Between Promise and Reality: online education and museums

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Abstract

AT&T Virtual Classroom Race Across Time (VC RAT) is an online interactive educational game for players aged between 8 and 14 years. VC RAT adopts a challenging self-paced format taking its young players on an adventure across time and space in Australia. Whilst they race the clock players send out data probes; zoom maps, hear strange and familiar sounds; study objects and photos in the form of clues; solve puzzles; send electronic postcards; search the web; get access to Fact sheets and lists of things to do in the real world with their class mates and friends. The sponsor AT&T wanted a resource to encourage new Internet users internationally, thereby bringing them under the banner of its existing Virtual Classroom program. The Powerhouse Museum was interested in enhancing web skills whilst looking at innovative ways to take its collection into the community. The result is a game for children about technology, using technology whilst borrowing motifs from other disciplines and practices.

Introduction

This paper will look closely at how this heady mix of agendas informed the game's development and its outcomes. It will address some of the issues thrown up in its wake. Issues such as the appeal and relevance of material culture for young people; whether the Internet truly crosses cultural boundaries and the distance between the promise and the reality of online education.

> Imagine a classroom without walls, without conventions. A school where learning is shared by teachers and students from countries across the globe. A center of learning that doesn't just cross international boundaries and generation gaps, it breaks them down. Welcome to the AT&T Virtual Classroom 1998. (from AT&T Virtual Classroom promotional flier)

...and welcome to this paper about one of the programs under the AT&T Virtual Classroom banner—AT&T Virtual Classroom Race Across Time (now RAT). The paper describes RAT and explores the validity of the assumptions underpinning its development and its place in the star studded internet gallery of programs that purport to transcend age and culture. It is written from the perspective of two practitioners reviewing their work.

What is the AT&T Virtual Classroom (AT&T VC) program?

The 1998 AT&T VC program (www.att. virtualclassroom) consisted of:

1. The AT&T VC Contest-an international Web authoring contest among 300 teams of three schools in three different countries.

2. The AT&T VC Clubhouse- an ongoing non competitive chat room for schools and

3. AT&T VC RAT-an interactive web game.

AT&T Asia/Pacific organizes AT&T VC with a regional partner. In 1998 the Powerhouse Museum played this role. The Foundation funded the museum to promote all Virtual Classroom projects in Australia and to develop RAT. The AT&T Foundation in New York funds AT&T VC with the help of a number of corporate sponsors. In 1998 these were AT&T Jens, AT&T EasyLink Australia, AT&T EasyLink Hong Kong and Samsung SDS. This paper does not review the role and motivation of corporate players in electronic education only notes their inclusion with interest.

The Stated Goal of AT&T VC is to:

> provide students with practice in this new social environment and first hand experience in international cooperation. This kind of project, joining classrooms from three different countries in a single room, is within reach of many K-12 schools. No longer limited to interacting with local resources and people, students will work together with their peers around the world.
>
> *(from the AT&T Virtual Classroom website: goals and history, viewed 30 June 1999)*

Certainly, the participating students appear to warmly embrace the notion of international friendship and union. Consider these extracts from the 1998 winning web sites:

> Explore our diverse areas in the world to see how our environment has shaped our cultures. The ghosts of the cultures of Japan, Malaysia and America will help Scrooge to enjoy the different look of humans around the world and then discover that their hearts are the same.
>
> *(from ww.att.virtualclassroom.org/e/contest/aw-16.html)*
>
> The students of VC81 have addressed mankind concerns using the ubiquitous theme of denim as our common background. Delve into our pages and when you leave, we're confident you'll have faith in a safer and more united world of tomorrow (from w.att.virtualclassroom.org /VC98/vc98/vc-81/jeans.html)
>
> The tough thing about building the museum was communicating with other countries. Another hard thing was learning how to use the new software. We all thought this was a very good experience. The most important thing that we learned was how different people can be but at the same time be exactly the same.
>
> *(from www.att.virtualclassroom.org/vc98/vc-65/entrance/welcome.html)*
>
> The world will eventually reconnect, physically, many hundreds of millions of years from now....Until the Earth's land masses reunite, we here at VC-17 have found a way to reunite with each other! Our virtual classroom made possible through technology.
>
> *(from www.att .virtualclassroom.org/vc98/vc-17/button1.htm)*
>
> Today, young people have quickly grown accustomed to the computer and the changes in the global community, have keen sensibilities and creative powers that many adults have lost. Moreover, children are not afraid of saying what they think and trying new ways of doing things—no matter how radical ... Young Voices is all about young people working and inspiring others to change the future by participating in an online experience and working towards a better world for all.
>
> *(from www.att. virtualclassroom.org/e/contest/aw-06.html)*

It would be interesting to see whether the introduction of the first penpals created such fervor! The AT&T VC contest has an extensive support network, sophisticated computer users and the opportunity for children to share the interests of their choice. An interest in the environment, Indigenous people and lifestyle (favorite games, food, hobbies) is typical themes for AT&T VC contestant sites. This year the contestants started to address world issues in their site e.g. Y2K bug.

AT&T Virtual Classroom wanted a site with appeal to all cultures which could sit beneath the international umbrella presumably created by telecommunications.

What is the Powerhouse Museum?

The Powerhouse Museum (www.phm.gov.au) is the largest and most popular museum in Australia. It is also one of the nation's most popular excursion venues for booked educational groups, attracting around 120,000 students per year to its sites. Legislated under the name the Museum of Applied Arts and Sciences its mission is to inspire diverse audience by using the collection and scholarship to provide informative, spirited, innovative and well-researched exhibitions, programs and services in the fields of science, technology, industry, design, decorative arts and history. With a history dating to the International exhibitions of the late 1800s, people, products and processes are its heartland.

The museum is known for being 'hands on'; its development as the Powerhouse Museum on its present site inspired by places such as San Francisco's Exploratorium where users experiment and infer scientific principles from first hand experience. This "hands-on" approach challenges the orthodoxy of museums as places to look but not touch. Another inspiration was the British Science Museum that emphasizes working models of machines that allows users to see processes previously hidden. This 'hands on' reputation, rightly or wrongly has slowly evolved to mostly mean an interactive experience with a computer. However, the hands on approach within the museum is still to support the theme and storyline of an exhibition. There is a dynamic between the idea, the object and the interpretative device. We are a museum of material culture.

The Powerhouse Museum has the scope to place information technology (IT) in its historical, social and cultural context. IT is not only treated as a communication tool throughout the museum's exhibitions and web site but it is also a collecting field and the subject of a series of integrated exhibitions. Therefore the contents, presentation and use of its website has layers of meaning and resonance for the organization.

Preliminary thinking about electronic education for the museum yielded these educational objectives:

- Fulfill the internets user expectation of challenge, stimulation and fun to motivate the user to learn
- Develop the users confidence and competency in computer and Internet literacy
- Develop a wide range of transferable skills i.e. skills which can be used beyond the particular program or activity
- Link activities to an application in the real world and/or a tangible reason to interact with the program
- Provide for self paced learning and differences in learning styles
- Encourage collaboration with other students including those physically close as well as distant

A long road starting with these objectives led to RAT. An interactive game like RAT was seen as an important extension to its website and indeed its dual role as a cultural and educational institution and a museum of applied technology.

What is RAT?

The AT&T Virtual Classroom Race Across Time (RAT) is an interactive game on a web site. It is designed as a teaching resource for use by English speaking children aged between 8 and 14 years studying technology in a formal education setting.

The museum proposed, and the funders accepted, that RAT provide an internet resource for schools as yet without the technical competence, equipment, school support and/or experience to enter the website building contest. It would build a bridge to this level of competency. Consider this statement from an enthusiastic and typically busy primary school teacher who entered the website building competition but may have been happier with a less challenging IT introduction.

> I'm told that only schools with high degree of development with computer technology go in for these competitions. Our success in coming in as a runner up certainly did wonders for the view of this school as a site for technology education, and for my self esteem as a teacher able to take on enormous task and see it through. I don't expect to be participating this year - I could hardly get out of a chair for the first five days of the holidays I was so tired. However, if a school has good equipment (plenty of memory) and students already trained in its use, problem solving strategies and with teachers who have good web site computer skills before they start (unlike me!! fools rush in..) would enjoy the challenge of working in a virtual classroom with the wonderful teachers that I met through our web site and the special chat room for teachers. Must go-bells gone.
>
> *(e-mail from Sylvia Tolhurst, teacher at Gosford East Public School one of the runners up in the 1997 Virtual Classroom Contest)*

RAT's Educational Objective

- Provide students with an absorbing framework to encourage them to enhance their Internet skills
- Provide information and research tools to explore aspects of technology demonstrate time, continuity and change
- Assist the students to draw global connections provide self based learning using information technology
- Encourage the exploration of ideas and hypothesis
- Enable the students to use the internet in a purposeful and stimulating way
- Sightsee Australia in a very new way
- Use of technology is the content and format of RAT.

The backbone of the site is the race across time, a challenging game taking students on a journey through time/space over Australia. In the game, students are pilots of an old model time cruiser on a mission to deliver life saving serum to a secret location marked by a beacon. The cruiser crashes

five times and to finish the mission they must figure where and when in Australia they landed. The clock is running (with a set time for each site) whilst they examine museum objects and photographs in the form of clues and puzzles and make decisions on the correct coordinates. Whilst the game's hint rats are helpful a player running out of time faces a stiff penalty-lost in time space forever! Or the even greater indignity of having to start again.

Features

- Two levels - Nova and SupaNova plus increasing difficulty in the game.
- Opportunity for repeat play. There are ten zones spread across 5 possible pathways with random commencement.
- Xtender sheets with a range of hands on activities (mechanical as opposed to electronic), discussion points or research topics for home or class use
- Sixty objects as clues and twenty six object Fact sheets written with a technology focus.
- Sixty four sites—internet and subject linked
- An E link button allowing players to jump to a Search page with generic information on how to use a Search engine for the novice surfer
- A choice of three space ship and console designs each with the target age group in mind e.g. the brief for Jewel jet was colorful, fashion conscious design, jewel knobs and buttons, suitable for shopping and sleep overs as opposed to SpaceAce- a star-fighter inspired design. Fast, detailed and sleek. (from RAT design brief by Craig Browne of Relatively Creative)
- A choice of three different E cards in each zone to reward the player for completing each zone and as an incentive to continue. The later E cards are animated.
- Frame of fame where each successful player can immediately publish their name
- Accurate information. All museum objects and clues inspected and dissected by a team of 17 curatorial staff.

Development

The game was developed by the Powerhouse Museum in partnership with AT&T staff in Hong Kong. The museum employed two contractors - a Creative Director and a Graphic Designer. The Creative Director was Craig Browne of Relatively Creative (relativelycreative @bigpond.com.au) who had previously worked as an Education Officer and IT curator at the museum and went on to start a company which specializes in educational games (e.g. Compatibility). The Graphic Design and programming was undertaken by Radiant Productions (http://www.radiant.com.au/) with sub- contracting of images to Freaky Dog Design. Over 30 museum staff were involved directly as team members or indirectly as advisors in the project development. For a full list of roles go to http://www.phm.gov.au/rat/game_credits.htm

> Kate, this project should perhaps be called Race Against Time as that is what we seem to be running out of and I only hope it is this exciting for our younger players. Any timely assistance would be greatly appreciated
>
> *(fax from Steve Miller, member of the development team in a national search for a Hermannesburg created hunting boomerang circa 1950s)*
>
> While these are known in this area as Woomeras, I am aware that this is not necessarily the language word for spearthrowers from your country. We have found this word for spear thrower attributed to the Eastern Arrente language: amirre, but I am aware that there are many languages spoken in your area
>
> *(fax, again from Steve Miller to an elder in Hermannesburg (now known as Ntaria) checking authenticity of clue).*
>
> Helen I have sent the X-tender, Fact sheet stuff to Carrie. I also sent her instructions for the screensaver (see below). You will notice that I have indicated to Carrie that you will tell her about the logos to go on this page. Also I gave her the text to go on this page - what do you think? Let me know so I can confirm it for her. ;-)
>
> Cya

Screensaver/Wallpaper

> The idea of this graphic is to give players a reward for finishing the AT so it should be attractive and interesting.

Use the background graphic as it is for the E-card "I've had a RAT of a day." Add some of the other RAT images such as the RAT logo, Time Cruiser, Gizmo, Officer, Rat, etc"

(email from Craig Browne of Relatively Creative (Creative Director) to Project Coordinator clearing instruction to graphic designer, sub contracted to Radiant Production (Graphic Design and programming)

Hey! I have fixed the bug that was causing users to jump to Zone 2 when starting a new game after being lost in space...The changed files are control.htm and lost.htm.

JG - you'll need to download them from the Radiant FTP, and replace the current live copies ... I am assuming that the control.htm file dated 3-Dec-98 is the most current one (i.e., had those location/time fixes from the launch incorporated in it) - otherwise you'll need to change the locanswers and timeanswers arrays as you did on the launch day...

(email extract to team from Radiant Productions indicating computer programming work completed and specific request to our webmaster).

I have changed the RATin credit line for platypus stamp, as it was not as per the required Australia Post acknowledgement. It should read:

Platypus stamp. Desiger: Eileen Mayo, 1959. ? National Philatelic Collection, Australia Post: alteration of this image in any way is forbidden by Australia Post. Collection, Powerhouse Museum, Sydney. 92/1750-42

(email extract to team from Gara Baldwin Rights & Permissions Officer indicating correct acknowledgment of stamp image).

Dear Judith,
I have had a quick look at the fact sheet and found it contains some inaccuracies as well as interpretations I am unfamiliar with. I have offered brief comments (below).

(email extract to Judith Flett, content coordinator from Martha Sear, curator assessing accuracy of Photographic print (Jandaschewsky) 95/28/181 Fact sheet).

The sentence in first paragraph is not grammatically correct: "You will meet helpful rats and space probes, ancient and modern artifacts, Time Pirates with attitude and even glance at death!" Cannot "meet" artifacts, or "meet" glance at death ... "glance" as a verb/noun is not common or easily understood word, so can you simplify that?

(email extract from staff of AT&T Asia/Pacific giving feedback on prototype).

The quotes cited above will give you an idea of the dynamic for the game's development-certainly not a case of dragging in suitable images from anywhere and hanging them onto a framework. Instead it was an interesting melange—a mix of corporate interests, sponsor's experience and needs, this museum's reputation and culture, and contractors feistiness and freshness. Whilst the sponsor provided the funds we requested, the budget (as always seems the case with IT products) became extremely tight. After a heady four months in development we launched the site December 1998.

We are very proud of the game and urge you to play it! (www.phm.gov.au/rat).

So where's the sting?

Whilst we like the site, is it achieving its multiple aims? Both parents, as parents do, wanted the site to take after their side of the family and their aspirations—to be an extension of the museum environment AND to appeal to English speaking children of all cultures.

The site was evaluated twice: during development and immediately it went live. We made changes in response to the feedback each time. The feedback generally is very positive. Unfortunately we have not undertaken a summative evaluation to report from the user. This paper now looks at whether the promise i.e. learning by all children regardless of their culture on a site which is an extension of a museum environment was ever truly possible. And as most papers do, raises more questions than it gives answers.

This is not the place to debate the core ideology and purpose of museums. We merely state our belief that museums are places of learning and look at ways museums now operate to enhance this

role. Eilean Hooper Greenhill (1996) summarizes learning in museums and galleries as: A response to the objects in the collections related to the museum gallery or site stimulated by exhibitions or by face to face interactions:

- Through the senses, through action and through experience frequently affective rather than cognitive
- Sometimes highly personal or idiosyncratic
- Dependent on the meaning constructed by the learner
- Dependent on the existing knowledge and assumptions of the learner
- Tacit, or felt, rather than fully articulated through words
- In need of analysis by the learner to be fully developed
- Frequently the basis for future work
- Sometimes individual, but learning often happens with groups working together
- Capable of enormous diversity; and complex, varied and flexible

This summary appears to be illuminated by many theoretical perspectives especially that of the constructivist and inquiry based learning approaches. Clearly it is based on a real and not virtual museum visit. It situates the role of museums in learning to build a bridge between the learners own experiences and knowledge and that of the museum's.

Education must be based upon experience-which is always the actual life experience of some individual (Dewey quoted in Ansbacher, 1998) and the use of technology will be appropriate to the extent that it supports the learning bridge. We must also be reminded that knowledge and social identity are tightly intertwined. A person's prior knowledge is part of his/her personal identity in society. Becoming a participant in a community can be a stronger motivation than gaining knowledge. Again, technology should be used as an entry point to the community in which the learner wishes to belong.

Ansbacher (1998) in *Hand to Hand* argues that technology is of use only to those already engaged in inquiry and have sufficient prior experience to interpret the results of the technology. Further that in order for technology to extend our senses we first need to have experience with the unaided senses. He warns against the use of technology as an experience in itself that will crowd out other experiences.

The museum, as others have done, looked at its site as a way to provide exposure to the wealth of its collection.-inaccessible because of constraints of time/distance. However if the user has no prior knowledge or relationship to the value/meaning and significance of objects where is there starting point? The inaccessibility may not be time and distance but lack of knowledge on how to read it. Although we often hear that data speak for themselves, their voices can be soft and sly. (Monstellar et al quoted in Kenderdine, 1998).

The other dilemma is the sheer breadth of the audience. How can we build a bridge when we cannot possibly know our huge and diverse audience in depth and more importantly they do not know us? Promise number one and two were looking shaky.

Teather and Wilhelm (1999) point out that many museums are coming to grips with the potential of the internet to extend their audiences. The healthiest approach to the dilemmas presented above is to treat the internet as an invitation for reinvention of the museum in cyberspace and not a duplication of the physical museum.

A number of museum web sites originate from the constructivist premises of visitors individual experiences and meaning making. These sites work to facilitate and encourage multiple voices and the exchange of stories both outside and inside the institution and between staff and visitors. If this is our task on the Web, museum meanings must be presented in a manner that focuses on visitors, and on their knowledge and meaning-making, which are in turn built on experiences and understandings.

Teather and Wilhelm in the same article suggest a three pronged attack to fulfill this approach.

1. Focus on the object and available data
2. Focus on the institution-exploring the nature of collections and museums
3. Focus on the personal-the visitor's interaction with the museum

This approach or framework is very consistent with that taken by AT&T VC. The competition and Clubhouse provides a space for collaboration and communication between cultures about an agreed subject. The children are able to apply lenses of interpretation to real things in their lives. As indicated above, the younger children focus on favorite hobbies, toys, games whilst the older ones move towards known issues. However this is NOT the approach we took for a number of reasons namely:

Resources An approach such as this is expensive in terms of set up and maintenance. It is not self contained. In view of our budget and other restraints an open ended approach such as this admirable one was simply not feasible.

Assumed Knowledge This approach assumes a level of technical expertise in using the Internet. One of the reasons for our site was to tempt novice users.

Perhaps more significantly we suspected this approach required an existing framework on the part of the child in which to locate information about objects and then through which a response could be made. Children need to want to engage with a museum object before they can move to a response. As Slavoljub Milekic suggests in "Virtual Museums: How to make digital information child-friendly" (1997) make the content structure compatible with the child's social environment. Further make objects manipulable in the way which makes sense to the child and provides feedback which can compensate for the unavoidable impoverishment of sensory input in comparison to the equivalent real world manipulations.

The museum decided early on to use a self contained game format for its program. Initially seen primarily as a motivational strategy to engage young users with the site, the decision to use a game motif in light of later reading takes on greater significance. The game format it chose was a race within a microworld.

Play is stressed as an important educational tool when appropriately applied in museums, (Forman, 1998), schools (Dockert and Lambert, 1996), and in the field of instructional design (Rieber, 1996).

Within educational settings, play has an important role for both children and teachers. For a number of reasons, play is potentially a powerful medium for learning for children. Play touches on every aspect of development and learning. (Docket and Lambert, 1996).

Games are one form of play. Play cannot be precisely defined however Forman (1998) offers these useful indicators:

Play is a form of exploration of the physical and social world that:

- Is detached from a need to reach a particular goal but may find spontaneous goals from time to time
- Flows fluidly from one idea to the next;
- Has an element of pretense or at least an attitude of what if towards the action
- Is driven by consequences that happen during the period of play itself rather than by later rewards such as praise or pride in a finished product, and
- Continues for some minutes during which time subsequent actions build on and are derived from former actions

RAT is a race you can win. The motivation for the children to look at objects and to commence to create some meaning about them is the motivation to PLAY THE GAME. It is play as power (Brian Sutton-Smith quoted in Rieber, 1996) however it does have the characteristics of play as progress and fantasy-as essential to its microworld environment. Comparing it with the characteristics above all hold to be true for RAT. There are other goals and other ways to extend the use if technology (E cards, puzzles embedded in the clue text, element of guessing, searching and the Xtenders) rather than just the elusive Beacon at the conclusion of the game.

However, the most critical aspect of RAT in this discussion is its function as a microworld-a subset of reality or a constructed reality whose structure matches that of a given cognitive mechanism so as to provide an environment where the latter can operate effectively Papert quoted in Dowling (1997). Whilst games have a long history in the development of almost every culture and society we were continually worried by the need to cross cultural boundaries in our game. We hoped that if an alternate reality could be effectively established the cultural context and prior knowledge required for learning to take place could be established. The promise would be fulfilled if the player found the activity to be intrinsically motivating.

Motivational researchers have offered the following characteristics common to all intrinsically mo-

tivated learning environments: challenge, curiosity, fantasy and control (Reiber, 1996) - all elements of RAT.

Forman, in the same article (1998), looks at designing play spaces to provoke constructive play. If you read site where it says exhibit it yields very interesting principles and successful links to our favorite game. The exhibit must immediately engage the child to enter the play space and interact with the material.

The exhibit must provoke problems that children consider within their range of competence to solve. The technical skill needed to try a variety of solutions should be minimal. The exhibit needs to provide opportunities for quick edits of an initial attempt to solve the problem. The exhibit needs to provide a medium that leaves some record of the child's initial predication so that the child can revisit the relation between the predicted and the observed. The space should be amiable and allow several children of different cognitive levels to play together in a manner where one child s play can positively influence the direction of another child's play.

Whilst the Splash page could be more enticing for users (a constant suggestion from AT&T) the actual graphics of the consoles are very enticing for this age children, discarding certain ideologies to enable them to buy in on a console they can relate to. The site does allow for comparison with an initial guess and whilst challenging the game is far from impossible to do. Our prototype testing demonstrated children collaboratively solving the clues and helping each other. Our observation of children playing the game is that it has intrinsic motivation, (Whitty, 1997).

Our post-modern hope was that Australia and Australian objects would be the motif only-the decoration in our microworld where children could enhance their internet skills and generate their interest in the social, cultural and functional aspects of the technology represented.

Last Words

Why is the Game Based on all This stuff Happening in Australia Anyway?

> Cause > I have not the slightest clue about Australia, so it makes the game kind of hard because I don't even know where to begin to look. If it were say, US history, I would have a better idea. But Is this game supposed to be like international? But then the Australian children have the advantage-Or is this for Australian children?
>
> *(extract from email from a 14 year old relative of an AT&T staff member after playing the game).*

Clearly the microworld did not hold for this player. All clues needed to solve the game are present on the site, however the block is that it is about unfamiliar territory. We are yet to test if the same holds true for others.

The purpose of this paper was illustrate that the promise of online and international learning as an extension of a museum world still holds on a variety of theoretical levels. The challenge is to keep thinking in innovative ways to play it out.

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