THE DEGREE OF USAGE OF SOFTWARE LICENSES IN SCHOOLS, HIGH-SCHOOLS AND UNIVERSITIES

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Abstract: *The papers develop main aspects on the legal software usage in educational area. It will be propose indicators for measuring the degree of licences usage. Case studies are oriented to gymnasia stage.*

Key words: software licenses, education system, Romania, schools, high-schools, universities

1. Informatics and Education

The developments of Computer Science has had its impact on all areas of society, the educational fields notwithstanding. The appearance of new concepts, such as e-learning has raised the necessity of developing processes on informatics applications in schools, high-schools and universities.

Some directions of the process that can be identified are:

- the acquisition of hardware equipment, such as computers and other devices;
- the acquisition of software;
- the development of training programs for teachers, students and pupils;
- the supply of internet access at reduced cost;

For the accomplishment of the above mentioned objectives, important funds have been allocated.

For schools and high-schools, the SEI program has been developed. The program is planned to last from 2001 until 2008 and it is attempting to accomplish the task of having all lessons and laboratories conducted on computers for several disciplines.

As for universities, there is an important number of investment programs with the goal of creating virtual university centres, on-line classes, on-line libraries etc.

2. Software and Software Licenses

The majority of schools, as well as high-schools are equipped with computer laboratories, which are using licensed software. The Romanian Government has constructed a favourable context for the use of software licenses for the most currently used software.

For example, in 2004 the Ministry of Education and Research has signed a contract for the free usage of:

- 50.000 software licenses for all learning institutions situated in districts;
- 3200 laboratories are equipped with licensed software, out of which 1200 belong to high-schools.

In 2004 the contracting firm has offered, free of charge, 2500 software licenses to the students whom had been granted money in the amount of Euro 200 for the acquisition of computers (a program through which the state stimulated the entry of computers in the students' homes).

3. The Usage Degree of Software Licenses. A Theoretical Review

In order to analyse the efficiency of software license usage, one has to define a mathematical model with a set of indicators.

A software license has a predetermined (by the means of a contract) duration of usage **N,** where **N** stands for the duration expressed in years. The duration of the license can also be expressed in months as:

$$D = N \times 12 \qquad (1)$$

For the model's presentation, a number of **M** districts where licences have been distributed and a series of **M** numbers quantifying the number of licenses ($\mathbf{L_1,L_2...L_M}$), a series of maximum durations for the licenses ($\mathbf{D_1,D_2...D_M}$) as well as a series of **M** activation moments ($\mathbf{T_1,T_2...T_M}$), where by activation is understood the actual moment the licenses are put to use.

We will also have a number of licenses for a certain district $\mathbf{NL_1,NL_2...NL_M}$**, out** of which only a portion have been installed. The number of installed licenses will be $\mathbf{NIL_1,NIL_2...NIL_M}$

Taking into account that there are a number of licenses that are never installed, the degree of usage for a particular district will be:

$$U_i = \frac{NIL_i}{NL_i} \qquad (2)$$

The total number of licences can be calculated as:

$$NL = \sum_{i=1}^{M} NL_i \qquad (3)$$

The total number of installed licences can be calculated as:

$$NIL = \sum_{i=1}^{M} NIL_i \qquad (4)$$

The total usage degree will be:

$$U = \frac{\sum_{i=1}^{M} NIL_i}{\sum_{i=1}^{M} NL_i} \qquad (5)$$

The duration of actual usage for a particular set of licenses is defined as:

$$DU_i = D_i - T_i \qquad (6)$$

The above formula is based on the fact that all the licenses in a set have the same maximum duration, as well as activation moments.

The degree in which a particular set of installed licenses were used (the simplest measurement to the efficiency of usage) is thus defined as:

$$PU_i = \frac{DU_i}{D_i} \qquad (7)$$

Thus, the total loss quotient will be:

$$L = 1 - \frac{\sum_{i=1}^{M} DU_i \times NIL_i}{\sum_{i=1}^{M} D_i \times NL_i} \qquad (8)$$

Out of this, the degree of loss generated by lack of usage is:

$$LU = \frac{\sum_{i=1}^{M} NIL_i}{\sum_{i=1}^{M} NL_i} \qquad (9)$$

while the degree of loss generated by partial usage is:

$$LP = 1 - \frac{\sum_{i=1}^{M} DU_i \times NL_i}{\sum_{i=1}^{M} D_i \times NL_i} \qquad (10)$$

Considering that the total cost of all the licenses is **C,** the monetary loss through lack of usage of the licenses will be:

$$ML = L \times C \qquad (11)$$

The above model takes into account losses generated by delays in usage and losses generated by total lack of usage.

The above formulae will be applied in the next section on a short analysis of the free distribution of licenses by the Romanian Ministry of Education and Research to its subordinated units.

4. The Usage Degree of software Licenses. A Practical Application

The Ministry of Communications and Information Technology along with The Ministry of Public Finance and the General Secretary of the Government has negotiated a set of general conditions for the contracts regarding usage rights for Microsoft, signed by The General Secretary of the Government for the Government of Romania. The provisioned duration of the above mentioned contract is 5 years.

According to current legal provisions, the State Budget Law will contain, starting 2005, special provisions for the allocation of money for the application of the general conditions contract regarding the usage rights for the existing number of desktops and servers.

The contract offers a new approach, in which software is no longer regarded as a fixed asset, but as a service with an annual subscription. For all the included software products, the user has the right to use the last version or any prior version, whichever may be more suitable to his needs.

This approach allows for an efficient solution to several issues, such as the legalisation of the installed software (no matter what version and no matter if it already had a valid software license or not), the issue of providing security to informatics systems through the installation of new versions (which are usually improved in comparison to prior versions) as well as the simplification of the administration of the IT infrastructure through standardisation.

The contract does not cover installation for the software products, its scope being exclusively the usage rights to Microsoft products.

The total number of acquisitioned licenses, as well as their distribution, according to the general conditions contract of 2004:

Institution name	**Desktop package**	**Windows 2003 server**	**Exchange server**	**System Management Server**	**Share Point Portal Server**
Ministry of Education and Research and subordinated units	1618	94	78	81	81
Research institutions and subordinated units	109	17	17	17	17
TOTAL	**1727**	**111**	**95**	**98**	**98**

Source: MEdR

The units subordinated to the Ministry of Education and Research are: School Inspection Offices, The House of the Didactic Staff, The National Office for Scholarships Abroad, The National Service for Examination and Evaluation etc.

The Desktop Package is comprised of: Microsoft Office Professional, Microsoft Windows Desktop System Upgrade, Core Client Access license.

In November 2004, The Ministry of Education and Research has signed an additional contract covering software licenses for learning institutions (schools, high-schools etc.).

Consequently, learning institutions have received 50,000 licenses including, apart from the above mentioned programs, the Microsoft Encarta Encyclopaedia 2004. Encarta 2004 is a vast encyclopaedia, with presentations from all areas of knowledge in a multimedia format, with extended usefulness in the developing of new knowledge and the broadening of horizons of pupils and students.

In August 2005, the process of distributing the above mentioned software packages in the covered territory was finished.

A statistic regarding the installation of the software in school units is presented in the table below (the notations are those presented in section 3).

By applying formulas *(2), (3)* and *(4)* to the existing data (number of licenses and number of installed licenses per district) the usage degrees for each district as well as the aggregate degree (U_i is given in percentage terms) can also be obtained.

District i	NL_i	NIL_i	U_i
District 1	1034	300	29.01
District 2	1136	200	17.61
District 3	1557	588	37.76
District 4	1355	1355	100.00
District 5	1525	1201	78.75
District 6	803	200	24.91
District 7	962	814	84.62
District 8	827	513	62.03
District 9	1564	200	12.79
District 10	4539	1123	24.74
District 11	1098	200	18.21
District 12	550	550	100.00
District 13	843	450	53.38
District 14	1881	200	10.63
District 15	1827	200	10.95
District 16	576	375	65.10
District 17	1129	200	17.71
District 18	1588	200	12.59
District 19	1258	1258	100.00
District 20	384	200	52.08
District 21	1120	1107	98.84
District 22	1074	250	23.28
District 23	1268	450	35.49
District 24	651	200	30.72
District 25	1917	1917	100.00
District 26	457	103	22.54
District 27	1189	200	16.82
District 28	684	220	32.16

District 29	1282	480	37.44
District 30	1213	200	16.49
District 31	1014	1014	100.00
District 32	1735	1409	81.21
District 33	656	200	30.49
District 34	882	873	98.98
District 35	1158	1158	100.00
District 36	1477	200	13.54
District 37	789	200	25.35
District 38	1775	1575	88.73
District 39	591	216	36.55
District 40	971	270	27.81
District 41	918	895	97.49
District 42	743	350	47.11
Total	50000	23814	47.63

Source: MEdR

The quantity of licenses for a particular district has been decided by taking into consideration the number of students that study in that particular area.

In 2006 the number computer systems used by the institutions subordinated to the Ministry of Education and Research has been recalculated and with the discovery that the actual number was greater, the necessity for additional software licenses appeared.

The supplementary number of software licenses is presented in the table below:

Institution name	**Desktop package**	**Windows 2003 server**	**Exchange server**	**System Management Server**	**Share Point Portal Server**
Ministry of Education and Research and subordinated units	1088	71	75	75	74
Research institutions and subordinated units	370	10	3	0	1
TOTAL	**1458**	**81**	**68**	**65**	**65**

Source: MEdR

In the above case, both the maximum durations, as well as the activation date for all districts are identical with $\mathbf{D_1=D_2=...=D_M=60}$ and $\mathbf{T_1=T_2=...=T_M=8}$.

Thus, applying *(6), (7)* and *(8)*, the total loss quotient will be **L = 1 - (52 * 23814 / 60 * 50000) = 0.58**

Applying *(9)* and *(10)* we get **LU = 0.47** and **LP = 0.13**

Considering the total cost of acquisition of the licenses was 25,000,000 USD, the monetary loss is ML = 0.58 * 25000000 = 14680600, out of which 0.13*25,000,000 = 3,250,000 is due to the delays in the activation of licenses.

Conclusions

The above analysis, albeit short, raises the problem of finding ways to minimise losses generated by lack of usage as well as those generated by partial usage.

While those generated by lack of usage are usually caused by undelivered licenses or other circumstances, which can not easily be affected by the user, losses generated by partial usage can be minimised through a series of simple means:

- A better organisation of activity in laboratories;
- Immediate installation of software in relation to the moment of receipt;
- Keeping track of all computer users, differentiated on the existence or non existence of installed licenses;
- Preventing the installation and usage of unlicensed software in schools.

On the side of the software buyer (in this case the Ministry of Education and Research) the most effective means of insuring that the software distributed to schools is actually delivered and used is to request periodical statistics of software usage in the beneficiary units.

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