

Complementary Pedagogical Strategies for Online Design

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Abstract

The First Fleet Convict Database has had a 20 year journey as an exemplar of educational software, published first on mainframe, then microcomputer, and now the web. We describe how the nature of the web environment has changed the nature of this educational package. Pedagogically, databases of primary source data provide students with a learning experience based on the inquiry learning model however, observations of students and teachers in the past 20 years have indicated that database searching is shallow and investigation perfunctory. Before, we could have blamed unwieldy search engines. Now that this obstacle appears to have been removed, we are evaluating whether we have achieved our educational goal of improving students' research skills. Other pedagogical strategies have been added to that of the database strategy, for example a discussion forum to enable learners to publish and debate their opinions on history. However our statistics show that the forum is the least used part of the site. Although this in part can be solved via classroom teaching, we have added another pedagogical strategy to complement the others. Online role play engages students in developing an understanding of the lives of others

and hopefully encourages discussion about the content of the supporting database.

Keywords

Role play, Database, History, Instructional design, Enquiry learning, Online collaborative learning

Designing for Online

Changing nature of the medium

The database of 778 convicts who arrived on the First Fleet to Australia in 1788 has been an *electronic* educational resource since 1980. It was developed for the Tasmanian Education Department's statewide timeshare network by the first-named author of this paper. The data was based on the works of Cobley (1970) and Robson (1973).

In 1982 it was distributed free to all Australian schools on a 5 inch floppy disk for Apple][computers. Sponsored by Apple and the Department of Industry as part of National Information Technology Week, it was the first educational software containing all-Australian content. It was also the first time many schools had seen a floppy disk as Apples at the beginning came with cassette drives. Because of memory constraints, the data was heavily coded.

It was re-versioned on a number of occasions for different brands of computers and operating systems, but the data did not change. In fact along the way, various versions produced by enthusiasts, without asking or acknowledging the original creator, introduced corrupted data without realising it.

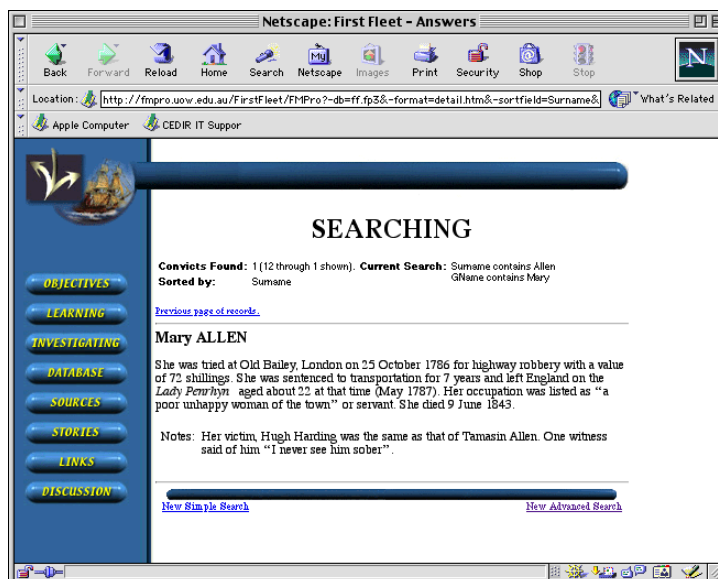
Now very few educational institutions have retained the computers that can run the First Fleet Database and the content was being lost to the next generation of students. The digitising of historical content has not proved to be as "permanent" as first promised, because of changing operating systems and changing storage devices (current computers are often not even equipped with a floppy drive). So the content has been re-purposed for the Internet and is available via a site at the University of Wollongong (<http://FirstFleet.uow.edu.au>).

Changing nature of the data

The rich and interesting set of data has been expanded and updated in free text format, using Gillen's book (1989) which provides information about what happened to the convicts once they arrived in Australia. The data now looks very different from its first appearance as heavily coded and abbreviated text with limited and unwieldy search capabilities. The first version of the software provided results in this format:

G/NAME: MARY SURNAME: ALLEN
 ALIAS: NONE
 SEX: F SHIP: L AGE: 22
 PLACE: OLD BAILEY DATE: 25-OCT-86
 CRIME: HIGHWAY ROBBERY VALUE: 72
 SENTENCE: T TERM: 7
 TRADE: SERVICE, PROSTITUTE

The abbreviations used in the first version have now been converted to plain English and the automatic output is in sentence format. The new online version outputs results in friendly sentence format (see Mary Allen below). The partners in crime are hyperlinked and the records of over 150 of the convicts indicate that their partner in the original crime was transported on the First Fleet and that about 170 married and/or had children with each other. The relationships between the convicts on the First Fleet make an interesting and revealing research topic.



Changing nature of the search engine

Previous versions were command driven rather than menu driven. An understanding of Boolean logic was required in order to construct search requests such as:

SEX=F AND (CRIME :CONTAINS THEFT OR CRIME :CONTAINS ROBBERY)

To achieve a sentence structure, users needed to design an output before they could type in the search request, for example:

```
>SURNAME <CR>                prints value of field SURNAME
>"WAS TRANSPORTED FOR" <CR>    prints text within " "
>TERM <CR>                     prints value of field "TERM"
>"YEARS" <CR>                 prints text within " "
>LINE <CR>                     moves output to next line
>"AND ARRIVED ON THE SHIP" <CR> prints text within " "
>SHIP <CR>                    prints value of field SHIP
>LINE <CR>                    leaves a line between records
><CR>                         end of output format
```

This complex request returned the following sentence for Mary Allen:

```
ALLEN WAS TRANSPORTED FOR 7 YEARS
AND ARRIVED ON THE SHIP L
```

Constructing such sentences was a time consuming and unsatisfactory exercise given the abbreviated data. Users of the new *First Fleet OnLine* however can get results quickly without grappling with the complexities of logic. There is a choice of Simple Search or Advanced Search (see figure below) so with this version the entry level has been lowered. Of course professional researchers cannot and should not avoid Boolean logic: they are invited to download the data onto their own machines for more sophisticated processing and report generation with their own data analysis package.

The website is a valuable resource for family researchers and historians, providing ways of analysing data that were not possible until now. For example we can see how many died in 1788, and understand how Phillip's rapid journey to Australia resulted in a good survival rate. We can gain an idea of how many were able to leave Sydney once their time was served. We can calculate the number of women who gave birth while on the journey out.

First Fleet OnLine is a File Maker Pro database delivered via the web. Web browsers automatically provide powerful search engines that are both comprehensive and quick. Many of the requests can be handled via pull down options. The speed of receiving search results over the Internet is actually faster than any previous version of the First Fleet on a stand-alone microcomputer.

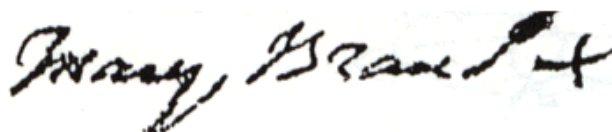
Changing nature of the accompanying resources

The first version in 1980 contained only the database and teaching notes which were aimed at assisting computing teachers to help students understand databases and computer searching, since without these skills the students could not get to the historical content. Subsequent versions recognised its use in teaching history, in addition to teaching computing, and the accompanying resources were of historical nature rather than technical: wall charts, maps, overhead masters, worksheets, activities etc (Wills et al, 1985).

The nature of multimedia and the web means that the site can now package both the database and accompanying resources together. The site links to other related Internet sites on history, Aborigines, and immigration, thus providing multiple points of view on the issues raised by white settlement of Australia. Links include the Tasmanian Library Heritage Collection Image Database, the Irish Transportation Records, and the Australian Literature Database at University of Sydney. An interactive map of the route of the First Fleet provides links to the web sites of the modern day cities on the route, for example Rio de Janeiro. Some examples of journals and letters from the time are also online at the site plus a scan of an original handwritten record so that students can see the difficulty that historians experience in transcribing incomplete and indecipherable historical records.

Often included with the convict records are their signatures (from Gillen) and this feature has proven to be a real winner with users, particularly those who are can trace a First Fleeter as an ancestor.

The cross beside the signature tells a story in itself. It indicates that the signatory was illiterate, and that the name was written by another. The practice of signing with a cross was widespread 400 years ago and common 200 years ago, but virtually unheard of in the western world today. Some crosses show far more fluency and confidence with the pen than other convicts, who quite clearly have no idea where to place their mark relative to their name. Interestingly, today we use something similar when we accept and recognise *digital* signatures.



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In addition, the accompanying materials include guidance on the nature of enquiry, framing questions, and sorting out evidence to support hypotheses: metacognitive activities that act as warm-ups for the mental gymnastics involved in making serious use of *First Fleet OnLine*.

Changing our concept of interactivity

First Fleet OnLine aims to be a model of online teaching and learning, emphasising not only the potential of the Internet to rapidly publish content but also its potential for enabling learners to query and manipulate the content themselves. Pedagogically, databases of primary source data provide students with a learning experience based on the inquiry learning model: framing questions, collecting evidence, making judgements from incomplete evidence.

But the Internet enables even more. It can facilitate meaningful communication and debate between teachers and learners. Via the forum and feedback forms, students, the general public and researchers are enabled and encouraged to question the data and/or send more data to be added, hopefully demonstrating that history is not static and that our perspectives on it are constantly changing. First Fleet descendants in particular have much to debate about the way their ancestors are represented: often the “facts” presented via court records and officials’ journals are at odds with the “facts” passed down via aural traditions.

Previously, with the database on stand alone microcomputers, interactivity was defined as the capacity of the software to enable people to interrogate and manipulate the data on the hardware (Wills, 1994). Now the definition of interactivity is expanded to encompass the capacity of the software to enable people to communicate with other people, not just with the hardware.

Evaluation

Online publishing of educational materials provides avenues for evaluation not possible before. It is easy to add a feedback form to the site and extremely easy for users to respond, anonymously or otherwise. Having a feedback form does not guarantee feedback, however *First Fleet OnLine* is receiving approximately one email per week from anywhere in the world (mainly Australia, and some UK & USA). This represents about 10 percent of the hits to the site recorded by the statistics counter.

Feedback is requested in three areas: accuracy of the historical content, experience of learning online, usefulness of learning about learning. To date, most feedback received has focussed on the first area, a small amount for the second area, and none for the third. The users who *do* provide feedback appear task oriented and occupied with the search for family links. This audience does not find it necessary to comment on the second two areas as they are competent researchers and competent online. In general, the other audience, school students, do not send feedback other than requests for further information about the officials, which misses the point – the database is about the ordinary people who founded white Australia, not about the officials who traditionally form the basis of history lessons.

The web offers an ease of inviting, receiving and analysing evaluative data electronically not available before. However it cannot be the only method evaluators rely on. We have reviewed the site via a focus group of history teachers and a focus group of educational designers. We are yet to organise thinking aloud videos and classroom observations.

Improving students' research skills?

Do users take up the opportunities offered by the powerful searching capabilities of the web site? Observations of students and teachers in the past 20 years have indicated that searching is shallow and investigation perfunctory. Before, we could have blamed unwieldy search engines. Now that this obstacle appears to have been removed, we are evaluating whether we have achieved our educational goal of improving students' research skills.

To provide data for this research question we can add online tools to track learners' use of the online site. Fritze (1994) describes a visual mapping tool for multimedia software. An online version of this tool, combined with more powerful web statistics packages, could be linked to *First Fleet OnLine* so that we can visually map learners' search strategies.

Improving the site's communication capabilities?

In evaluating the site to date, it is noticeable that the forum is the least used component of the site. Currently the *First Fleet OnLine* uses a very basic forum tool, majordomo, a tool not adequate to the multiple, and sometimes conflicting, tasks of providing the students with threaded discussions, the forum manager with editorial and filtering capabilities, and participants with advice of new contributions direct to their email address. More work is yet to be done in this area. One interesting tool

under investigation is Web Constellations (Goldman-Segall, 1997). Web Constellations from UBC is a server-side, web-based database application designed to enable a community of students (and other researchers) to collaboratively catalogue, describe, and meaningfully organize data accessible on the web regardless of whether that data is text, video, graphics, audio. It is an online collaborative media authoring tool.

The main reason for under-use of the forum is because the site has not yet been used in one class, virtual or otherwise, as a coordinated teacher-facilitated activity. In the main, the site is discovered by individual learners researching the topic of the First Fleet so there is no time for them to participate in, or benefit from, discussion via a forum. However, it also a common complaint of novice educational web site designers that nobody uses the forums (Harisim et al, 1995). Unless participation in forums is tied to assessment and unless the teacher designs real-world collaborative activities which provide a meaningful reason for participation, the forum will remain an under-utilised, albeit potentially pedagogically powerful, feature of web sites for teaching and learning.

Harisim outlines a number of learning approaches that can be adopted in an online communications environment in addition to the “ask an expert” and informal peer support that is resident in the site so far: mentorship, tutor support and structured group activities. Structured group activities include:

Seminars	small group discussions
learning partnerships & dyads	student work groups & learning circles
team presentations & teaching by the learners	debating teams
peer learning groups	networked classrooms
virtual cafes	simulation or role play (see next section).

Does multimedia improve interactivity?

Future plans for personalising the convict information and enhancing the appeal of the site include more graphics, some songs and audio, guides, role plays, and maybe games – predictably the most asked for feature from young people filling out the feedback forms.

A newly released Australia on CD project from the National Archives of Australia, *Convict Fleet to Dragon Boat*, has already been sent to every Australian school. To support classroom use of this CD-ROM an online Activities Database is available. The CD's promotional material says: "Meet migrants from many different countries, revealing their hopes, challenges, experiences and feelings. Also includes oral histories, videos of important events and a database of information about the many nationalities that make up the multicultural society we enjoy today. Two **interactive games** take you on a journey through history travelling as a Chinese miner caught up in the gold rush or a **British convict on the First Fleet.**"

A graphically rich exploratory environment enables the student to immerse themselves in convict experiences on the First Fleet, however it will be interesting to see evaluative data from usage of this CDROM. Initial observation indicates that the pace may be too slow and the plot not dramatic enough to hold students' attention for long despite the professional and expensive graphics and sound effects. The level of interactivity provided is little more than point and click (Wills, 1994) and the element of chance that usually spices up game design is not enough in evidence. Although simulation and role play are pedagogically powerful teaching techniques, they are difficult to design (Shirts, 1975) and often very expensive.

Role Plays and Our Role Play Generator (Fablusi)

With the advent of the bi-directional communication capability of the web and the ubiquitous availability of web-browsers, it is now possible to engage learners in online collaborative role plays. To add a role play to the First Fleet, we are using an online role play generator called Fablusi. This is a cost effective strategy because:

- we do not rely on rich graphics to convey the context and "interactivity" – instead the learner is actively participating in constructing the simulation collaboratively, using text in emails;
- underlying support for collaboration has been provided by Fablusi – designers need only define the social structure among the characters and create the scenario for interesting interaction, instead of worrying about programming – the authoring interface allows designers to create new role play simulations.

One of the problems with conventional simulations is that they are based on the occurrence of randomly generated chance factors. With early Australian history we know the outcome, so different results arising from

chance factors could lead to students' misunderstandings about the actual sequence of events. As the model being used in the First Fleet role play relies upon negotiation rather than chance, it is appropriate for learning Australian history.

We are selecting specific instances from the early days of the First Fleet's arrival when everything had to be built from scratch and a range of interesting characters rose to meet the challenges. For example, the arguments and decisions about allocation of rations and how to make convicts work in the gardens when they were at the same time on near-starvation rations. Role play provides the best learning environment for students to understand the problems they faced. The database provides a "factual" account of what had happened to the convicts to bring them to the *Fatal Shore* whereas role play allows the learners to play a what-if situation, projecting into the convicts' future. It adds *plot* to *character* in the story of early Australia. Plot and character are important elements of an immersive learning environment (Laurel, 1991). Or as Pine and Gilmore say in their book *The Experience Economy*, we need to "ing" the "thing", that is turn a product or a service into an experience. They define four Experience Realms on a matrix: Entertaining, Escapist, Esthetic and Educational - the Educational Realm being high on active participation AND high on absorption or immersion (p30).

Students can select one of the First Fleet characters, research it via the database and then interact in character with other students, asynchronously and synchronously, and at a distance. Fablusi is based on the theory that human interaction and collaboration are communicative events (Naidu et al, 2000). It provides the technical support to create social structure (conferences) yet enables any-role-to-any-role communication (sim-mail) with optional real time private chat ability. It uses the concept of a "conference" to define the social structure for roles. For example, we as designers can create conferences to simulate the Governor's Table, the Officers' Mess, the male Convict Camp and the female Convict Camp. The designers define the social structure by controlling what interactions a character is allowed to see. As in real life, a convict would not be aware of the interactions between officers. They will only see officers' interactions when officers collaboratively agree to convert their Discussion into a Resolution. Similarly officers will not be able see male and female convict gossip until the convicts collaboratively agree to convert their Gossip into a Petition to the Governor. New participants in the role play can view the threaded discussions that have occurred to date and then contribute to the

continuing plot, which may take months to emerge and may in fact never finish.

Fablusi supports a large number of roles in any role play, for example, Linser, Naidu and Ip (1999) reported on an earlier version of the generator used in Political Science at the University of Melbourne with over 80 roles. However, such a rich interaction is a fairly challenging task for students and to achieve specific learning objectives, the selection of a representative group of characters is probably more important.

Conclusion

We envisage a web site for the numerous other Australian history databases that were spawned in the 1980's by the original First Fleet Database but which likewise no longer run on today's computers: convicts, bushrangers, explorers - all hyperlinked. The Fablusi designers envisage role plays attached for each of these themes.

We believe that learning is best experienced in a context of intrinsic interest to the learners. We aim to combine the techniques of "resource-based learning" used in the database with "goal-based learning" used in the role play to provide a rich learning experience for students at the design of the teachers. The overall thrust of our research is designing learning environments that extend the concept of interactivity beyond browsing and beyond "point and click" (Wills, 1994).

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