International Baccalaureate

Extended essay cover

SAMPLE A

Diploma Programme subject in which this extended essay is registered: ITGS

(For an extended essay in the area of languages, state the language and whether it is group 1 or group 2.)

Title of the extended essay: To what extent is the effort made by school IT administrators, to enforce responsible computer use and security policies, futile?

Candidate's declaration

If this declaration is not signed by the candidate the extended essay will not be assessed.

The extended essay I am submitting is my own work (apart from guidance allowed by the International Baccalaureate).

I have acknowledged each use of the words, graphics or ideas of another person, whether written, oral or visual.

I am aware that the word limit for all extended essays is 4000 words and that examiners are not required to read beyond this limit.

This is the final version of my extended essay.

Candidate's signature: _____ Date: 4/02/2009

IB Cardiff use only: A: 4/7/4 B: ✓

International Baccalaureate, Peterson House,
Malthouse Avenue, Cardiff Gate, Cardiff CF23 8GL, Wales, United Kingdom

Supervisor's report

The supervisor must complete the report below and then give the final version of the extended essay, with this cover attached, to the Diploma Programme coordinator. The supervisor must sign this report; otherwise the extended essay will not be assessed and may be returned to the school.

Name of supervisor (CAPITAL letters) ____

Comments

Please comment, as appropriate, on the candidate's performance, the context in which the candidate undertook the research for the extended essay, any difficulties encountered and how these were overcome (see page 13 of the extended essay guide). The concluding interview (viva voce) may provide useful information. These comments can help the examiner award a level for criterion K (holistic judgment). Do not comment on any adverse personal circumstances that may have affected the candidate. If the amount of time spent with the candidate was zero, you must explain this, in particular how it was then possible to authenticate the essay as the candidate's own work. You may attach an additional sheet if there is insufficient space here.

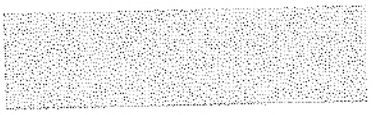
Rafal approached his essay as a "real" situation as we have just become a "lap-top school". As a result, the playing field was constantly changing as he pursued his essay. He did not see this as a difficulty but rather as proof for the validity of his investigation. ✓

I have read the final version of the extended essay that will be submitted to the examiner.

To the best of my knowledge, the extended essay is the authentic work of the candidate.

I spent [4] hours with the candidate discussing the progress of the extended essay.

Supervisor's signature: _____ Date: 4/2/09



ITGS Extended Essay

"To what extent is the effort made by school IT administrators, to enforce responsible computer use and security policies, futile?"

Candidate Name:	
Candidate Number:	
Subject Area:	Information Technology in a Global Society
Supervisor:	
School:	
Examination Session:	May 2009
Words:	3998/4000

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I. Abstract

Since I am deeply interested in the ongoing conflicts between the students in schools and the IT departments, and the issues that arise from this, my research question is *"To what extent is the effort made by school IT administrators, to enforce responsible computer use and security policies, futile?"* Students are becoming technologically smart enough to be able bypass school internet filters, or perform exploits such as getting access to local administrator accounts. The social and ethical issues covered were thus *policies* and *security*. The essay looked first at the IT background that has made this issue possible, and then at the resources that have allowed students to get technologically "smarter".

The essay provides examples of the current issues in my school, such as prevention of browsing entertainment sites. I looked at my school's Responsible Use Policy to see if there are flaws in it, which would allow students to perform computer exploits without going against any written rules. To aid me in my research, I made a survey for students and teachers[1], to see what their opinion is on the IT department, and their views on what I believe is an ongoing battle between the students and IT departments.

I concluded that the effort to enforce responsible use and security policies is currently futile to a certain extent, as there will be students who are able to get around the security. A solution is not to have a set of complex policies, but to have schools educate their students about the dangers of IT misuse, by having engaging presentations, workshops, and other trainings. More importantly, the students need to be educated to understand why the policies were set in the first place.

RQ

what and how

How

not stated

not mentioned in concl.

Word Count: 298/300

Some conclusion, but not completely consistent.

[1] See Appendix, Sections i) through vi) for complete information about the survey, pages 22-40

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ToC well-layed out

L

II. Introduction

Computers and technology are becoming more widely used in the educational environment. Many schools and universities, even elementary schools, are introducing computers, either desktop, laptops, or touch sensitive tablets.[2] The schools set many policies to combat inappropriate use of technology, but an important consideration is whether these policies are working and to what extent they are futile. One must not deny that students are getting better with technology day by day, while old-fashioned teachers don't know how to operate the equipment at the same level of expertise. More importantly, the school IT administrators either assume that the students are not technologically able enough to bypass restrictions such as website filters, or they omit patching simple vulnerabilities. Hence, students are beginning to outmaneuver their schools, find loopholes in the computer use policies, or behave stealthily to prevent detection. My "one step ahead" theory predicts that whatever is done to prevent the misuse of computers in schools, the students will find a way around it.

A: eg.

B: Context

My research question is important because it will allow exploring how and why students circumvent school computer policies, and if there is something, the administration could do to hinder this. The problem is that students are given a policy document to sign, yet it is never discussed or explained by the school. If that is not changed, student will never understand what the school wants and why it wants it. Lack of IT education could in the future lead to pupils who have a flawed sense of IT security. The social and ethical issues related to this problem are therefore *policies* and *security*.

B: Signif / worthy of inv.

[2] Ansary, Tamim. "Computers in Schools: Are We There Yet?" MSN Encarta. 5 Oct. 2008 <http://encarta.msn.com/encnet/features/columns/default.aspx?Article=computerschoolsmain&page=tamimhome>.

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III. IT Background and System

Networked computers in schools are what created this problem. In the school year 2008-2009, The International School of Brussels (ISB) distributed tablets for pupils, ranging from students in the elementary school, up to the seniors in the high school. A development that made this possible is the decreasing price of technology, which allows many schools to deploy a networked computer system. According to the Bureau of Labor Statistics[3] and December 2007 as the base period for the price index[4], in July 2005 the price index for personal computers was 142.9, while now it is 94.71. Governments are also sponsoring access to technology, such as the Digital Education Revolution[5] program in Australia, where each school is provided with grants up to one million dollars to get computing equipment. In many schools where computers are a new idea, their implementation will undoubtedly be troublesome for some faculty.

needs to be shown

The issue comes with the students, as they are beginning to outsmart, or bypass, the network facilitators in terms of technology. Last December, an image appeared on the Internet that showed a detention letter because the student was using a program called foxfire.exe, supposedly the popular browser Firefox[6]. The school released a statement that the letter was fake, digitally altered, but discussions started on social networking websites such as Digg[7]. Mathmanjeffy, who has worked in IT at a school, comments, *"Many of the teachers in schools didn't grow up using computers. They are like your parents and even grandparents. Some are tech-savvy and can stay up with the tech trends, but many are not.[8]"* Even a person who has worked in the field says that teachers are not up to date with the technology. Another poster, x788, commented, *"command prompt (cmd.exe) has been banned at my school since someone figured out "net send *. however command.com is still available[9]."* This illustrates the issue how the students are outsmarting their schools' IT administrators. x788, upon figuring out that cmd.exe was blocked, used the command.com

✓

[3] "Consumer Price Index - All Urban Consumers - Personal Computers." Bureau of Labor Statistics Data. 24 Aug. 2008 <http://data.bls.gov>.
[4] "Retail Price Index (RPI)." Oxford Reference Online. Oxford UP. 24 Aug. 2008 <http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t20.e3255>.
[5] Digital Education Revolution. 8 June 2008 <http://www.digitaleducationrevolution.gov.au/>.
[6] Firefox Web Browser. 12 Nov. 2008 <http://www.mozilla-europe.org/en/firefox/>.
[7] "Digg - Kid gets detention for using firefox." Digg. 16 Dec. 2007. 24 Aug. 2008 <http://digg.com/software/Kid_gets_detention_for_using_firefox>.
[8] Mathmanjeffy. Online posting. 16 Dec. 2007. Digg. 24 Aug. 2008 <http://digg.com/software/Kid_gets_detention_for_using_firefox?t=11329019#c11329717>.
[9] X788. Online posting. 16 Dec. 2007. 24 Aug. 2008 <http://digg.com/software/Kid_gets_detention_for_using_firefox?t=11329019#c11330195>.

2

workaround to access the command prompt. What has made all this knowledge possible? The Internet, which provides free access to nearly any learning resource. A search for "cmd.exe blocked" gave many results[10], most of them on how to get around the block. One of the results, go4expert[11] forum, had a post on how to go around the block and access the command prompt. Another article[12] from CNN describes how a fifteen-year-old boy was able to obtain the school password and change his grades from an A to a D, the reverse of what most students would do. His motive was not to help his grades, but to test his own abilities and show the school their lack of computer security. The boy was asked to write a report on how their network security can be improved. Because of his help and "high moral fiber"[13], he was given his top marks back. Even though many students don't possess the necessary expertise to perform hacks such as this one, they do exist, and schools need to make sure to protect against them. An institution that is less lenient on people hacking, is the Invercargill's James Hargest College, where a pupil was expelled for gaining access to sensitive information[14].

Use of command not explained

Students in conjunction with IT in schools can sometimes cause issues. The outcome of this is that schools put effort into creating computer use policies, but the issue is if the students are obeying them, and how futile these policies are.

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[10] "Google." cmd.exe blocked - Google Search. 6 Sept. 2008 <http://www.google.com/search?hl=en&q=cmd.exe+blocked&btnG=Search>.

[11] Aussiedude. "cmd.exe block work around." Online posting. 30 May 2008. Go4Expert. 24 Aug. 2008 <http://www.go4expert.com/forums/showthread.php?t=10932>.

[12] Legon, Jeordan. "Student gets 'A' for hacking school computer." CNN. 18 Dec. 2002. 24 Aug. 2008 <http://edition.cnn.com/2002/TECH/internet/12/17/student.hack/index.html>.

[13] Wayne Norton – Advisor of the boy

[14] "Invercargill student expelled for hacking school." Stuff.co.nz. 13 Oct. 2008 <http://www.stuff.co.nz/4724020a7694.html>.

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IV. The Resources

It is becoming increasingly easier for anyone to gain access to restricted areas in the computer, or exploit other vulnerabilities. The issue of students outsmarting the IT departments wouldn't exist if not for the "how to" information about hacking and network exploitation which is readily available on the Internet.

An interesting book on the subject is "Gray Hat Hacking"[15]. It provides a preface about the ethics of hacking, and then continues about the necessary tools and step-by-step tutorials on privilege escalation. The figure below is from the book, and illustrates the attack sophistication vs. intruder knowledge.

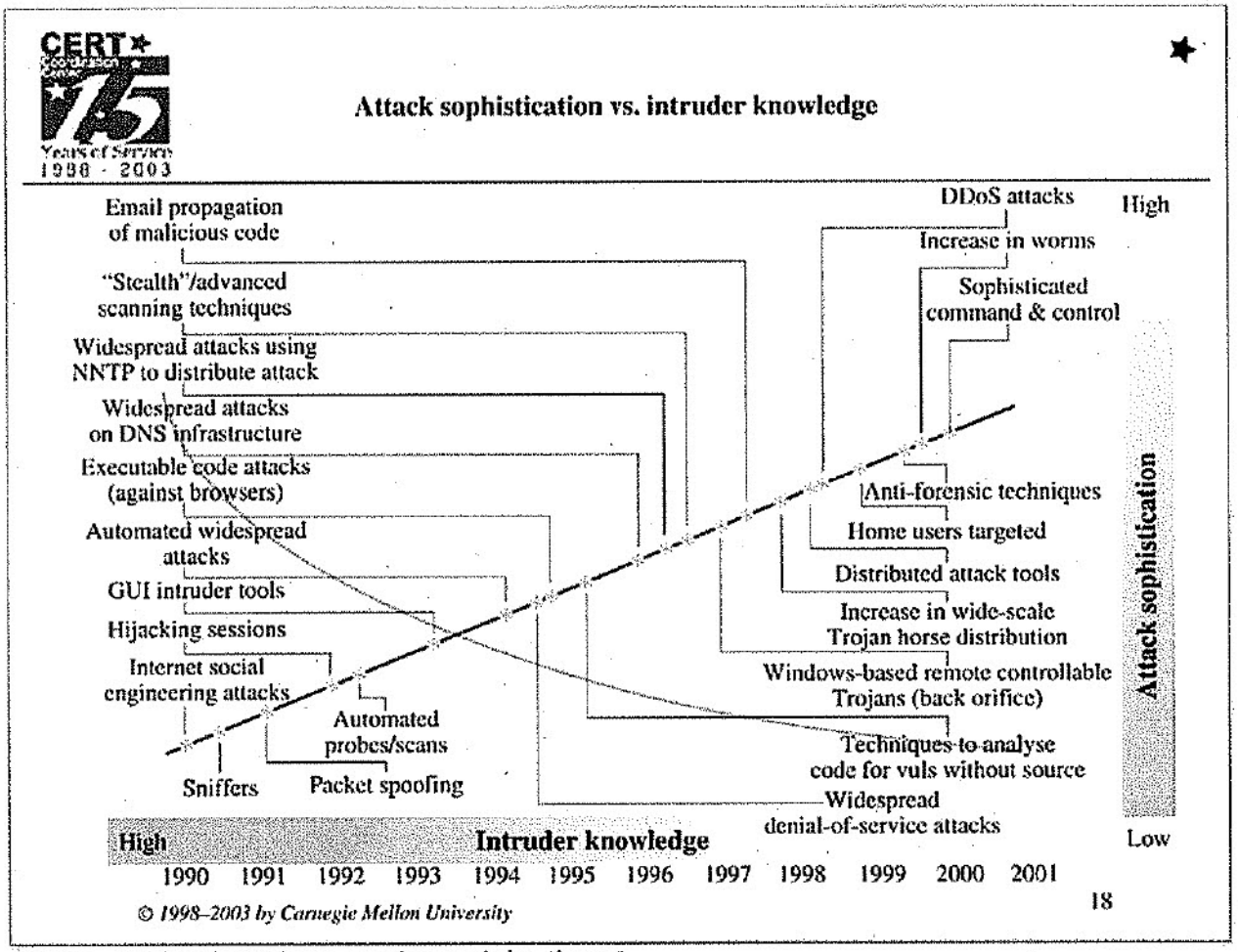

Figure 1 - Attack Sophistication vs. Intruder Knowledge. Shon, p9

[15] Harris, Shon, et al. Gray Hat Hacking - The Ethical Hacker's Handbook. N.p.: McGraw Hill, 2008.

The graph illustrates the trend of how powerful your attack is versus how much you know. In 1990, you had to have a highly technical knowledge to exercise even a simple network sniffing attack, while now, with the help of various tools, even someone non-technical could perform a denial of service attack. The author writes, *"Easy access to ways of exploiting vulnerabilities gave rise to the script kiddie point-and-click tools available today, which allow people who did not even understand the vulnerability to successfully exploit it"*[16]. A non-technical teenager is able to download the software, which will allow him/her to perform tasks such as WEP/WPA key extraction[17] or hashed password cracking[18].

It astonishes how much information one can find on the Internet about the subject of privilege escalation, which is why we are experiencing this problem, and why we have a more technologically aware young generation. There are countless sites which show step-by-step hacking instructions. For example, the site "Hack This Site"[19] allows you to follow a series of missions to test your hacking abilities. Other sites from which one can learn exploiting are milw0rm[20], a collection of videos and exploits, and remote-exploit[21], the creators of Backtrack[22], the penetration testing Linux distribution. If one is having trouble with performing an attack, the online community forums will usually be glad to help.

The cause of this issue is the fact that computer security tools are widely available on the Internet, which has led to *script kiddies*, people who do not understand the underlying exploit, but rather download specific software, and click to gain access.

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[16] Shon, p49.
[17] "Wireless WEP Key Password Spy 1." Cnet Download. 6 Oct. 2008 <http://www.download.com/Wireless-WEP-Key-Password-Spy/3000-2085_4-10559819.html.>.
[18] Ophcrack. 6 Oct. 2008 <http://ophcrack.sourceforge.net/>.
[19] Hack This Site! 6 Oct. 2008 <http://www.hackthissite.org/>.
[20] milw0rm - exploits : vulnerabilities : videos : papers : shellcode. 6 Oct. 2008 <http://milw0rm.com/>.
[21] Remote-Exploit.org - Supplying offensive security products to the world. 6 Oct. 2008 <http://remote-exploit.org/>.
[22] "Backtrack." Remote-Exploit.org - Supplying offensive security products to the world. 6 Oct. 2008 <http://www.remote-exploit.org/backtrack.html>.

V. Policies and Loopholes

Nearly every school with an IT infrastructure will have a set of IT policies. This is the case in ISB, where before receiving a tablet-PC, one must sign a form declaring one agrees to the tablet rules. Last year this document was named "Acceptable use Policy", while this year it has been renamed to "Responsible Use Policy" (RUP)[23] to highlight the fact that the school would like the students to learn responsibility, rather than make them do what the school deems "acceptable". This subtle language difference is interesting, as it shows how schools are beginning to take a different approach; rather than telling students what is acceptable, teach them responsibility. ISB has followed the path that the American School of Bombay (ASB) has taken, shifting the name of the rules from "acceptable" to "responsible". ✓

The most important part is the implementation and understanding of the policies. In ISB, nothing has changed except the name of the policy. A mechanical approach is present, as ISB does nothing except give you a document, which you have to sign, as otherwise you can't attend the school. There is no training, workshops, presentations, or even short discussions clearly explaining the content of these policies and why it's important to follow them. Hence, the students don't know and understand these rules, as my survey shows that 57% of students either never read them, or don't remember them (graph below). The problem is that the school gives policies and procedures, but does not actively engage students in their full understanding and implementation. analysis

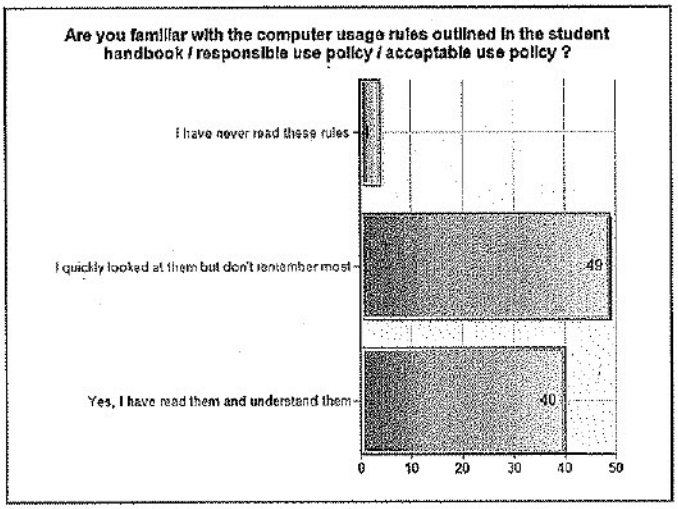

Figure 2 - Student Survey Question 2 Answers

[23] ISB. High School Responsible Use Policy & Tablet Agreement. N.p.: International School of Brussels, 2008. See Appendix, Section vii), for whole document, page 41

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There is a flaw in these policies, as the school IT administration cannot put every possible rule in the student handbook as that would make it a book. This creates policy loopholes, so some students might argue that there was nothing in the rules about security bypasses such as administrator password extraction using a bootable Linux distribution, for example Ubuntu[24]. That is why it's important to make students feel engaged and responsible, than having them follow a set of written, complicated, policies.

analysis

The following examples will clearly demonstrate the effect to which the policies set by the school are mostly futile, as students find ways to circumvent them, many times without detection. This is the issue of *security*, as whenever students perform these exploits, they are breaching the security of the network.

[24] "Download Ubuntu." Ubuntu. 6 Oct. 2008 <http://www.ubuntu.com/getubuntu/download>.

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VI. Examples of Impact on Society

i. Extraction of the WPA2 Preshared Key

The introduction of tablets required ISB to set up wireless access points. To allow only trusted people to be able to connect to the wireless network, a protection scheme has to be employed, which usually is either WPA or WPA2, which are more secure than the still widely used WEP, that is vulnerable to attacks. At ISB, WPA2 protection is used, so to connect, the client needs to know the predefined password.

When students asked if they could have the password to connect their iPods/iPhones/personal laptops, the IT department has refused, saying that it is a security risk. Angered, some became determined to figure out the password to gain access. As a member of the student body, I am able to look at what some students did. The vulnerability exploited was that for everyone to connect to the wireless network, the WPA key had to be locally stored on each machine. Using my theory of how easy it is find hacking tools using the Internet, one can quickly find *Wireless Key View*[25], which after running, displays the list of locally stored wireless passwords. Within days, every student with an iPod/iPhone or another Internet-capable device could connect to the school network.

The school denies giving of the password, so students figure it out themselves, which follows my theory of how students will be ahead, without even breaking any rules, since the policy does not state anything about WPA key extraction. The question is if it the WPA protection was needed at all, as all it does is it prohibits legitimate users from accessing the network. When visitors come to ISB, they cannot connect their own laptop to the network because of these policies[26]. The impact of this on the school is that ISB has not only failed at protecting the WPA2 preshared-key from students, but also made harder, if not impossible, for legitimate users, such as visitors, to access the network.

eval.

[25] Sofer, Nir. "WirelessKeyView v1.18 - Recover lost wireless network key ." Nirsoft. 3 Oct. 2008 <http://www.nirsoft.net/utils/wireless_key.html>.
[26] Smith, Tom. Informal Conversation. 24 Oct. 2008.

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ii. Lack of Computer Privileges

If the school provides their own computers, such as is the case in ISB, which gives tablets to every student, the users will have no administrative privileges on their machine. This is done for security purposes; nevertheless, the practice infuriates many legitimate students who would, for example, like to install a printer driver to be able to use the printer at their house. The issue of *policies* arises again, as students will try to go around the protection schemes set up by schools.

As a student, I was able to observe the process of privilege escalation at ISB. Using the fact that administrator passwords have to be stored locally on each machine, people used a popular method of password cracking. Firstly, one has to boot to Linux using a USB distribution such as Damn Small Linux, and extract the .SAM hash file from the appropriate system directory. This file, as it stores hashed versions of local passwords, is inaccessible from Windows because of security policies, and thus has to be copied using Linux which allows direct access to that directory (%systemroot%/system32/config/). Then, the students used rainbow tables in combination with software such as Ophcrack[27], to bruteforce the hashes and recover their unencrypted versions. Detailed tutorials for this procedure can be found via Google extremely easily[28]. Now the students were in possession of the local administrator password, and had full control over the machine. Thus the IT administration has failed at enforcing their policies.

My theory how the school will respond came true, as soon after realizing what has happened, the exploit was disabled by the IT department. Now the local administrator account and the BIOS are both disabled, rendering the use of Safe Mode to re-enable it obsolete. As of now, there are no students who have figured out a way to gain administrative privileges on their tablets, but this is just a matter of time. Since this is a BIOS lock, someone in the future will probably take the time to remove the hard drive and attach it a hard-drive reader, which will enable the person to regain administrative privileges.

Sometimes, it is also the idea of doing something prohibited, that excites IT-savvy students to experiment with hacking. For my survey, an IT Admin replied, *"It's a challenge for the students to*

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[27] Ophcrack. 6 Oct. 2008 <http://ophcrack.sourceforge.net/>.

[28] "Crack and Hack to Find, Reveal, Get, Recover and Retrieve All Windows Passwords with Ophcrack 2 and Rainbow Tables." My Digital Life. 4 Oct. 2008 <http://www.mydigitallife.info/2006/11/05/crack-and-hack-to find-reveal-get-recover-and-retrieve-all-windows-passwords-with-ophcrack-2-and-rainbow-tables/>.

manage to hack the system, so they will not give up, it's too much fun"[29]. This could spring a possible solution of giving everyone local administrator accounts, as is the case in the International School of Zurich[30].

The issue is whether the policies limiting the privileges are essential, since it has been shown that there will always be students who will figure out a way to get what they desire. These restrictions are only hindering the legitimate users who would like to, for example, print their homework at their house, but cannot because driver installation is prohibited.

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[29] Respondent 6. "Rafal Szymanski Extended Essay - For Teachers and Admins." Survey. 16 Sept. 2008
See Appendix, Section vi), Respondent no. 6, page 37
[30] Crouch, Kevin. Informal Conversation. 20 Nov. 2008.

iii. Entertainment Prevention

Schools don't appreciate the use of technology for entertainment purposes during school hours. It is against the policies to play computer games, watch videos, or otherwise use the technology for fun.

Students though, usually are not concerned about these policies, and play networked games regardless of the proposed restrictions. An example of policy circumvention is that many educational institutions use web-filtering software such as ContentKeeper[31], which allows blocking sites such as YouTube [32] or Facebook[33], but students find ways to circumvent it. I have noticed in ISB the use of various circumvention methods, but primarily the use of proxy-servers, which allow fooling the school server into thinking that it is not connected to the site the user is viewing[34]. Another method I have seen put into use is accessing a blocked site through its static IP[35], which sometimes allows circumventing protections.

"static IP" needs descrip.

The student body is able to be "one step ahead", and go around protection mechanisms. There is the issue of *policies* again, as why do the schools keep on blocking entertainment portals knowing that students will circumvent them. The administration should either get rid of this protection, or implement a foolproof method, as currently some students even consider it fun to bypass restrictions, and thus prove themselves IT-savvy.

Source?

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[31] ContentKeeper Technologies. 11 Oct. 2008 <http://www.contentkeeper.com/products/web/>.
[32] YouTube. 6 Oct. 2008 <http://youtube.com>.
[33] Facebook. 6 Oct. 2008 <http://www.facebook.com>.
[34] "Proxy Server." Whatis. 2008. 2 Oct. 2008 <http://whatis.techtarget.com/definition/0,,sid9_gci212840,00.html>.
[35] "What is Internet Protocol?" SearchUnifiedCommunications.com Definitions. 9 Sept. 2008. 3 Oct. 2008 <http://searchunifiedcommunications.techtarget.com/sDefinition/0,,sid186_gci214031,00.html>.

R.

VII. Survey Result Analysis

i. Student Survey Analysis

The student survey gave me an insight into what the students in grades 9-12 think about this issue[36]. Question 4 (diagram below) had interesting answers, as 92 out of 93 respondents said that they never had their computer account suspended, while in Question 6 (diagram below), 59 students said that they broke the computer rules.

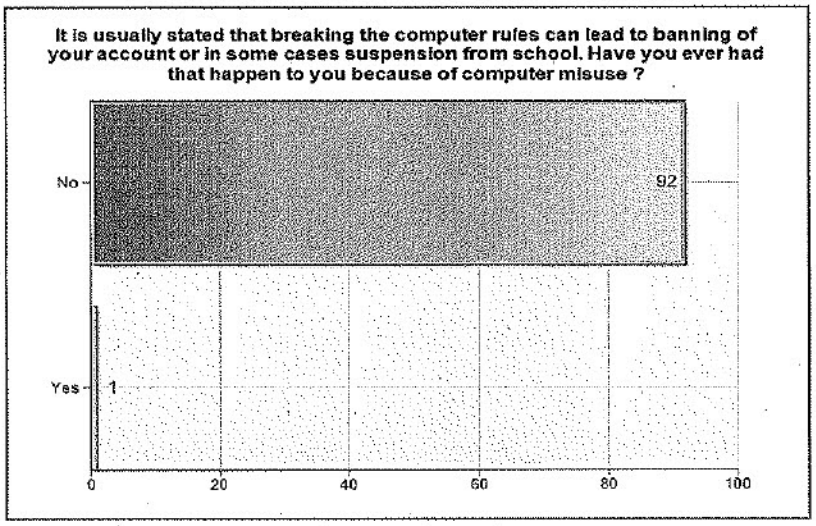

Figure 3 – Student Survey Question 4 Answers

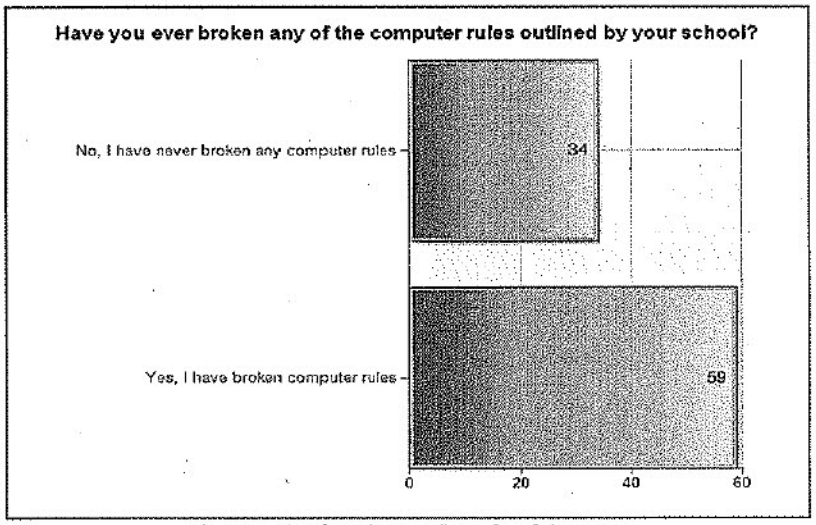

Figure 4 - Student Survey Question 6 Answers

[36] See Appendix, Section i) and ii) for full information about the student survey, page 22-27

This is interesting, as the RUP states that your account may be suspended for misuse. The fact that barely anyone actually had that happen shows that the institution is not heavily enforcing their own RUP. Possibly it either needs to be altered to not mention this, or this draconian system should be enforced, as currently the consequences of computer hacking are very unclear.

analysis

See last line p43 of policy - "clear"!

As mentioned earlier, 57% of students either never read, or do not understand the policies, which defeats the purpose of these regulations. The problem is that ISB doesn't engage its students in the understanding of the policy, but rather follows a pattern of *sign it and forget it*, and this needs to be changed.

analysis, eval.

On Question 7 (diagram below), about 25% of the respondents said that they think they can outsmart the IT department, which reinforces my theory of how the young generation is becoming very technologically aware, and is able to execute a multitude of exploits.

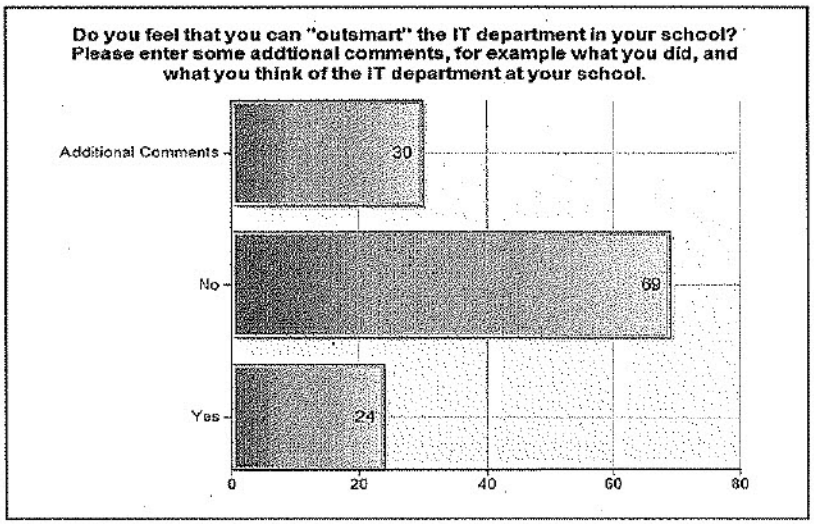

Figure 5 - Student Survey Question 7 Answers. Note: Only possible answers were Yes/No. Additional Comments were not mandatory.

Student respondent 20 additionally comments, *"There's a trick around everything, so everyone probably could* [outsmart the IT] *if they wanted to put the effort in it."*[37], which is a good example of the general view of the student body.

cannot generalize 1 to many

[37] Respondent 20. "Rafal Szymanski Extended Essay - For Students." Survey. 16 Sept. 2008. See Appendix, Section v), Respondent 20, page 33

ii. Admin/Teacher Survey Analysis

This survey helped me understand more what the IT facilitators and schoolteachers think of this issue. The majority of respondents (26/45) said that they believe that there is a constant battle going on between the IT department and the students. A number of comments illustrated that a solution is to teach the students responsibility, as respondent 4 writes, *"I think it is important to teach RESPONSIBLE use. In the real world, there is rarely a filter to try to get around."*[38].

I agree fully that schools are trying too hard to prevent the students from computer misuse. As the teacher above states, when we leave for our future jobs, there will be computer rules, but the consequences of not following them will be stricter. Hacking will probably mean losing your job or facing criminal charges.

evidence should have been collected on this.

[38] Respondent 4. "Rafal Szymanski Extended Essay - For Teachers and Admins." Survey. 16 Sept. 2008. See Appendix, Section vi), Respondent 4, page 37

VIII. Possible Solutions

At first, I thought a good solution would be to have the students buy their own laptops, which would reduce the school's jurisdiction upon them. After reading numerous survey answers pertaining to this, it would not be a viable solution, since not all students would be able to afford it, and handling different hardware would be difficult for the IT department.

Considering the teacher and student survey results, it is vital that computer responsibility be taught in schools. While breaking computer rules in a school environment is not malicious, it can be devastating in your future life. Hence, the solutions are:

- Show presentations teaching IT responsibility and depicting the dangers of its misuse. There is a need for discussions, trainings, and workshops, which present the content of the RUP and develop full understanding and responsible engagement. These could be delivered by professional external presenters, IT teachers, or mature ITGS students. When I had my internship at a professional company[39], everyone was required to take online quizzes, which tested their knowledge of IT security; this professional approach should be undertaken by schools. While extremely important, IT security is not taught, and I have not seen any talk in ISB about IT responsibility.
- Students who enjoy hacking/exploitation should be openly invited by the school to exploit as much as possible, and then report these so that the holes can be patched. Students will feel engaged if they are given this trust, and hence will stop covert hacking.
- Reduce the number of policies to a minimum, giving the students freedom, and hoping that common sense of responsibility will prevail. While risky, the reason why many students experiment with hacking is that it is a challenge to perform exploits. Possibly, if the access to things such as the local administrator account is there, students will no longer find it interesting to hack. On the other hand, putting too much trust into the students could result, for example, in the network becoming virused.

Should consult IT Dept.

opinion - has this been done?

analysis, what were the results in Zürich?

[39] I had my internship at a pharmaceutical company, *AstraZeneca PLC*, in Belgium, in the IT department

R

IX. Conclusion

Looking at the survey answers and examples on the Internet of students hacking, I believe that my "one step ahead" theory prevails in school environment, and that the effort made by schools' IT departments to enforce responsible computer policies is currently mostly futile. This is because there will be individuals who are determined to get what they want, which means going against the RUP in most cases. On the other hand, the answer to the question also matters in how strict a school is with punishments – in the aforementioned article[40], the school expelled the student for hacking, which set an example in that school. Probably no more pupils from that institution will do similar things. According to my survey, 99% of the students weren't expelled nor had their account banned. This could be because ISB and ASB are private schools, were the policies are more lenient. The solution found throughout this investigation was to have schools educate their students about IT security and the consequences of hacking. It's important not only what types of procedures are to be followed, but why they are to be followed. Once the students understand this, and feel engaged and trusted, they will not exploit anymore.

An unresolved question stemming from this essay is whether expulsion is a just punishment in the fight between IT department and students.

✓ 99% inc.

Opinion, no evidence

No research from schools with training and RUP

Not the biggest unresolved issue... ie. What kind of training would be effective for students?

[40] "Invercargill student expelled for hacking school." Stuff.co.nz. 13 Oct. 2008 <http://www.stuff.co.nz/4724020a7694.html>.

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XI. Appendix

i. Student Survey Questions:

Thank You for visiting this survey. Please answer the questions below. The results will be used for my ITGS Extended Essay about computer policies in schools. You will remain anonymous, so please give constructive comments

1. What is your current grade level?
    a. 9
    b. 10
    c. 11
    d. 12

2. Are you familiar with the computer usage rules outlined in the student handbook / responsible use policy / acceptable use policy?
    a. Yes, I have read them and understand them
    b. I quickly looked at them but don't remember most
    c. I have never read these rules

3. Were you ever confronted by a teacher for playing computer games?
    a. Yes
    b. No, and I play games
    c. No because I don't play games

4. It is usually stated that breaking the computer rules can lead to banning of your account or in some cases suspension from school. Have you ever had that happen to you because of computer misuse ?
    a. Yes
    b. No

5. Do you feel that there are too many computer rules in your school ?
    a. Yes, there are too many rules
    b. It's just about right
    c. No, my school should have more computer policies

6. Have you ever broken any of the computer rules outlined by your school?
    a. Yes, I have broken computer rules
    b. NO, I have never broken any computer rules

7. Do you feel that you can "outsmart" the IT department in your school? Please enter some additional comments, for example what you did, and what you think of the IT department at your school.
    a. Yes
    b. No
        i. Additional Comments box available

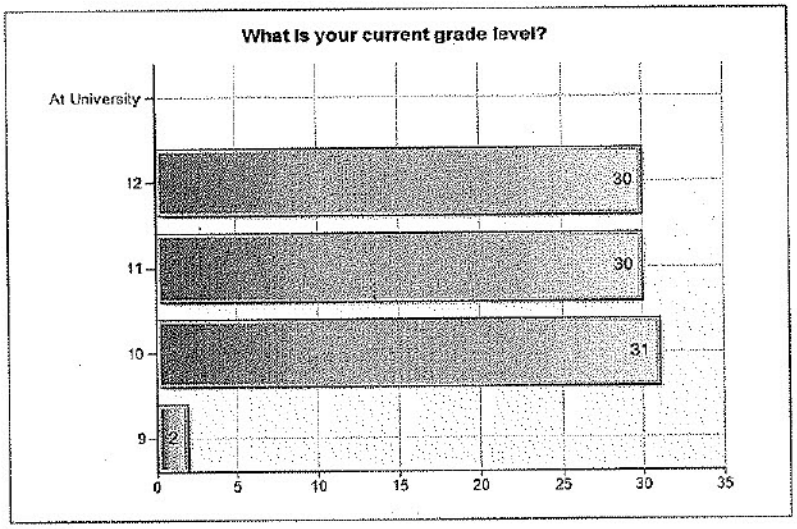
8. If the scenario below is the scenario in your school, just answer what you think about it.

    Do you think a better idea for tablets in schools would be the following: *The tuition stays the same and you have to buy your own tablet from a set of certain models. The tablet is your property and you are free to install any software on it that you want.*

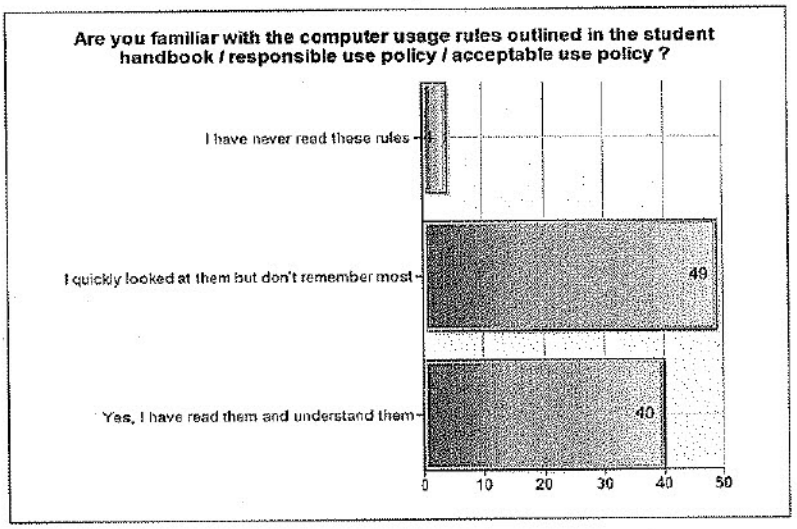
    a. Yes
    b. No
        i. Additional Comments box available

ii. Student Survey Collated Responses (Graphs)

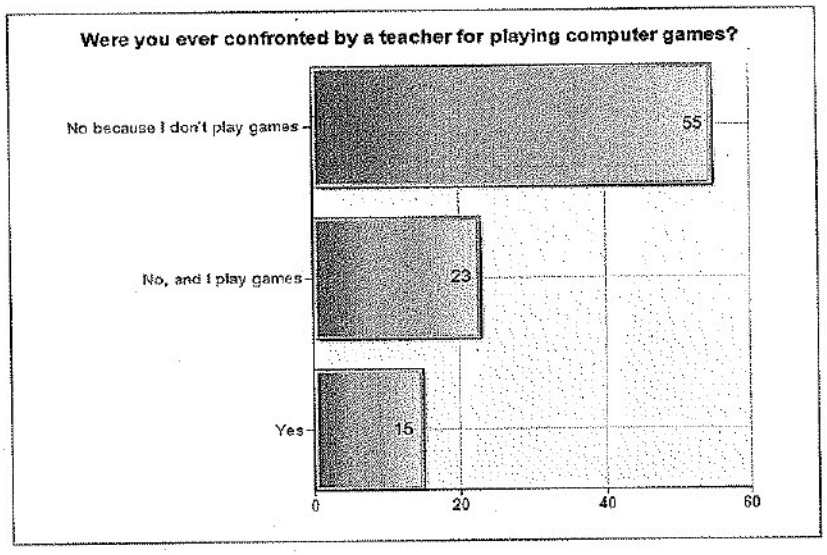
Computer Policies Survey - For Students: What is your current grade level?



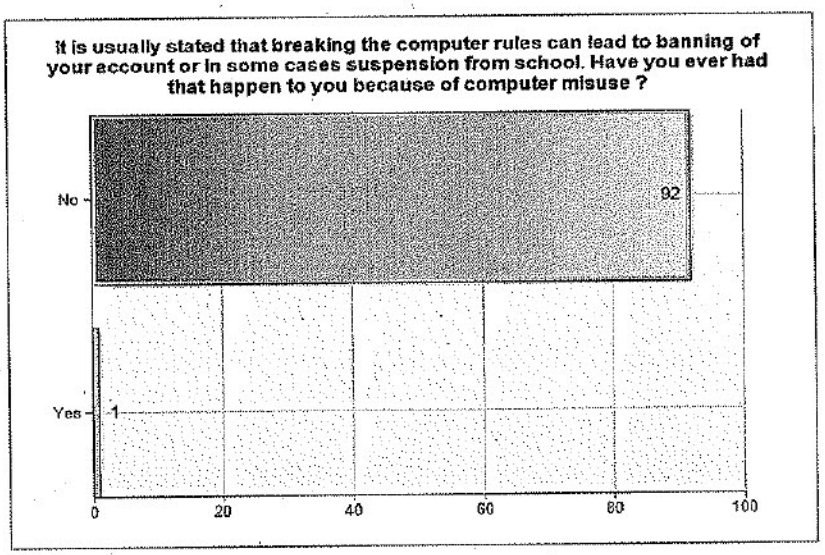
Computer Policies Survey - For Students: Are you familiar with the computer usage rules outlined in the student handbook / responsible use ...



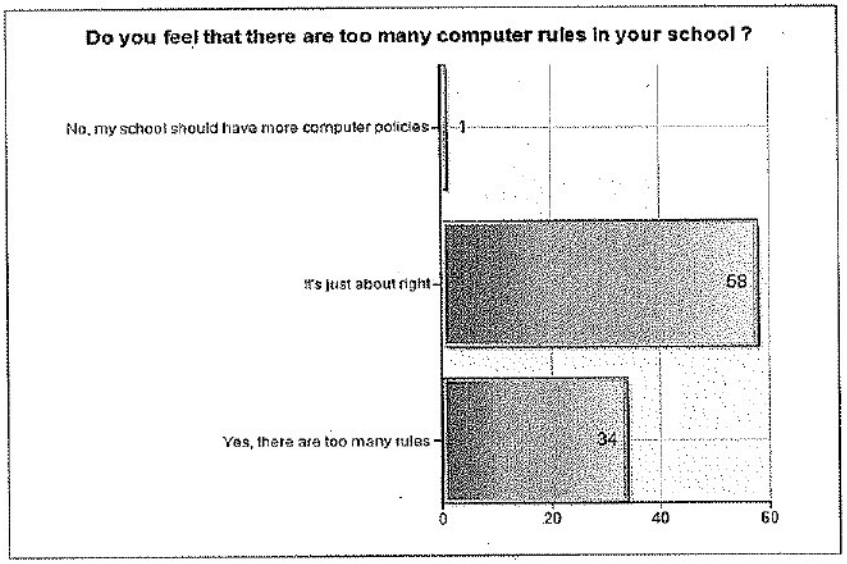
Computer Policies Survey - For Students: Were you ever confronted by a teacher for playing computer games?



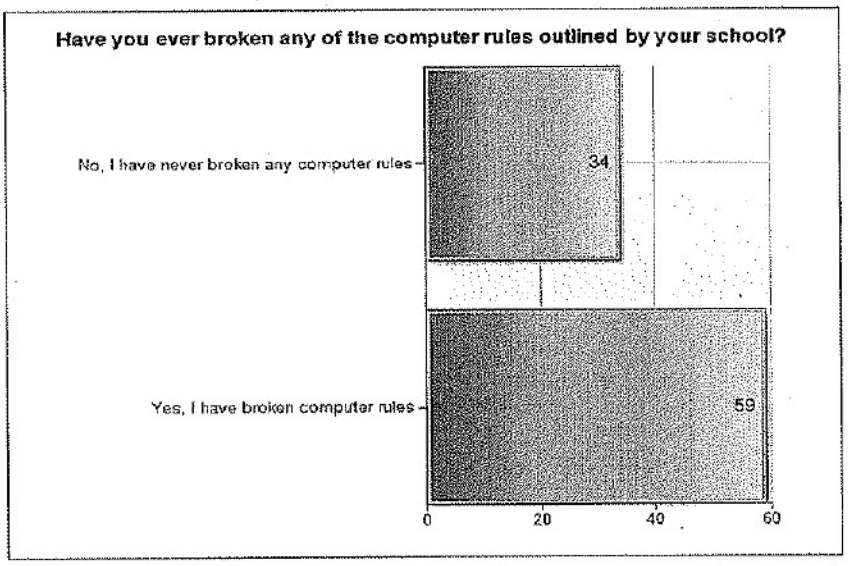
Computer Policies Survey - For Students: It is usually stated that breaking the computer rules can lead to banning of your account or in s ...



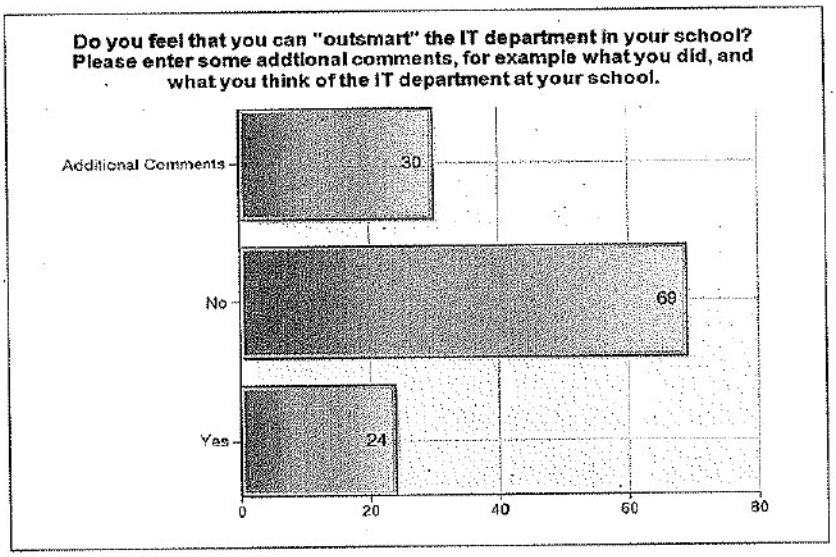
Computer Policies Survey - For Students: Do you feel that there are too many computer rules in your school ?



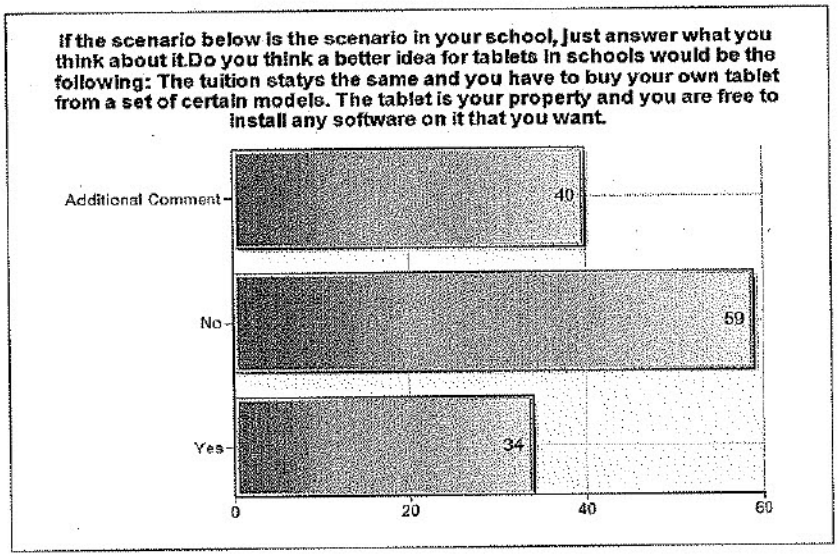
Computer Policies Survey - For Students: Have you ever broken any of the computer rules outlined by your school?



Computer Policies Survey - For Students: Do you feel that you can "outsmart" the IT department in your school? Please enter some addtional ...



Computer Policies Survey - For Students: If the scenario below is the scenario in your school, just answer what you think about it.Do you ...



iii. Faculty/Teacher Survey Questions

1. What is your position in the school?
   a. Teacher
   b. Network admin or an IT facilitator
   c. Other, please specify

2. Do you believe that there is little, just right, or too many computer rules in your school?
   a. Too little
   b. Just right
   c. Too many

3. Were there ever students in your school who circumvented the protections set up by the network administrators, such as visiting websites which normally should be blocked, or somehow getting access to local administrator account?
   a. Yes
   b. I don't know of any such students

4. Has there ever been an incident in your school of a student who got his/her computer account suspended, or even got suspended from school, for breaking computer policies?
   a. Yes
   b. No
   c. I don't know

5. Do you believe that there is a constant "battle" going on between the students and the IT department in the school?

   For example, students figure out the local administrator account credentials, and the IT department changes the password and implements a method which no longer allows to get the password using the students' previous method. Eventually the students figure out a new method and the "battle" continues.

   The above is just an example, but the point is if you believe that whatever protection or policy the school sets, will the students get around it?

Please enter some additional comments

a. Yes
b. No
c. Additional comments box available

6. Do you believe that the following scenario is a good idea in a school environment? If that is the current scenario in your school, reply as to what you think of it.

The tuition stays the same and the students have to buy their own tablet/laptop from a set of certain models. The device is their property, and they are free to install any software they want on their computers.

Please enter additional comments!

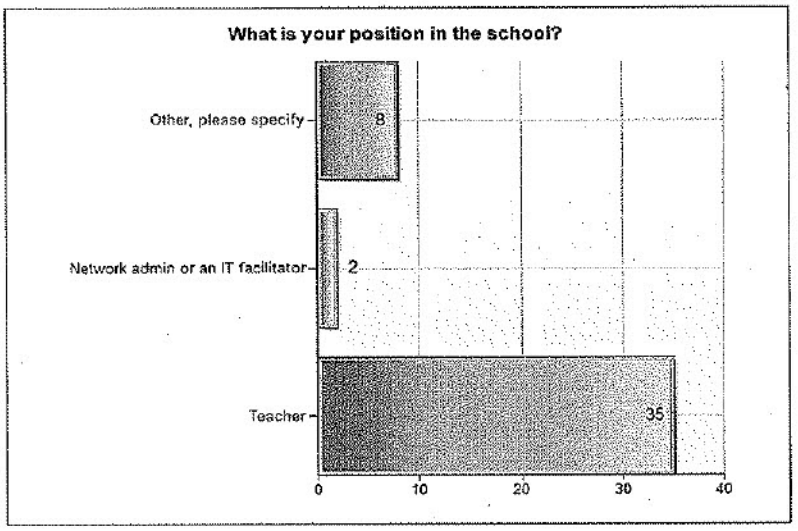
a. Yes
b. No
c. Additional comments box available

7. Any additional ideas that could help me with my essay?
   a. Comments box available

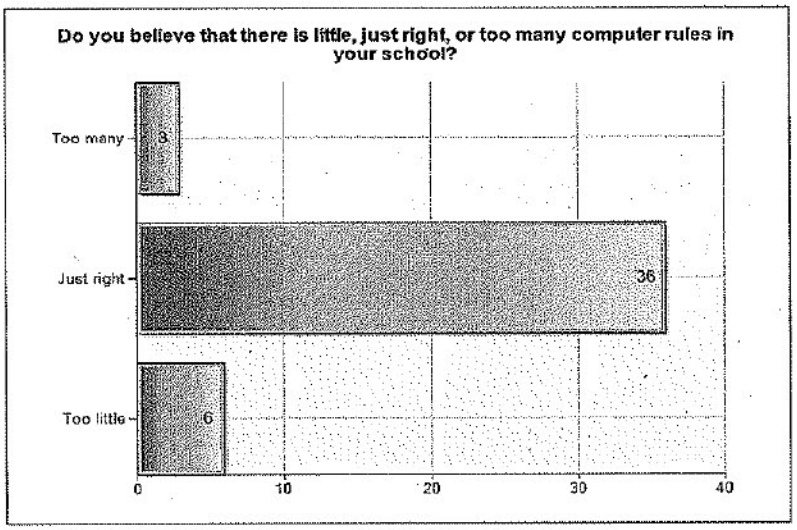
R

iv. Faculty/Teacher Survey Collated Responses (Graphs)

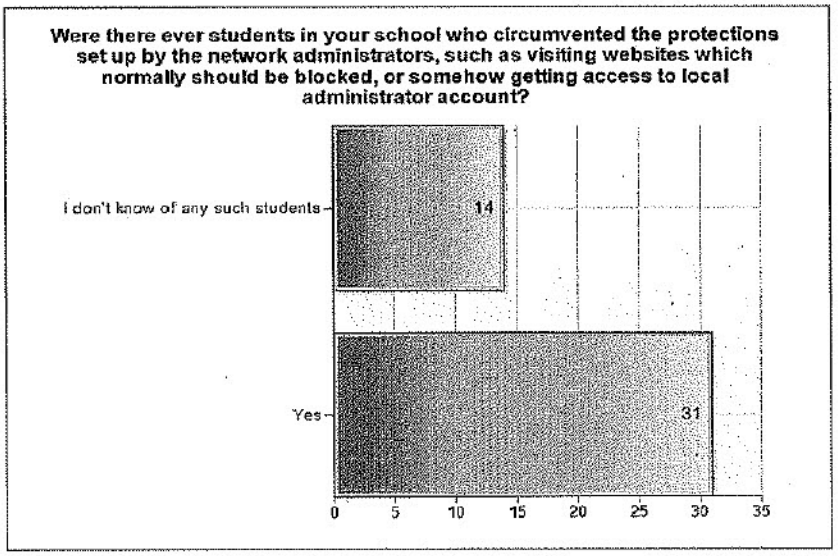
Computer Policies Survey - For Teachers and Administrators: What is your position in the school?



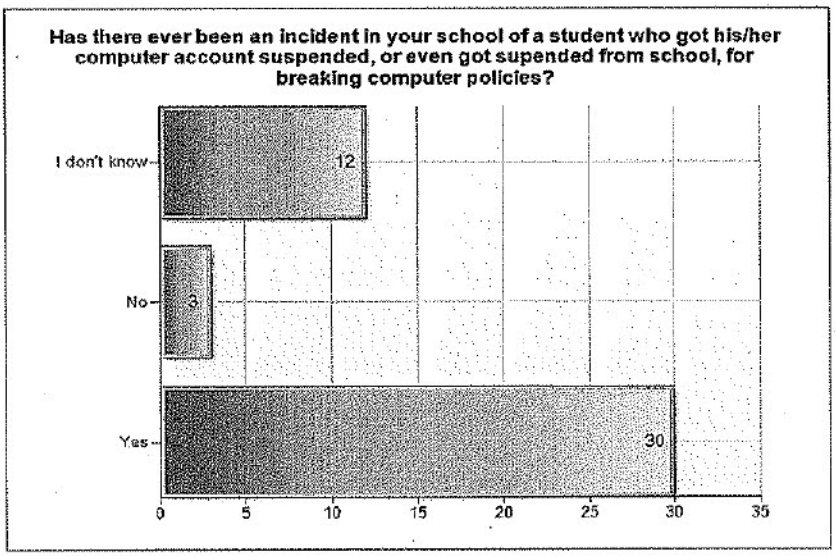
Computer Policies Survey - For Teachers and Administrators: Do you believe that there is little, just right, or too many computer rules in your school?



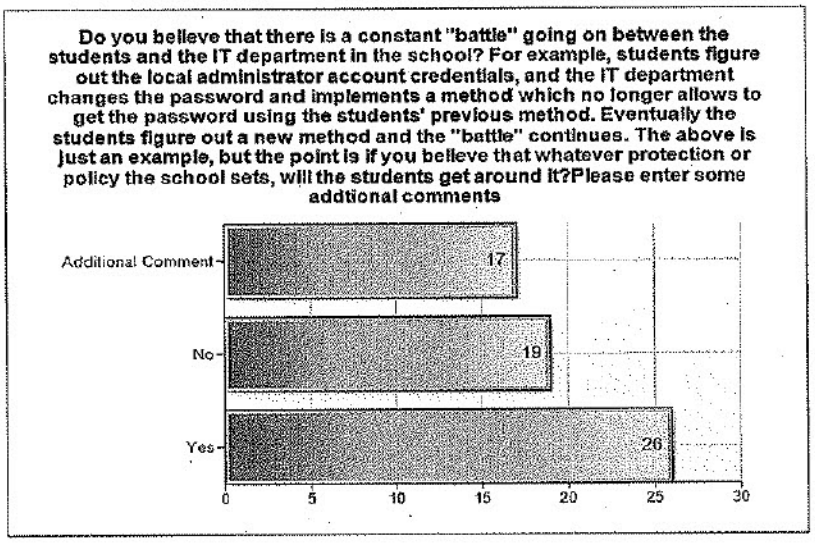
Computer Policies Survey - For Teachers and Administrators: Were there ever students in your school who circumvented the protections set up by the network ad ...



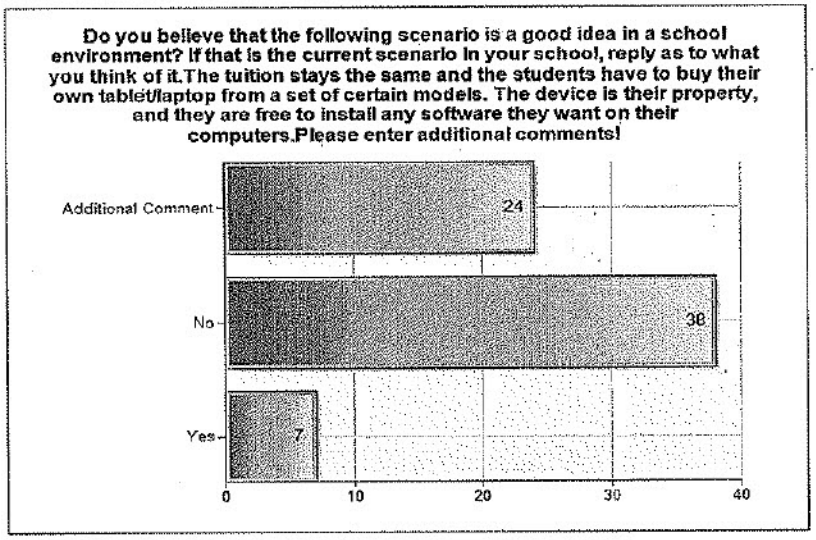
Computer Policies Survey - For Teachers and Administrators: Has there ever been an incident in your school of a student who got his/her computer account susp ...



Computer Policies Survey - For Teachers and Administrators: Do you believe that there is a constant "battle" going on between the students and the IT departm ...



Computer Policies Survey - For Teachers and Administrators: Do you believe that the following scenario is a good idea in a school environment? If that is the ...



v. Student Survey Individual Responses[41]

Question 7: Do you feel that you can "outsmart" the IT department in your school? Please enter some additional comments, for example what you did, and what you think of the IT department at your school.

Question 8: Do you think a better idea for tablets in schools would be the following: *The tuition statys the same and you have to buy your own tablet from a set of certain models. The tablet is your property and you are free to install any software on it that you want.*

Respondent No:	Question 7 Comment	Question 8 Comment
1	YES THEY ARE WIN BUT I ARE MORE WIN	THIS IS THE LOGICAL THING TO DO
2		
3		
4		
5		
6		
7		
8		Some families though wouldn't be OK with buying the computers. The option where the school supplies you with one should still be available.
9	They will be able to find anything you do, so it is pretty much impossible to out smart them	Now, everyone has the same and its just a part of school instead of you
10		
11		
12		
13		um no too lazy
14		
15		
16		
17		
18		
19		
20	There's a trick around everything, so everyone probably could if they wanted to put the effort in it. It'll only attract problems, and IMO there's no point doing it except maybe giving you a e-boner.	I have (and most people) have another computer available to install any software they want or do anything they want to do with it. The tablet is there mostly for extra utility, and I would do perfectly fine without it. Besides, a lot of people would not be able to afford it.
21	Yes, we already did with admin ;)	It would be tough to set up to work with all the school licenses and programs, but I like the theory of it better than the current model.
22	I believe that in some aspects the policies are completely unreasonable. My tablet was taken away for being in the lunch room and held overnight. The new tablets make us dependent on taking notes and working on them. This	

[41] Note: Only free response questions are included here. The answers to the other questions are holistically documented in the preceding graphs.

	severely affected my ability to work on anything that night.	
23	No you can't. They can catch you at any time or any where.	No because if you can install anything. You can do bad things that the school and your parents will not premit.
24	i found codes to put into the address box of the site i wanted to go to so that it wouldn't be blocked anymore. ie. facebook, youtube, etc.	
25		
26	I believe it has done a very good job so far...	
27		
28		
29	the computer department should give more rights	even though the price is proably quite high, itwould help the students use IT efficiently
30		A few families would be unable to afford their own tablet, especially if there were several siblings in that family enrolled in the school. From the school's perspective, this is unwise as it prohibits the unauthorised installing of programmes for a reason, even if the student body does not share this view.
31		I don't think this is a good idea, as i only ever use my tablet in school. At home i use my own laptop.
32	I dont understand much about technology, the IT department is very helpful.	Some people do not feel they need a tablet and as a result, they don't use the one they're given and are more likely to break it. However, I think the tuition should be a little higher and students can buy tablets from the school at a discount in order to encourage the use of technology.
33	I dislike the IT dep. If I could outsmart them, I would love to	
34		That would be a good idea as well but i think how it is now is ok.
35	I think the IT department is really helpful and efficient - there is always someone available to help you when your tablet doesn't work.	My parents would not want to pay for our own tablets. Besides, I already have my own computer at home, so I won't need it unless I'm at school.
36		
37		Yes, I think that is a good idea they give us an amount of tablet to choose and we take anyone we want! this is a good idea
38	on certain things, like finding ways onto sites that are blocked (like facebook) but i have yet to figure out how to get administrator access	our tution is definitly high enough to pay for computers for all of us
39		
40		
41		I think on some levels this is better because it can get annoying not being admin sometimes, and knowing that theyll take the tablets away from us at the end of the year anyways, but on the other hand, the school wouldnt be responsible for broken or lost laptops and so it'd be more of a hassle for us
42		tuition be the same, we should get free tablets
43		
44		
45		
46		
47	IT department is very helpful	
48		
49		
50		I wouldn't be able to afford it.
51		

52		
53		
54		There is more choice and you can use it as your personal computer instead of needing two.
55		no because some people may already have their own tablets, and most people already have their own tablets at home so if they want to misuse their computers, they should use their own computer
56		it's a learning instutition, everyone should have the same or nothing at all, installing programs could lead to studetns having an advantage/more distractions in class.
57		
58		
59	If someone realy wants something they will find a way around the restrictions put up by the IT Department	Many children at the school aer from embassys, if the government did not pay for their tuition then they would not be at ISB.
60		
61	In some ways you can get around not being able to install programs, which I have used for physics class.	From a practical student perspective this would be a good idea, but in reality it would likely never work out, as it would be too risky, and people would never get work done. Another issue would be the cost. If parents had to pay 2000 euros for a computer, they likely wouldn't send their children to that school.
62	The IT department keeps trying to block all websites, but people find ways around it. The IT department is doing it to save the bandwidth which is good and to prevent students from going on games during class. It is the right thing to do but it is not working...	The reason we are not administators is because we would download viruses and ruin our tablets. This way they are protected, they should remain just for school work.
63		
64	Yes, I am awesome	Yes, it's a better idea
65	I think the IT department is very capable, but they're not going to do anything, even if they find out. It's not like we're doing anything serious.	I don't want to install stuff, and most people don't want to. It's stupid to make us pay for something we don't want. If we want to have our own tablet, we can just buy it; we don't have to buy it from the school. Alex Capon took his own laptop to school before he got his tablet. Anyway, if you have one already, that means you have to buy a second one, which is stupid if you don't need it.
66	The IT department chose a good program to block sites since it works only for the school's wireless points. Of course, there are simple ways to add programs without being an admin.	Actually it would be a great idea. There would just be a set of problems. 1. not everyone could afford those extra fees 2.students could buy expensive models and show off 3.more problems for IT department (more work, different models, adjust every single tablet etc)
67		
68		
69	the IT department are really smart although there may be some softwares that individuals are better at	asb's method is much better and controlled
70	I take it to the lunch room! mwahahahaha! And you'll never stop me!	We pay alot to go to the school, we shouldn't pay more.
71	about question 2, i think it is pretty straight forward of how to use the computer. but then i guess not everybody sees it the same way.	depends on which software since it can give virusses and all
72	i do not think i can outsmart the IT as they have solutions for all our problems, but i can always help the IT with support if they need any.	
73		
74		

75	our IT department is VerY good	I believe, this is a good idea andit could work out pretty well
76		This is similar to our school's system except for the freedom of installation.
77		What if you don't want that specific computer can you get it on a loan instead?
78	I think that the IT Department in our school is very knowledgeable and helpful.	Some softwares are necessary to install for specific classes.
79		
80		Because I already own my personal computer at home, and I do not want to waste any money.
81	This is Nik.	For me, everyone else, who is stupid and retarded and likes da pr0nz, absolutely not.
82		
83	There are ways around everything.	Bad idea.
84	there are ways past every school security	If you could maybe just pay a rental fee. Also then you could choose which model suits you best. Excellent idea
85		
86		
87		This would cause less concentration in class and allow certain richer students to buy more powerful models while other students would have trouble affording even a cheaper model.
88		
89		
90		
91		
92		
93	Well, internet proxies are blocked, so I use one that they don't know about, it's called radical proxy. I cap my downloading speed so that they dont get suspicious. I modify the counter strike executable to be able to run it in school, change the .exe name to something like excel, change the icon and the name of the program.	I think that you that you should be offered anything, either write by hand and don't use a computer, or buy your own laptop that doesnt necessarily has to be a tablet, you can still use it for long essays, while tablets distract because some poeple use them all the time, and that is also bad for your health, and I think that the internet at isb should be available to people who would rather use their own laptop

vi. Teacher/Faculty Survey Individual Responses[42]

Question 5: Do you believe that there is a constant "battle" going on between the students and the IT department in the school? For example, students figure out the local administrator account credentials, and the IT department changes the password and implements a method which no longer allows to get the password using the students' previous method. Eventually the students figure out a new method and the "battle" continues. The above is just an example, but the point is if you believe that whatever protection or policy the school sets, will the students get around it?

Question 6: Do you think a better idea for tablets in schools would be the following: *The tuition stays the same and you have to buy your own tablet from a set of certain models. The tablet is your property and you are free to install any software on it that you want.*

Question 7: Any additional ideas that could help me with my essay?

Respondent No:	Q1	Q1 (specification)	Q5 Comment	Q6 Comment	Q7
1	Other, please specify	administration			
2	Teacher				
3	Teacher		...a small minority...not a problem for everyone	it appears youb are trying to make a pointI keep it simple	no...it's your essay
4	Teacher		I think it is important to teach RESPONSIBLE use. In the real world, there is rarely a filter to try to get around. Instead, people will have to make sure they are using technology responsibly and getting their work done. It is our responsibility as teachers to try to teach that responsibility.	It is very valuable to know that all students have the same hardware and software installed and the IT folks can fix anything we need. That means that I as a teacher can rely on using certain software for specific class activities.	
5	Teacher				
6	Other, please specify	Admin	It's a challenge for the students to manage to hack the system, so they will not give up, it's too much fun	Too complicated for the IT technicians to deal with that	
7	Teacher				
8	Teacher				

[42] Note: Only free response questions are included here. The answers to the other questions are holistically documented in the preceding graphs.

9	Teacher		But we need to find common ground for responsible use and I do believe we are moving in that direction	IT support for multiple models will be chaotic for a whole school community	
10	Teacher		I have no clue		
11	Teacher				
12	Network admin or an IT facilitator				
13	Other, please specify	Teacher-Librarian	Generally, in our school students use computers respecting the policy established by the school. There are always some expections, of course. But that applies to all school discipline, not only to the use of computers.	I think that a school computer is a professional tool ment to serve professional purposes. That's why it should be more or less similar for everyone. Teachers are not allowed to install any software to the school computers. Why would students have to?	
14	Teacher		The students were born into a world of technology. We teachers are way behind....and always playing catch-up.	We need to have some control overwhat the students are exposed in the school environment.	
15	Teacher			I think it is important that tablets be provided by the school with all the necessary software installed.	
16	Teacher			Presents problems of access to applications and data, reliability, compatibility...	
17	Teacher		It's a real shame, since having tablets are a privilege and it's sad to see people abusing this.	Some might not be able to afford it. The same should be available to everyone.	
18	Other, please specify	Librarians	It is the nature of technology and the passion of some students for it that the retsrictions are seen as challenges... the IT people need to be one step ahead... it's not a battle it's a process	If in return the students comply with acceotable use policies while in school - I think that this is a two way street and too ofetn kids feel that the school is authoritarian when in fact it is realistic... if technology in schools is there to support learning then computers in use during school time must be directed to learning as defined by the school...this is a question of responsible use and kids are not always repsonsible	If responsible computer use policies are futile is the suggestion that we can never teach responsible use or is is an assumption that whhherever there are computers there is no responsibility or commitment to learning... be careful in what your own assumptions are...
19	Teacher		Don't know.	No opinion.	
20	Teacher		I think the HS IT department has a positive relationship with students		
21	Teacher		The IT department are very smart, but students have far more time to crack the system, especially if motivated to do so	It is a tool to be used for school work; therefore it should be owned and controled by the school	I agree with your thesis, but feel it applies to a small minority of students. The overwhelming majority use their tablets

					responsibly and for academic purposes (at least while at school!)
22	Teacher				
23	Teacher				
24	Teacher		It all depends on the students'personalities and what they want to achieve. Breaking into a secure system can be very difficult, and depending on what they hope to achieve, doing the homework (for example) may be easier.	Then the tablets may not be covered by insurance. Also, if students try to download too much while at school, the band width may not support the use.	There are several other tablet schools - for example, New International School of Thailand - www.nist.ac.th You may be able to get some of the faculty/students to complete your survey. Try emailing the link to hstanton@nist.ac.th Ms. Stanton is the IB coordinator. You can mention that you received her email from Danielle Tylke.
25	Teacher		This is the way of IT as it evolves - there is always a way around things like this	We need clarity of purpose - this is too confusing....	
26	Teacher				
27	Network admin or an IT facilitator				
28	Other, please specify	PA to the Director		This would be a risk to network security	
29	Teacher		An IT facilitator told me that the password has to be changed frequently because students are hacking into teachers' grade books, etc.	This is what home computers are for. School should absolutely retain control over the laptops just as they would a printed math book--you are not allowed to deface it, etc.	
30	Teacher			Teachers need to know what programs and capabilities the students' tablets have in order to plan effective lessons.	
31	Teacher			Either everyone is the same or nothing at all.	
32	Teacher				Many teachers are rightly busy with their lessons and are then unable to also police the use of tablets, resulting in the misuse of the tablets.
33	Teacher				
34	Teacher			Not all people can afford laptops, nor should they have to buy one. If the laptop is not really your property then you have to abide by the rules set up by whomever does own the laptop. The option should be that you can buy your own laptop - not have to! That	

				way everyone is happy. There could even be a payment plan set up that would allow those individuals who do not have the funds to slowly pay off the purchase.	
35	Other, please specify	Guidance Counselor & Psychologis t	The 'battle' is not major by any stretch and may even be healthy -just students pushing the limits, the act of which can be educational.	To guarantee that all students are equally equipped, the school will probably need to take on the responsibility of making sure that all students have tablets.	Perhaps it is just my perception, but the angle of the survey questions seems to suggest that the essayist favors deregulation rather than remaining neutral. This too is okay, perhaps as long as the essayist's position is made explicit.
36	Teacher			So much depends on the student population. What if the family can't afford it? Many families don't pay tuition (employers do) and if they do, they often are given financial assistance at most private schools.	
37	Teacher			they will take care of it.	
38	Teacher				
39	Teacher				
40	Teacher				
41	Teacher			Some parents may refuse to buy a computer for their child.	
42	Teacher				There is a problem of abuse amongst the weaker students. They are looking at the internet or e-mails during class. They are not using the tablet for its intended purposes.
43	Other, please specify	administrat or - data analysis		It is too much of a financial burden for some families.	
44	Other, please specify	Librarian			
45	Teacher		Would like to think they had something better to do!!!!!!!!!!!!1		Scool is there to study, hopefully some classes will still need books, notes, pencil and pen etc. Exams are still that way!!

vii. High School Responsible Use Policy

International School of Brussels -
High School Responsible Use Policy & Tablet Agreement

A. Respect & Maintenance of School Property

Having access to a world of technology resources at your fingertips is a tremendous privilege, which comes with responsibilities to ensure the technology will always work when you need it.

What this looks like:

- Tablet PCs are loaned to students while enrolled at ISB and are school property.
- Each student is responsible for his/her Tablet PC, and should treat and use it responsibly and appropriately, keeping in mind that most malfunctions are the result of misuse.
- Students are responsible for taking care of their tablet, stylus, battery, and charger. Keep pets, siblings, food and drink away from the tablet.
- Students are responsible for damage, theft or loss for all loaned equipment which occurs as a result of negligence or carelessness on the part of the student (please see the insurance agreement for more information on accidental coverage).
- Do not leave your tablet unattended. Tablet PCs are to be kept in a secure location (i.e. locker) when not in use and should be transported in a way which minimizes damage (including scratches). ISB issues a carry-case to help eliminate this incidental damage. It is expected that students will use them.
- Tablets are not to be taken on *athletic* trips.
- Permission must be provided by the school Head before taking tablets on *school field trips*.
- Damage, theft or loss of the tablet or accessories is not covered by ISB insurance if it occurs on an athletic trip. This restriction does not apply to school field trips in which the organizing teacher has explicitly stated that tablets are required.
- If your tablet develops a problem, report it to the Technology Help Desk immediately.
- Charging your tablet on a soft-surface can cause damage. Always charge on a hard surface (i.e. desk, etc).

B. Maintaining Bandwidth and Battery Power

Bandwidth & battery power are necessary for all students and faculty to have equal access to technology resources. We expect all students take personal responsibility for having a charged tablet battery and use the network bandwidth appropriately.

What this looks like:

- Students will maintain school bandwidth by limiting the amount of non-school-related video streaming and communications as much as possible.
- Students will ensure that their tablet batteries are fully charged at the beginning of the day.
- Charging stations are available in the school in classrooms and in the library for charging during school hours and students will bring their charger to school each day

C. Maintaining Integrity and Lawfulness

The behavior of all ISB students reflects on the school. Students are expected to ensure that the integrity and the reliability of the ISB network is maintained at all times.

What this looks like:

- To maintain the integrity of the school and continued access to licensed software, students may not use the school's network, hardware or software for illegal purposes
- Using the tablet for the following activities is not permitted during class time, except as a part of an assigned class activity, during lunch periods, or where an explicit exception has been made. : playing computer games, listening to music, watching movies or videos on the tablets, instant messaging and joining chat rooms.
- Students may use tablets in supervised areas including classrooms, hallways and the library. Tablets **must** not be brought to the cafeteria, gym, theatre, playgrounds or playing fields.
- Downloading music, videos, and software from the Internet is prohibited at school at all times.
- Any information obtained through research on the Internet and then used in academic work must be properly cited.
- There should be no copyright law violations with regard to software.
- Regularly run the virus scan to ensure any potential dangerous files or viruses are not transferred to the ISB network.

D. Respecting Privacy

We expect all ISB students to respect the privacy of other students, faculty and staff as well as other users of the Internet.

What this looks like:

- Students are responsible for keeping their password secret and students will not use anyone else's user name & password.
- Sending email or creating documents in on another person's name is prohibited.
- Attempts to read, delete, copy, or modify the electronic mail or other electronic documents of other users without permission or deliberate interference with the ability of other users to send/receive email is prohibited.
- Any malicious attempt to harm or destroy school technology equipment or materials, the data of another user, or any of the institutions, or other networks that are connected to the Internet is prohibited.

E. Appropriate Usage of Internet & School tools

Students are expected to use technology tools in a way that actively supports the ISB School Mission.

What this looks like:

- Educational technology tools provided by ISB should always be used to support learning.
- Students will take responsibility for all emails sent in their name.
- Derogatory, obscene, or otherwise inappropriate email exchanges, including those that harass or annoy, are prohibited.
- Always back up your files to your P-folder before you leave school each afternoon.
- A good rule of thumb is if you are doing or looking at something which would make you uncomfortable if it were shared in your name with a teacher or parent, you are making inappropriate use of your computer.
- Keep the virus software on at all times.

- Do not alter the set-up of the computer, including removing program files disabling programs, services, hardware or deleting desktop items.

F. Monitoring Personal usage

We expect students to monitor their own usage and use technology appropriately.

What this looks like:

- Email and personal folders are not private. Any electronic documents stored on or sent through the ISB network can be monitored at any time by designated staff to ensure appropriate use of technology resources.
- Students should monitor their own well-being by using their tablet in correct ergonomic positions and not for extended periods of time
- Students should be aware of the the signs of internet addiction, such as avoiding family, friends and school work to participate in online activities and seek help if they find they are behaving in this way.

By accepting a tablet and signing the tablet agreement, you and your family agree to and understand the Responsible Use Policy and the Insurance Policy. The insurance document and all related documents can be found on Blackboard under HS : Technology : Tablet PC Program. Failure to follow the Responsible Use Policy may result in loss of network and/or tablet privileges, suspension from school and in extreme and repeated behaviors, expulsion.

Assessment form (for examiner use only)

Candidate session number	0	0							

		Achievement level		
		First examiner	maximum	Second examiner
Assessment criteria	**A** research question	2	2	
	B introduction	2	2	
	C investigation	4	4	
	D knowledge and understanding	4	4	
	E reasoned argument	4	4	
	F analysis and evaluation	4	4	
	G use of subject language	4	4	
	H conclusion	1	2	
	I formal presentation	4	4	
	J abstract	1	2	
	K holistic judgment	4	4	
	Total out of 36	34		

Name of first examiner: _____ (CAPITAL letters) Examiner number: _____

Name of second examiner: _____ (CAPITAL letters) Examiner number: _____