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# Reflections on Computers in Education 1984 – 2001: The Logo Continuum

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**Abstract:** These reflections describe Martin Chambers time in the mid-1980s as a computing student; the early 1990s at University and from the early 1990s to the early 2000s as a computing educator.

**Keywords:** Computing student, university student, computing education

## 1. 1984 – 1987: First Experience with Computers in Education

My enjoyment of computer programming began in 1984 as a high school student in Northern Tasmania where I was introduced to Logo on an Apple IIe. I had previously spent some time gaming on consoles such as the Hanimex and Atari 2600 and later on personal computers such as the Vic 20 and the Commodore 64 but I had never used a computer to actually write programs. Logo, complete with its sixteen colours and pixelated turtle, intrigued me and the wonderment of ‘creating cool images’ with simple computer instructions filled my young, impressionable mind.

With this new found passion, I convinced my father that computing was an area of great importance to me and after much persuasion he purchased a Dick Smith branded ‘Cat’ computer. This was a clone machine that emulated the Apple IIe via a plug-in cartridge on the side. Apple IIes were virtually impossible to purchase for the home as the price was prohibitive and they weren’t being sold in mainstream electrical stores.

Memories come back to me of the salesman (a Greg Evans look-a-like from Perfect Match fame) being so enthusiastic about this Cat computer that ‘could do everything’. This machine was going to change the world! I was thoroughly convinced and being an over excited 14 year-old, I pushed the case to my father to purchase one very hard. My father, a bank manager at the time, who relied heavily on his own computational thinking ability instead of that offered by any computer, was less convinced about this deal but never-the-less he cautiously purchased the computer as perhaps he saw there was a flicker of hope it may indeed help in my education. Maybe, on reflection, he did see that one day I may end up working in the computing field and was happy to support me in this way.

The Cat lasted a couple of years, but before long the lack of hardware expansion became extremely limiting and now that I was working part-time I was able to upgrade to another Apple IIe clone. With this brand less new computer you could use third party peripheral cards in the expansion slots, just like the original Apple IIes. I remember vividly the various video enhancement cards, copy cards, network cards and the like that I purchased over time to improve the capability of my clone.

Thinking back, this opened my mind to the importance of having truly expansive systems, a tenant still valid today.

I purchased this new computer from a partially blind, fanatical backyard supplier who had quite a band of followers in my region. Not only did he build and sell clone machines, he imported many and varied expansion cards from the United States of America. I remember one card in particular was used to bypass software protection and enable most software titles available on the market to be backed up. I was on the waiting list for a long time for this card – the demand obviously out stripped the supply!

Soon after I purchased the clone, the Apple IIc appeared on the scene and one of my close friends purchased one. Whilst being faster, having a built in disk drive and generally looking a better machine, it did not excite me as much as my expandable Apple IIe clone. We both joined the ‘Australian Software Library’ based in Renmark, South Australia, where Apple titles could be rented for a short period of time. Newsletters were posted out with a listing of titles included in the library, much like a catalogue of video rentals. You would simply select which items you wanted, return the slip with a cheque and your software would arrive in the mail a week or so later. You used the software for seven days and then returned it when finished. This scheme was a major coop for users (particularly down in Tasmania) because there was now access to a whole range of software not ever heard or seen of before.

## **2. 1988 – 1991: The University Experience**

In 1988 and after completing my Higher Schools Certificates’ computing subjects, Computer Science and Information Systems, I arrived at the Tasmania State Institute of Technology (the next year it was to merge with the University of Tasmania) looking for an appropriate course, however, there was not a full-time computing course on offer. As a result, I majored in computing and physics within an Applied Science Bachelor degree.

My computing experience at University was mainly based around using MS-DOS driven machines. I remember in the third year of my degree (1990) Windows 3.0 was released and installed on the 286/386 IBM machines in the physics laboratories. The excitement of this moment was memorable as it appeared that finally the clunky computers we were using now somewhat resembled the slick Apple Macintosh computers that were being used in the design areas of the University. Our physics lecturers did remind us, however, to make sure we didn’t get carried away with this superficial new interface.

The student computing learning areas in the late 1980s and early 1990s at my University were basically confined to laboratories. In time this started to change, however, and I recall what an astounding moment it was when a number of ‘mobile computing stations’ appeared in the physics laboratories.

These stations comprised of a large 386 IBM computer, set up with its own printer, keyboard, mouse and large display monitor all mounted on a portable desk with wheels. The mobile stations could wheel back and forth from one laboratory to another, giving us an unrivalled sense of computing freedom. Looking back now it

must have been absolute chaos trying to organise ten or so mobile workstations into a physics laboratory where the stereotypical benches and stools took pride of place. At the time though, we thought this new mobile computing solution was an absolute revelation.

With the Applied Science Bachelor degree all but finished, I turned my attention to studying education, as I had now decided to become a high school computing teacher. During my Diploma of Teaching in 1991, I had my first exposure of how using computers could be useful in an educational setting. Theoretical study centered around some of the early constructivist approaches to learning and I now understood why programming in Logo was so exciting for me as a teenager back in 1984.

As well as the theory, there were a number of practical tutorials we attended on teaching with computers. One such class, as I recall, was structured around reviewing educational software and reporting back to the other students the purpose and effectiveness of what was reviewed. This process was quite enjoyable but at the same time, very dysfunctional!

Classmates would attempt to load their software into a computer (usually a BBC Micro or Apple Macintosh) in front of 25 odd eager fellow students, but inevitably the software wouldn't load or would crash at some point during the explanation. The presenter, more times than not, simply had to reflect on 'how it worked at home.' Looking back now, this experience was indicative of the pitfalls I would face later on in my teaching career running stand-alone software with groups of teenage students.

All of the educational computing at that point in time relied on the hardware and software to work flawlessly. Of course there was no Internet available at that stage.

### **3. 1992 – 2002: Teaching Computing in Catholic and Government Schools**

Graduating from University in 1992, I was ready for the workforce and was granted a secondary teaching position in a K-12 catholic school in Hobart, an institution I would teach for the next ten years. Along the journey I also become Technology Co-ordinator and Manger of Information Systems.

Nervously starting out, I remember the Principal at the time not being concerned with my mathematical or science teaching skills (although I was employed to teach those subjects as well), but more interested if I was 'The computer man who could fix everything'. He chaperoned me down to the main corridor of the school where on the floor lay a pile of BBC Micro, Archimedes and Apple IIe computers as well as metres of old networking cable. I did have a slight nauseous feeling of 'what have I got myself into here!'

As the year progressed, we (including a technician from the Catholic Education Office) managed to set up the computer laboratory which included a network hard drive where students could save files. This drive (which resembled the size of a large shoe box) was unfortunately unreliable and students, in the main, used 3.5 inch disks to save their work.

Loading up programs was conducted in a controlled manner by handing out disks to students, passing them on, loading the software up on the next computer, and then

finally being ready to teach twenty minutes later. Class sizes were generally of thirty students and programs consisted of Logo programming, basic office (word processing, database and spreadsheet) programs as well as some other general educational titles which the Archimedes and BBC Micros were renowned for. At this time in Tasmania there was a healthy debate on the most suitable platform for education; the traditional UK based computers (BBC Micro / Archimedes) or the increasingly popular IBM or Macintosh machines.

In this my first year of teaching, computing was very much seen as an elective but much of the content was heading for the mainstream curriculum. The illusion was that all students needed to experience time on a computer to receive a 'modern education'. As a teacher in this learning area my popularity was unsurpassed, and other colleagues in some of the more traditional subjects were experiencing fluctuating student interest. It was a good feeling indeed to be so popular. I had landed the right job at the right time! We were now ready for the next big thing.

My earliest memory of being connected to the Internet was in 1993. By this stage the school had increased the number of computer laboratories and computing teachers, reduced student numbers down to twenty per class and even employed a full time technician to look after our systems. Running parallel to the computing needs of students was the push to fully computerise the administration. The demands on the ICT staff seemed many!

By connecting to the Internet via a sufficient 2400 baud modem, our class was able to participate in text based online bulletin board discussions. I remember there was a large community of Bulletin Board System (BBS) users in Austin, Texas who we would chat with now and again, but the time differences made this exercise somewhat problematic. Students, however, seemed less impressed than I was with these sessions and at times I felt they didn't actually believe we were chatting with people on the other side of the world.

My first experience of the power of the Internet as a genuine learning tool came when we performed 'ping and trace route' tests in class. The entire class would be looking at a largish monitor in the computer laboratory and then we connected to a computer on the other side of the world via the ping or trace-route communication tools.

As the Internet traffic jumped from one server to the next in various places, students would record these locations and plot them later on a world map or whiteboard in the classroom. This notion of plotting Internet traffic versus location engaged the students for many lessons. I doubt whether this would have the same impact today.

As experiences like this were happening in our classroom, there were many new developments building in the wider Internet community. In the latter half of 1993 I recall attending a particular ICT based, professional development meeting at our school, which at the time, I thought gave us an insight into the way teaching would be crafted in the future. Others were not so convinced.

A guest speaker from the University of Tasmania was invited to run this session and demonstrated to approximately sixty staff a new software program called 'Mosaic'. As we found out on that day, Mosaic was a 'web browser' which could not only download text information from the Internet, but also download and display images on the same 'web page'. We did not fully appreciate it at the time, but this was

our first introduction to Hyper Text Markup Language (HTML) and the new way of finding, sorting and displaying information.

I sat in complete awe when I viewed an image being rendered from the other side of the world. I couldn't stop thinking about the implications that this would have on my future classes. After all, I had been exposed to the sending of plain text across the world – this new 'web browser' would open up new learning opportunities. The image did take approximately thirty minutes to download and render and was quite low in resolution but that did not deter my enthusiasm at all.

Contrary to my own personal excitement and to my complete amazement, I recall many colleagues were not impressed at all with this demonstration. 'I just don't see the use of it', 'It is just too slow', 'Books are much better' were just some of the comments that resonated on that day. I don't believe the classroom teachers attending that meeting were being negative towards this new teaching tool, it was more they couldn't see a legitimate use for anything like 'the Internet'.

On reflection, it would still be a few years before mainstream Internet usage was accepted as a legitimate teaching tool in the classroom.

In the years 1993 through 1995 there seemed to be a reorganisation of ICT in the curriculum. Should typing or secretarial studies still be taught? Were teachers of those subjects now expected to teach computing? Which faculty did this new subject computing belong to? Did it follow a design, science or mathematics based pedagogy? Steering committees had to be established to manage computers not only from a technical viewpoint but also to answer these burning issues.

With the rapid change of technology at this time, there was an increase in CD-ROM based educational materials, particularly the multimedia encyclopaedias. When not too long ago, shelves were filled with volumes of encyclopaedias, now students could sit at a work station and be provided with endless facts and imagery found on the CD-ROM. Students enjoyed this immensely.

Little did we know the open-source movement and the prolific rise of information available on the Internet would overtake in popularity that of the CD-ROM materials, which in turn overtook the popularity of printed encyclopaedias.

Libraries were definitely moving with the times. New searching and booking systems seemed to appear regularly and the push for web-based integration was paramount. There was nothing better than being a student at the time and able to search the library catalogue internally via a computer and web browser from the other side of the school. Previously, sending a student on a journey to the library to quiz one of the text based OPAC's or even ask the librarian for help, seemed in many cases an exercise fraught with danger.

Back in the computer laboratory, I recall teaching robotics for the first time during the years 1993 – 1995. The availability of any ready to go 'Lego' style robots was scarce so instead unassembled robotic kits were purchased and soldered together before becoming operational. Each robot had only one sensor or function. This was fine in a classroom situation as groups of four or five students could examine the 'light sensor robot' and the following week swap it with another group's robot. By the end of a four week block all the students had experienced (to a degree) a range of operations which these robots could perform. The students did enjoy the robotics unit giving them a healthy break away from the computers.

Secretarial studies were still quite popular in the early 1990s, and the challenge of integrating new computing hardware into the course was obvious. Typing laboratories had undergone a transformation whereby the legacy mechanical typewriters were upgraded to electronic typewriters but computers were considered, for some time at least, to be unsuitable for this type of course. Opinions soon changed as more sophisticated integrated software packages were developed and introduced. Eventually all the electronic typewriters were replaced.

With the creation of new laboratories for the technology subjects, printing was becoming more and more of an issue. Each laboratory contained dot-matrix style printers, the bigger and louder the better. After a while, however, a revolution took place when the stand-alone 'printing station' and computer were replaced by computers that could share their printer over a network. This was great as students could now print from their own machines without having to save their work on a disk and walk over to the dedicated printing station to print it out. As time progressed shared printing machines were replaced by shared network printing devices, which removed the need for a computer to be involved in the printing production altogether. The advent of laser printers in later years changed the ambiance in the computer laboratories, with the slicker looking, better print quality and quieter machines being very popular. Soon printing quotas and ink management policies had to be introduced to keep costs under control.

Community support for all the new technology was also on the increase. As I recall in the early 1990s numerous educational technology user groups appeared which half rivalled the popularity of Apple User Groups of the late 1980s. Computing in education was becoming a legitimate player in the ICT Industry and suppliers were ready to support community initiatives that were being developed.

As the awareness of computers in education changed in the community so did the role of the computing teacher. By the middle of the 1990s the role was very demanding and I recall one of my extra responsibilities was to create and maintain the school website. For me, new scripting technologies were being developed which built on my prior HTML knowledge and I was able to integrate this dynamism into our school website.

As there were no human resources allocated for the creation of the website student help was crucial. I talked with the senior computing classes (Year 10) about ways we could make the website more interactive and what we could do to offer something back to the community. We didn't want to just display our school's contact information and some nice pictures. We wanted to make it of some use to others. At the time students were now creating word-searches and crosswords with automated software, so we decided to have them available for download. Some of the more able students attempted to create interactive quizzes using online forms and database queries. These were also integrated into the website.

A further idea was to create the 'Australian Schools Directory', since as far as we could tell there was no publically listed database where we could find all the Australian schools contact information. Taking this challenge on, we attempted to collect all the printed directories that we could find (from Catholic, Independent and Government Schools) and enter them into a database which we eventually published online in 1996. This was an extremely arduous task and many students soon

understood the tediousness of data entry and the extremely important notion of data validation.

By now, the idea of creating their own personal websites was quite within the realms of many students and ‘The Australian Schools Web Challenge (1997 - 2000)’ provided a perfect opportunity for students to work in a team, learn HTML and showcase their work against others on a national level. Students competed annually in this event. The notion of learning through a challenge continues today through such competitions as the highly successful Grok Learning Python Challenge.

By the end of the 1900s the transformation from schools with stand-alone computers and printers, connected to unreliable networks and poor Internet connections to schools with fully networked computers and printers, support provided by dedicated technicians and relatively fast internet speeds had been completed. As I moved into my next computing teaching position at a government high school (years 7-10) in Hobart, this transformation was quite evident and attention now was starting to focus on providing students with a useful learning interface and the ability to access their work remotely.

It was at this time, I had my first experience at using a Virtual Learning Environment (VLE) and the school Intranet provided students with the ability to manage their learning assets easily. Laptops and more mobile solutions were becoming popular and affordable as was specialised printers and scanners. In the computing curriculum around 2001, there was still a need to teach business type applications and the sophistication of some of these, such as Office XP, were making an impact on the general curriculum as well. Soon the notion of ‘every subject teaches computing’ was becoming popular and some of the more traditional computing topics such as programming seemed to diminish in focus.

#### **4. 2002 – 2013: Internet Safety and Teaching Computing at Independent Schools**

In 2002, I moved out of the classroom and worked on the Australian Governments first national Internet Safety program. From there, I returned to teaching in 2007 at an Independent k-12 in Tasmania, where I am presently still employed.

My journey has seen the popularity of computers in education rise and fall and rise again. A learning area where there is always a new challenge or new technologies to become excited about. Where students can find a passion and engage in higher order thinking. I have enjoyed every minute of this journey.

Ironically, with the pending release of the Digital Technologies Australian Curriculum in 2014 and due to their ability to stimulate computational thinking in students, programming languages such as Logo are regaining popularity once again – a language that started my thirty year computing in education journey back in 1984. The Logo Continuum!



## **Biography**

Martin Chambers is currently a senior computing educator in Tasmania, Australia. He has had a passion with computing for thirty years and been involved in teaching and educational initiatives for twenty years by teaching in Catholic, Government and Independent Schools. He has also worked on the peak government Internet Safety program in Australia for a number of years. Martin has been a former Branch Executive Member of the Australian Computer Society in Tasmania and is a current committee member of the Tasmanian Society for IT in Education (TASITE).