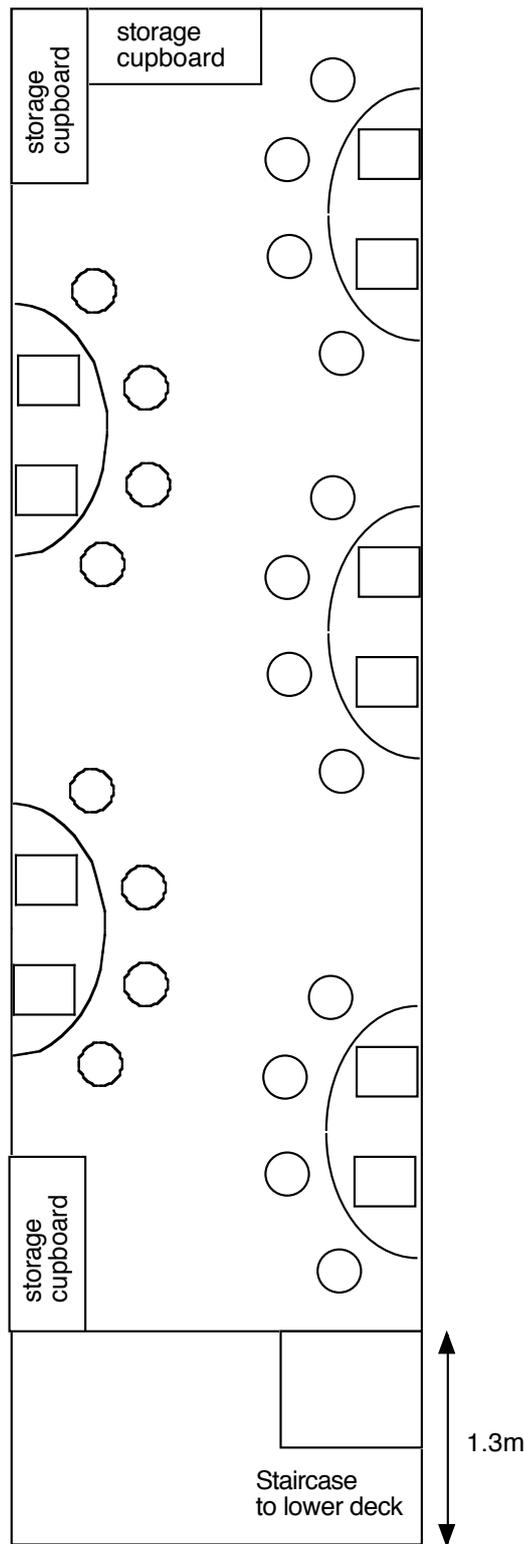
CELEBRATION

At the end of each year a celebration of children's work takes place at a prestigious venue such as the Victoria & Albert Museum and invites children and their families to come along and be part of the occasion. Other dignitaries and people involved in the media industry would also be invited to speak at the event. This would raise pupils self-esteem to have their work shown and defended, by themselves, if they wish, in front of a large audience. During this event, the bus would be parked outside the venue to promote the occasion and the children's work, to the public.

LOWER DECK



TOP DECK



Key

- swivel stools
- iBook computers

Diagram is drawn to scale