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INFLUENCE OF INFORMATION AND COMMUNICATION TECHNOLOGY SECURITY MANAGEMENT IN THE IMPLEMENTATION OF ICT FOR EDUCATIONAL PURPOSES AT HIGH SCHOOL: CASE STUDY OF RADOM REGION

Abstract. Security becomes more and more important in all aspects of our lives and Schools are aware that it has become a management problem. In this paper we analyze the obstacles of ICT use for education purposes at school in the Radom region. Is it a lack of ICT security management systems or may be lack of Information and Communication Technology knowledge the reason why this important instrument is not fully implemented in the educational system in this region? To this and other questions we will give answer in this research based on OLAREX[1] survey results.

Keywords: Information and Communication Technology, Security management, educational activity, Administrative staff, OLAREX

Introduction

Since 1999, following a reform of the system of education there are the following types of schools in Poland: 6-year primary school, 3-year gymnasium and post-gymnasium schools like[2]:
– 3-year specialized lyceum
– 3-year general lyceum

[1] OLAREX: Open Learning Approach with Remote Experiments", 518987-LLP-1-2011-1-ES-KA3-KA3MP. This project is funded with support of the Lifelong Learning Programme of the European Union. http://www.olarex.eu/web/index.php/en/
[2] The Embassy of the Republic of Poland in: http://www.london.polemb.net/index.php?document=57 (retrieved: 8.05.2012)

– 4-year technical secondary school
– 2 or 3-year vocational school
– 2-year complementary lyceum
– 3-year complementary technical secondary school.

In this paper we decided to concentrate our research in the 26 post – gymnasium schools that functions in Radom - Masovian Voivodeship. Radomska Szkoła Wyższa sent questionnaires to all of them between the others institutions surveyed within the research performed in frame of OLAREX project.

OLAREX: Open Learning Approach with Remote Experiments Project is a consortium of eleven partners from six European countries and is co-funded by European Union. The general aims of survey were:

- to analyze the knowledge and skills needs requested from secondary school students to successful transition to employment and career building;
- to analyze a demand on teacher competence development;
- to analyze a role of Administration staff in ICT integration in school curriculum;
- to analyze e-learning materials and remote experiments needs and education methods.

OLAREX has collected and analyzed data as part of a quantitative approach to research which are useful for analyzing knowledge and educational needs of target group. The consortium has established four target groups:

- students of secondary schools and universities,
- teachers of secondary schools,
- administration staff of secondary schools,
- managing staff of enterprises.

The main problem why we decide to study the group of post – gymnasium schools in Radom is because there are only few institutions that offer online courses and ICT support for students, teachers and parents.

As a consequence of the fast integration of technologies as Internet, Intranet, Extranet, Voice over IP and e-learning, the schools and private – public institutions ICT-infrastructure are more opened to the outside world and as a consequence it is much more vulnerable for security threats. This fact has created a lot of new opportunities not only for the staff management and to have a better control of information but also has created new threats. That's why focus and responsibility concerning security become even more and more important.

The Computer Crime and Security Survey 2010/2011[3] shows that the most frequent attacks or misuses are Malware infection, Bots / zombies within the organization, Being fraudulently represented as sender of phishing messages,

[3] CSI Computer Crime and Security Survey 2010: 149 Respondents at: https://cours.etsmtl.ca/log619/documents/divers/CSIsurvey2010.pdf (8.05.2012)

Password sniffing , Financial fraud , Denial of service, Extortion or blackmail associated with threat of attack or release of stolen data, Web site defacement, Other exploit of public-facing Web site, Exploit of wireless network , Exploit of DNS server, Exploit of client Web browser, Exploit of user's social network profile, Instant messaging abuse, Insider abuse of Internet access or e-mail (i.e. pornography, pirated software, etc.), Unauthorized access or privilege escalation by insider, System penetration by outsider, Laptop or mobile hardware theft or loss, Theft of or unauthorized access to PII or PHI due to mobile device theft/loss, Theft of or unauthorized access to intellectual property due to mobile device theft/loss, Theft of or unauthorized access to PII or PHI due to all other causes, Theft of or unauthorized access to intellectual property due to all other causes.

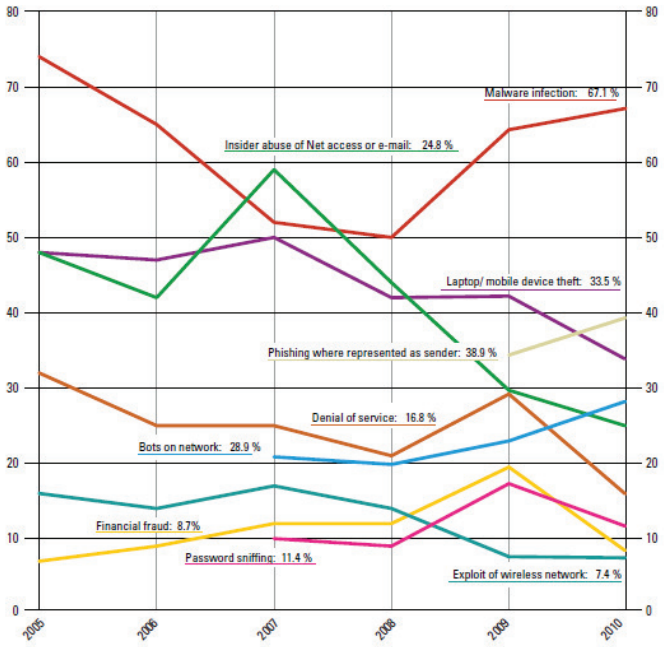

Fig. 1: Types of Attacks Experienced By Percent of Respondents: 2010/2011 CSI[4]

Because of these large costs, companies became more and more aware that they not only deal with a technical problem but also with an ICT management problem. The most important action taken against this problem has been the use of Anti-virus software, Firewall, Anti-spyware software, Virtual Private Net-

[4] CSI Computer Crime and Security Survey 2010: 149 Respondents at: https://cours.etsmtl.ca/log619/documents/divers/CSIsurvey2010.pdf (retrieved: 8.05.2012)

work (VPN), Vulnerability / Patch Management, Encryption of data in transit, Intrusion detection system, Encryption of data at rest (in storage), Web / URL filtering, Application firewall, Intrusion prevention system, Log management software, Endpoint security software / NAC, Data loss prevention /content monitoring, Server-based access control list, Forensic tool, Static account logins/ passwords, Public Key Infrastructure (PKI), Smart cards, one-time tokens, Specialized wireless security, Virtualization-specific tools and Biometrics

Research Method

In our research we used a quantitative research that in social sciences refers to the systematic empirical investigation of quantitative properties and phenomena and their relationships. The objective of our research is to give answer to the following question: What is the main reason why Information and Communication Technology is not use fully used in the educational system in Radom region. Is it the threats of external-internal agents or lack of knowledge from the teaching staff. To eliminate the subjectivism, we have direct the questionnaires to administrative staff of High schools from this region.

OLAREX survey was conducted during the months of March –April 2012. It was invited 172 administrative staff of secondary school and recruited through advertisements in the electronic system of pbworks. The survey was conducted via online survey using encuestafacil.

Apart from the invitations sent by email, we use other ways to access the questionnaire[5]:

- direct access via a personal link: every individual is given a unique link which identifies and provides direct access to the questionnaire. It is possible through this link stops and continues later in the questionnaire because the system stores the information for each individual. This system is the most used because it prevents duplicate participation and is simple for the respondent.
- Access through Login - Password: The participant is given a web address easy to remember with a login and password that enter once they have agreed to that address. This system prevents duplicate participation but introduces an uncomfortable step for the participant who can motivate lower response rates than those achieved with personal links.

[5] Ochoa Siguencia, L., Cwiek H., Ochoa-Daderska R. (2011), Instructional and cognitive impacts of online learning tools for internet based education at Higher Schoools, in Pedagogical Technologies in Socialization and Resocialization of Society, Volume 2, 2011, ISSN 1691-5909, p. 57–64, Latvia

– direct access via a generic link: as we explained earlier, this was the way we use with our students. Do not forget that the shortcut link to the survey is the same for all participants. Although there are technologies like cookies-control system that records the user's computer to access the survey, they can be disabled or the user can access the survey from another computer, an Internet portal, etc.

Statistical analysis

Profile of respondent

According to respondents of OLAREX Questionnaire for Administration Staff all employees of the school administration who took part in the study come from Radom. 62% of respondents are between 25 to 40 years and the 38% are aged 41-60 years old. Within the respondents we had that most of the administrative staff that works at School are female (69%) and only the 31% are male. Most of them has a master's degree (77%).

Concerning foreign language knowledge we found that as 83% of respondents have sufficient knowledge of English and they are able to use it in their professional matters. 29% of the respondent has a second language knowledge and it is the German language. Most of them has experience in Administrative school work. As 23% has betweren 11-20 years' work experience and 19% worked in the administration from 1 to 3 years.

Use of ICT at School's administrative staff

38% of the OLAREX respondents agree that the use of ICT is occasionally when contacting with parents and to prepare presentation materials and electronic resources in general. Only 42% says that sometimes use ICT during the registration process and turnout data analysis. 31% use frequently in administration, clerical exams, evaluation of the National Curriculum. 42% of respondents sometimes use Information and Communication Technology to prepare reports. 58% of respondents sometimes use ICT at their work related to the implementation of policies and objectives of the school.

62% of respondents working at school use ICT from 5 to 10 years for support of the educational process.

Concerning the use of software for administration and support in education, just 15% affirm to use Anti-virus software, Firewall, Anti-spyware software. The most frequently used software and support for Administrative tasks is Miscrosoft Word and Internet (100%), slightly less popular is the E-mail (96%) and the spreadsheet - Excel (85%).

Computers with Internet access

In the institutions we invite to participate in OLAREX research we found that less than half of them has within 10-20 computers with Internet access (46%). 35% have 21-30 computers connected to Internet. Concerning the use of ICT Laboratories, as 88% affirm to have a science - laboratory equipment. The responsible of this laboratories for practical design and implementation of laboratory equipment is the director of the school (73%) and the Ministry of Education (Provincial / District) 69%. Over the last 3 years expenditure on ICT (only for educational purposes) remained unchanged (31%), and 38% affirm that has increased over the last 10 years. On average, 36% of contributions believes that over the past three and 10 years expenditure on laboratory equipment remained unchanged.

Answering to the questions included in OLAREX survey respondents tend to agree that teachers should have the ability to integrate the use of technology and communication technology and not the administrative staff. Teachers have 45 minutes of Security management training as a support from the school.

Directors and administrative staff in general believe that teachers at high school should have a basic knowledge of the equipment and software (50%), should have knowledgeable about search engines, software, communications technology and power point [presentation] (50%), software knowledge and application for management applications (50%), ability to use network resources to help students in collaboration learning (Pbworks, wiki…), accessing information and communicating with external experts to analyze and solve teaching problems (50%), the ability to use ICT to create and monitor individual and group student project plans (58%), ability to use ICT, to encourage the development of knowledge and the ability to create educational content (54%), the ability to experiment and engage in continuous training and the use of ICT to create a community of professional knowledge (50%).

ICT security management

From the list of Internet Security Suites like Symantec Norton Internet Security, BitDefender Internet Security, Panda Internet Security, McAfee Internet Security Suite, Avira Premium Security Suite, Kaspersky Internet Security, F-Secure Internet Security, Webroot Internet Security Essentials, Trend Micro Internet Security Pro, Avast[6], most of the enquired, is not sure if they have an Internet security and all of them say that this task is part of the IT specialists and they are not aware of the program they have at work. At home generally use

[6] Erik Larkin, E (2009)., Top Internet Security Suites: Paying for Protection, retrieved 9.05.2012 at http://www.pcworld.com/article/158157/top_internet_security_suites_paying_for_protection.html

McAfee during the first year of computer use (It is free of charge if you buy a new computer – laptop) and Avast.

Conclusion

The awareness that security is a management problem is everywhere present. But at school the general administrative staff are not interested to know what are the critical resources and processes of the school and their weaknesses because they leave this problem to the ICT specialist who will repair the hardware if an infection or the computer does not work.

OLAREX survey reviewers tend to agree that the obstacles in the use of ICT for educational purposes at school is not the lack of a serious security management system but insufficient number of computers (65%), insufficient technical support for operation and maintenance of computers and / or insufficient assistance in solving technical problems of ICT (73%). Most of them agree that the main problem is insufficient training for teachers (62%), insufficient space for proper installation of computers (46%), inadequate peripheral devices (printers, scanners, etc.) (58%) and mainly lack of knowledge / skills of teachers in using computers / Internet for instructional purposes (58%).

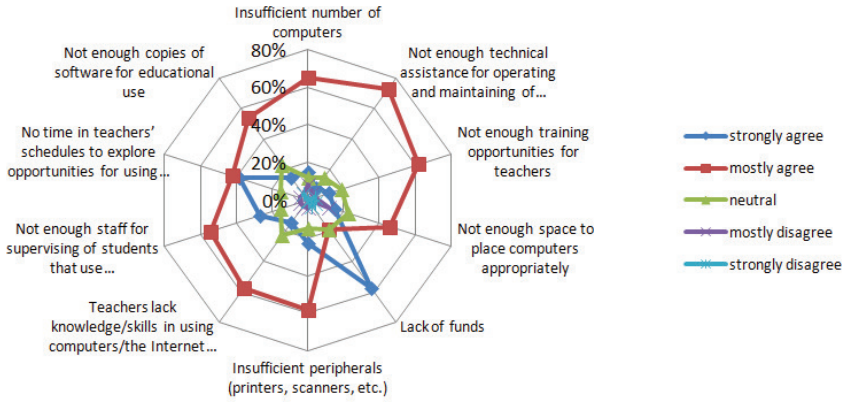

Fig. 2: Obstacles of ICT use for education purposes (a)

One of the main aspects is insufficient staff to supervise students using computers / Internet (54%), very tight time schedules of teachers to explore the possibilities of using computers / Internet (42%), insufficient number of copies of software for educational use (54%), insufficient time for teachers to prepare lessons based on ICT (42%), poor infrastructure (telecommunications, electricity, etc.) (35%). Other problem is the lack of interest / willingness on the part of teachers to use computers / Internet (65%), inadequate administrative support

and initiative in the school / department / regional level (54%), inadequate program and / or measures to prevent theft and vandalism computers (58%), difficulty integration of computers / internet to practice in classroom instruction (38%), insufficient number of types of software (46%), lack of knowledge about computer hardware and software (58%). Respondents completely agree that the obstacle is the lack of funds (58%). They have no opinion about the lack of or outdated school network / LAN (38%).

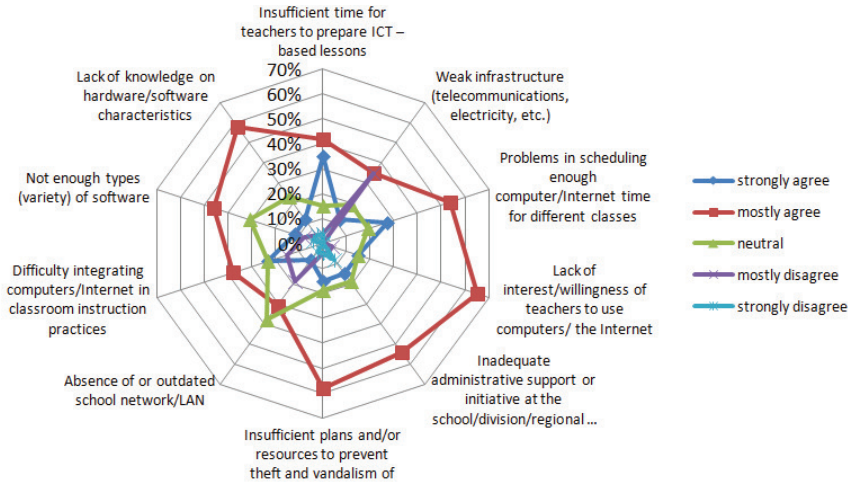

Fig. 3: Obstacles of ICT use for education purposes (b)

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WPŁYW TECHNOLOGII INFORMACYJNYCH I KOMUNIKACYJNYCH (TIK) W ZARZĄDZANIU BEZPIECZEŃSTWEM WE WDRAŻANIU TIK W CELACH EDUKACYJNYCH W LICEUM: STUDIUM PRZYPADKU RADOM

Streszczenie

Bezpieczeństwo staje się coraz ważniejsze we wszystkich aspektach naszego życia, a szkoły uświadamiają sobie problemem w sferze zarządzania. W niniejszym artykule analizujemy przeszkody wykorzystania TIK w celach edukacyjnych w szkole. Czy to brak teleinformatycznych systemów zarządzania bezpieczeństwem czy może brak wiedzy i technologii informacyjnej i komunikacyjnej jest powodem dlaczego tak ważny instrument nie jest w pełni wdrożony w system oświatowy w tym regionie? Na te i inne pytania postaramy się udzielić odpowiedzi w tym artykule na podstawie przeprowadzonych i uzyskanych wyników badań ankietowych OLAREX.

Słowa kluczowe: technologia informacyjna i komunikacyjna, zarządzanie bezpieczeństwem, działalność edukacyjna, personel administracyjny.