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Open Education

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GENERATION 'P'

(Why kids dont learn today and *our* 'failure to connect')

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Children today certainly differ greatly to children of yesteryear. They adopt to new technologies faster than you can blink an eye- obvious in our research on computers in education, since they have adopted to Linux and new types of software almost instantly.

But these children are not just 'different' in the way the use technology. They also have tremendous power under their fingertips. Take for example the fastest PC you can buy today. It can hardly execute 50GigaFLOPS (thats Billions Instructions Per Second, roughly). As of next year, since Sony just announced its latest games console- the Playstation3, children will have access to a machine that can perform more than 2 TerraFLOPS (Trillions Instructions Per Second). Does it sound scary? You bet it does!
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Think Open Source: Thin Clients and Linux in Education

So you thought deploying computer labs inside the classroom is a utopia due to restrictive costs.... think again! And this time, please do think Open Source!

Our research, even at this very early pre-pilot stage, has shown that deploying a computer lab inside an actual classroom can be cost effective while at the same time increasing the interaction between students and actual information.

The main obstacles in using computers in education effectively usually stem from two reasons: the complete absense of proper methodologies (many theories exist but so far they have been untested in Cyprus) and content (there aint any) as well as the cost of purchase, but more importantly, the cost of maintenance. At this stage, we have a completely working lab of 14 clients inside a Fifth-grade classroom. Come to think that all these machines were deemed 'obsolete', its amazing that -hooked on a fast server with the proper software- they feel and work like brand-new Pentium4s. So how much is this initial cost? Every one of these clients (with 15" monitor) is valued around 50 pounds (even though we have a plan for getting disposed units). We have 14 of these machines inside the classroom, so not including the server that takes us to £700! A lot less than the cost of just 3 'fat' clients used in other classrooms throughout Cyprus.

(***Continued page 2***)

Think Open Source: Thin Clients and Linux in Education

Early December 2004 we were awarded a grand from the Research Promotion Foundation to deploy computer labs inside the classroom based on thin clients and Open Source Software. One of the main goals of this research is to examine the possibility of reusing obsolete PCs as thin clients.

As of January 2005 we have deployed in Dasoupolis Elementary school (Fifth grade) a working lab with 14 clients- all based on PentiumII, Celeron and a few PentiumIIIs. An interesting addition is a PowerPC-based iMac (233MHz early model) that is used for monitoring and maintenance work.

Our Server

Our server is nothing more than a custom-built PC inside a powerfull case with an almost silent power supply. It is built aroung a Pentium4 3.06 GHz processor, hardly cutting edge, with 1GB DDR SDRAM, 2x120GB SATA drives, 2xFast Ethernet cards, a DVD-ROM and the absolut absence of either keyboard, mouse or monitor!

Our OS of choice is based on K12OS- A Linux Fedora Core 3 Distribution with LTSP. Actually K12OS comes preinstalled with all the necessary settings for the network- we just had to add the clients with Ethernet Cards that include BootROMs and thats it- the machine runs without a hitch (just add the accounts!).

The Clients

All the clients are based on obsolete macines. We have removed the hard drives, floppy drives and most of the CD-ROMs.

The only reason we left some clients with CD-ROMs is to test Nick Niktaris KNOPPEL, a live Linux distribution based on KNOPPIX. KNOPPEL comes preinstalled with most software we need for our everyday tasks and at the same time supports Greek as the main language of choice.

Our lowest machine is actually a Pentium 200MMX(!) we found lying around. We just installed a PCI Fast Ethernet card with BootROM on it and it happily booted up through the network giving as our customised Login screen.

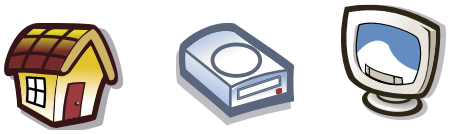
At this point we did not use any benchmarking software but there was no noticeable slowdown in system response. Applications run quite efficiently and launch fast enough as not to cause any delays. Also there was no performance penalty even when working with several applications at the same time.

Client Specifications	
Processor:	4 x Pentium II 6 x Celeron (<500MHz) 3 x Pentium III (<800MHz) 1 x iMac (PPC 233MHz) 1 x Pentium 200 MMX
RAM:	1 x 32 MB 4 x 64 MB 10 x 128 MB
Displays:	3 x 17” monitor 10 x 15” monitor 1 x 15” monitor (integrated into iMac)

The Operating System

Linux is actually a Kernel, not a complete Operating System. After evaluating several distributions in the final stage of the 'apoplous' research (see box 'Building the proper classroom') we decided to go for K12OS, based on Fedora Core 3/LTSP (http://www.k12os.org). Apart from the fact that its completely free, its extremely easy to install and maintain. Also, Fedora is under constant revising and upgrading and most of its tools are based on the highly respected RedHat tools.

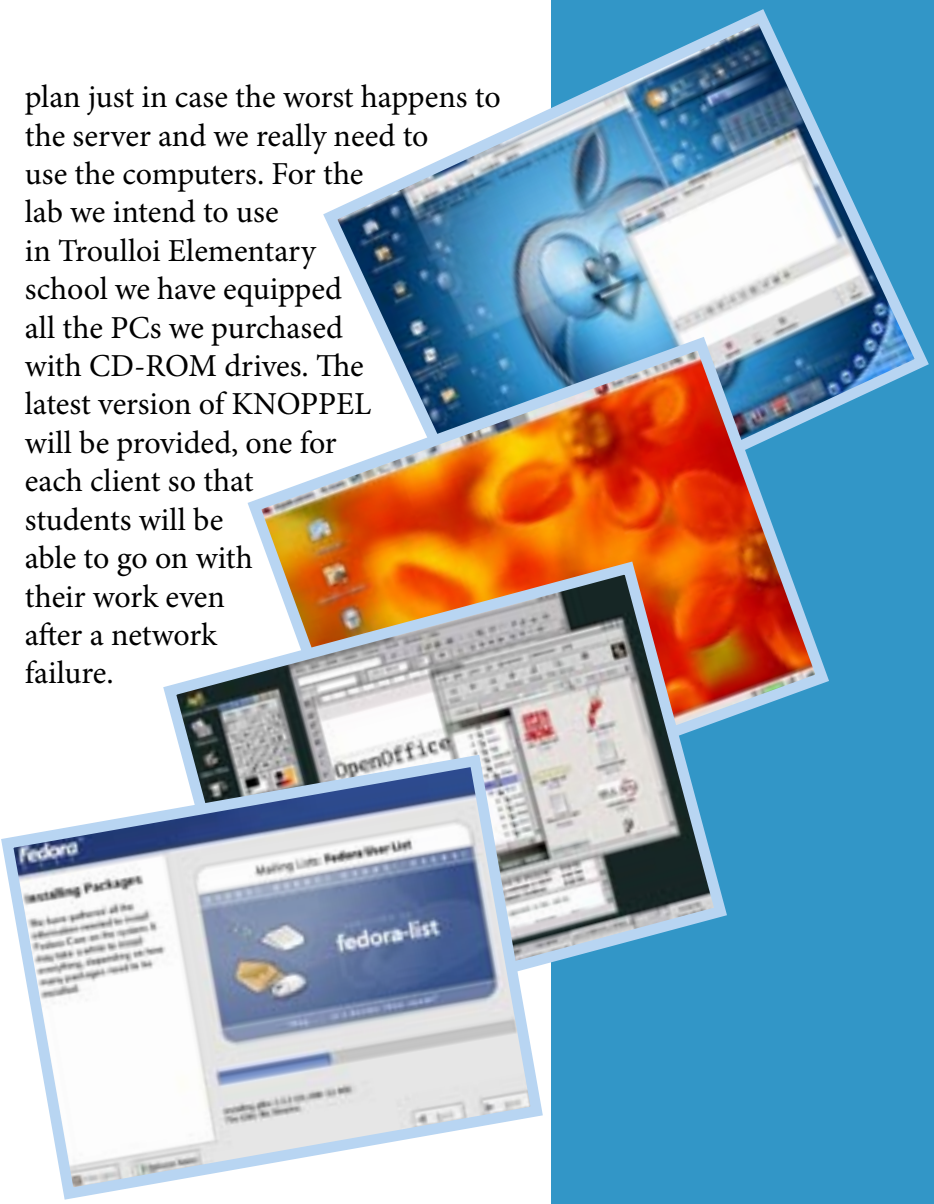
For the User Interface we have selected the Gnome environment, even though we are quite happy with KDE as well. We have added some nice touches here and there, customising the icons with the excellent Gartoon icon set (http://zeus.qballcow.nl/)



Our SunRay 170s seem to prefer RedHat or SUSE distributions. However, we are moving towards Fedora for our schools even though other distributions are not excluded.

We are keeping an eye on Ubuntu, Slackware, Mandriva and other distributions. Sun Java Desktop was used briefly but we favor either SUSE or Fedora instead.

KNOPPEL is the great exception here. With our thin clients running of a server, it is essential to keep a backup plan just in case the worst happens to the server and we really need to use the computers. For the lab we intend to use in Troulloi Elementary school we have equipped all the PCs we purchased with CD-ROM drives. The latest version of KNOPPEL will be provided, one for each client so that students will be able to go on with their work even after a network failure.



Building the proper classroom

Between the school years 2002- 2003 and 2003- 2004 we initiated a research in Troulloi Elementary school (Larnaca). Our main goal was to establish the perfect ratio students- computers inside the classroom. In the second year we used a Windows server with 10 clients (one for every two students). In the final stage of this research we replaced all Windows software with Linux distributions. That was the basis for this research.

The Applications

The single most important thing a computer must have is software. When you dont have the proper software tools, then the speed of your computer or the number of clients you have is irrelevant. The number of tools available is the defining part of success or failure. One good example should be Microsoft's Xbox console. On paper its faster and more capable than the original PS2. However, the Sony machine has so many more software titles that left Microsofts machine in second place - and only because Nintendo decided to play niche.

Not long ago, not many software applications for 'normal' users were available on the Linux platform. However, get some of the best minds on the planet together and have them work effortlessly and selflessly. The result? Incredible applications that have little -if any- to feel jealous about their proprietary cousins.

The Operating System is such a beast- a Unix class OS that gains market share in the corporate sector day by day and boasts stability and security over MS products.

OpenOffice: 'Power without the price'!

(Quote from the Atari St brochures)

It would have been impossible to even start this project if we couldnt get our hands on a respectable Office suite with Greek compatibility and of course the ability to read and write MS-Office documents. OpenOffice and StarOffice fortunately not only meet but also exceed our expectations.

We have tested both OpenOffice 2 Beta and StarOffice 8 Beta. We are anxiously awaiting the official release of both suites. StarOffice is free for educational purposes. OpenOffice is free for everyone(!) and it can be downloaded from their developers web site (http://www.openoffice.org). For this research we are in constant contact with Louis Suarez Potts of OpenOffice and Lefters Papakostas and Manuel Jaffrinof Sun Microsystems Europe, Educational Divisions.

Students have managed to adopt quite well to the new Office suites even though we have had some trouble with MS Access compatibility. However, we are working on it and hopefully we will solve the problem soon. At the same time we are evaluating several other applications including Kexi, a DBMS suite, as well as AbiWord,

We have given projects to children to work on at home. These projects require research, using either the internet or normal means (ie books, magazines etc). By organising information we then set the tasks of presenting their projects to the rest of the classroom. At home most children use PowerPoint or Word. Not all of them of course have access to a PC at home therefore we give alternative assignments to those children working without computers.

We have divided the children into small groups of 2. Every group has at least one student with access to a computer from home. It is quite easy for them to bring the material they have managed to create at home and open it using StarOffice/ OpenOffice Impress.

Similarly, we use open-ended assignments embeded inside Impress presentations. Students have to research through their given resources to complete the assignments. Usually students tend to 'lend a hand' to other teams and even share some of their resources and material. This is something we strongly encourage, especially inside such a classroom. Collaboration after all is everything!

We have even donated discs with OpenOffice 2 and some Live Distributions of Linux (KNOPPEL 0.5) to some students. However, they have been reluctant to use it.

Since Cyprus is a country with a high percentage of pirated MS products, OpenOffice is a real solution for effectively fighting the problem.

The prospects

With less than two weeks to go before we complete the pre-pilot stage of this research, we feel very confident that we have the right tools and we are devising the proper methodologies to make this work. This was just an initial phase, to test the machines inside the environment and isolate variables that have to do with technical issues mainly. During Summer we will work closely to develop content for both offline and online work. We are working with our partners for IBM and their business partrners Inteliscape to introduce Lotus Learning Management System to our Elementary Education. This highly praised platform will serve as the means to deliver content to students and at the same time keep proper records of student achievement.

We are not neglecting the Open Source community. We are using Moodle, an Open Source Learning Content Management System that will be open to everyone without licencing issues. However, both platforms will be used with different end users and both will be evaluated under their own respective uses.

For content development we are using Macromedia Flash, Authorware, Director (applications created run on Linux under WINE), as well as applications buiilt on REALBasic.

GENERATION 'P'

(Why kids dont learn today and *our* 'failure to connect')

'The power of a warehouse full of standard PCs in a box that fits on your desk'

(Atari ST User, 1991)

It seems quite obvious that children today dont quite resemble the children of yesterday. Much has changed in the way they conceive information and of course in the way they interact inside the classroom.

Dr Jane Healey in her books "Endangered Minds" and "Failure to Connect" attempts to identify the reasons why children today dont quite learn in the 'traditional' ways most of us were brought up. Her somewhat bias against using computers in education fails to capture a given fact: that children in our times have much greater control and access to magnificent technologies that we could ever dream of.

Take the Playstation3 for example. Sony is clearly the market leader in digital entertainment, and their announcement of the next generation console will mark a turning point in the way we perceive entertainment as well as education.

The fastest PC today boasts 50GigaFLOPS of processing power. However, the PS3 can perform as much as 2 TerraFLOPS! This once inconceivable performance will lead to an entire new era of video games that will challenge real life. Games will become (even) more realistic while children will have access to a (virtually) real world inside their games, a world where they go online (as they already do) to meet and challenge other people (Command and Conquer, Quake, etc) or even build their own teams of adventurers (World Of Warcraft, Matrix Online, Final Fantasy XI), construct their own cities or civilizations (SimCity, Civilization), conquer entire continents (Rome Total War, Alexander), even make their own families and pass their DNAs to their ancestors (The Sims).

But while this raw processing power is used to deliver stunning graphics and realistic physics, what makes games more challenging is the AI factor- Artificial Intelligence. Anyone who has ever played Half Life knows how AI can change the pace of the game. Make the slightest noise and your enemies take cover. Try to force an assault and they team together to attack you from various places. This increase in AI will require -and succeed- from our children to devise more strategies and think faster, better and 'different'.

At the same time we try to use the 'usual' methods of teaching and learning- to what extent?

Joining the Revolution

Lets take things from the beginning: there are various theories on how children learn but there is obviously no clear path on how to get there. The information overload we face today seems too overwhelming and we are refocusing our attention from delivering instructions and information to actually trying (and trying hard, from a certain point of view) to teach our children how to learn. However, it seems possible that a lot of students do know how to learn- they just learn it their own way and in their own fashion.

We have children classroom who find it dificult to concentrate in one paragraph of their text books to find a certain piece of information. At the same time, even simple questions that have to deal with understanding (of the context) seems to puzzle them. Make no mistake, every time Cyprus has participated in international surveys we have managed (with minor exceptions) to either reach bottom or at the very best reach a not-so-good average.

But then, how come these same children manage to complete games such as Square Enix's Final Fantasy X? This is not a simple game- it requires knowledge of English, albeit its not quite a philosophy text book. But, in order to complete the game, you are required to devise strategies, solve puzzles and of course, if you cant figure the answers yourself, use the internet to get some help online. Amazing as it might sound, more than a few of my students have completed this game anaided by older children or adults!

Likewise, how comes a girl who finds it difficult to realise small details from a tiny section of her Greek textbook, manage to build her own dreamhouse and establish relations in EA's 'The Sims 2'?

Or how comes half the class can learn how to create games using 'The 3D Game Creator' with just a small preview of its functions from their teacher?

Or... how come they consume (and understand, and put to use) all the information that lies inside games or inside the functions of every new electronic gadget? Or... how on earth did they manage, in just a few days, to startup the server, log into their clients, use Linux efficiently from a users point of view, save, copy, delete files, logout, shutdown the clients as if as they have been using them forever? Something definitely is going on here.

Maybe its time to embrace their culture and (to quote Apple) 'Think Different'. Maybe its about time to start thinking in 3D instead of 1D or -at best- 2D like we are doing today. Perhaps the answer to education lies more in Art than Science and perhaps we have to re-evaluate everything we know about education. This is definitely the path we (personally) intend to take- make learning a play-and-learn-while-having-fun thing instead of am-gonna-torture-you-by-using-boring-text-books-and-force-you-to learn-things-you-will-never-need-and-probably-forget-yesterday.

Even though developing actual 'games' is very prohibitive (the costs are quite high) we can either use existing games or game footage inside learning material or even teach the children to use creative tools to unleash their creativity while at the same time engage in problem-solving situations. Applications such as Stagecast Creator, Hyperstudio, 3D Game maker, even though hardly Open Source, can greatly aid our work. By blending all the digital content with a learning management platform, we can ensure that the aims of our educational system are followed with enough liberty for self expression, adjustment to student needs and immediate and necessary feedback for self evaluation and self improvement.

'Hell, there are no rules here - we are trying to accomplish something'!
-- Thomas Edison

Editor's Notes

I dont quite intend to publish my photo here- am far too ugly to even attempt such a thing and even the 3-4 readers that I expect to read this would probably be repulsed and never come back again.

Lets get serious for a moment and try to put down some facts: we have a problem and that is the quality of learning. Bill Gates, in his May 2005 speech, addressed the problem and welcomed any attempt to alleviate the rising problem of information overload. At the same time, upon closing the E3 expo, Entertainment Software Association (ESA) president Douglas Lowenstein offered his view on where gaming should go and actually introduced the concept of 'more complete games' that embrace moral values and everyday situations.

In this regard we have to start thinking of how to blend the digital revolution with the traditional teaching and create not a blended hybrid but something new, that sports 'the best of both worlds, all of their strengths, none of their weaknesses' (to quote Wesley Snipes from 'Blade').

We are taking the first step here, with this research, as we prove that it is feasible to create classrooms-computer labs that are not only inexpensive to build but also far easier to maintain than equivalent 'fat client' classrooms.

The rising of the Broadband Internet gives us access to information that was previously impossible to put our hands on- at the same time forcing us to find ways to ensure the proper content gets through and children learn how to make the most of it.

Through the use of communication tools, that children already have made their second nature, we can demolish the cultural and physical barriers between countries. We dont have to read how the Frensh or the British children learn or interact in their normal life through (biased) textbooks- we can establish video conferencing between classrooms and have the children communicate. All we need is a webcam and a respectable Internet Connection.

We dont need to have children with no access to computers- we could (and we are in the process) of donating recycled but useable computers to children without the financial capability of buying one. Thank God the people working on Open Source software have given us the means to install on these obsolete but quite useable PCs a modern Operating System and some cutting edge applications!

However, we must (at the same time) teach children to use and not abuse technology. We do not replace normal means with digital ones, the same way we never make art for art's sake. When we get to teach about oranges we dont use digital ones- we use the actual fruit. When we need to show how real athletes workout we dont use digital 3D athletes- we either show real-life videos or -if possible- actually take them to a real practice. We need to transform while keeping the best aspects of both worlds- the physical and the digital one.

As Queensryche rightly stated
'Freedom belongs only to those without Computer Screens'
(Rage To Order).

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For all your comments please feel free to email me alexandros@apoplous.org

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