INTERNET, QUALITY, EDUCATION

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Videkov V. H., Radonov R. I.,Internet, Quality, Education. This article describes the common thing between those three subjects. The application of Quality Management Systems elements in Education using the Internet is the uniting item. The system comprises electronic tables (MS Excel), image files of scanned documents and encryption methods. The system ensures the possibility to trace back documents and makes them publicly available.

1. INTRODUCTION.

It is observed nowadays that contemporary education is changing with high rates and it is not only due to the needs of new types of knowledge, but also to the introduction of new techniques in the Education itself. Those techniques significantly transform the Education, turning it into distant, multimedia, and other types. One of those techniques is the implementation of the Internet.

On the other hand the links and relations in modern-day information stream are becoming more and more complex. A number of human activity management principals are being developed. Quality Management Systems are implemented widely [1, 2, 3]. The process management truly for the client is the basis of the ISO 9001/2000 standard.

So here comes the logic question: Is it possible to integrate Quality Management Systems with Internet technologies? As a result of the ISO 9000 elements review and Internet capabilities, a procedure for their combining in education is suggested.

2. TASKS.

One of the main elements of Quality Management Systems is to guarantee the clients that their process could be traced through their records. Records are something very habitual in Education – in the form of written examinations and tests, protocols, etc. There are certain rules and regulations for their processing in the system of Education. So the question is whether it is applicable to use them with Internet technologies, computers and the Quality Management System rules. In connection with that the following elements are considered:

1. Making archives of the current educational process information.
2. Data processing procedure.
3. Methods for data protection.
4. Data access levels

3. MAKING ARCHIVES OF THE CURRENT EDUCATIONAL PROCESS.

There are different criteria for educational process classification. Here we have economic data, structure and lecturers data, teaching materials, educational process results, etc. For the purposes of this article, the information is divided into two basic types:

Graphical data information -- usually photos, signed documents, and other of the same kind. The solution that is suggested is to transform that information into formats that are suitable for the implementation of the Internet through scanning of the documents. In order to do that, the file should have a small size and the image should be readable enough, at the same time. The student's mark-book and different lecturer signed protocols are two typical representatives of those documents. Fig. 1 shows a scanned image of a student mark-book and fig. 2 shows a scanned image of a practicum protocol.

Fig. 1. A scanned image of a student mark-book.

Documents are scanned with 300 dpi resolution and 1 million colors. The file that is created may have different format, depending on the scanner software, and can be easily transformed into a JPEG image, if the scanner does not support that. Tests are made with a HP ScanJet IIc scanner. The size of the final file is approximately 60 – 80 KB. The image obtained is readable enough and signatures are clear. It is possible to zoom it twice without a significant loss of readability.

Fig. 2. A scanned image of a practicum protocol.

The second type of data is different text files, tables, etc., electronically represented. They could be processed with the relevant kind of software. This is the more widely used type.

There are two requirements when making the archives. A physical media for saving the information, which could be stored for a longer time and one that is quickly accessible, should exist. This is easily achieved with a CD-ROM and a hard disk drive on a server.

4. DATA PROCESSING PROCEDURE.

1. Determining the document parameters – a graphics, text or a table, etc.
2. Defining the order of making the archives – graphics are scanned, and the rest are typed or copied.
3. Defining the name of the files. The name should contain alphanumeric symbols, for example the initials of the subject and student group number.
4. Definition of student data and priority year it belongs to (the priority year is the one in which the student had been enrolled).
5. Filling in the file names in the archive table. Files are named according to the rules defined in step 3 (the archive table is an electronic table, the fields of which contain students names and their data, divided into groups and subjects). Fig. 3 shows part of such table for students, who are enrolled in the academic 2001.

No	Name	Surname	Family	Fac. No	Speciality	Year of study	Group	Remark
1	Boriana	Stoyanova	Borisova	6029392	Electronics	1	44	
2	Vessela	Velizarova	Asparuhova	6029847	Electronics	1	44	
3	Philipina	Lozanova	Ivanova	6029873	Electronics	1	44	
4	Kaloyan	Vasilev	Atanasov	6029974	Electronics	1	44	
5	Stefan	Evgeniev	Chachev	6029986	Electronics	1	44	
6	Vladimir	Emilov	Grozdanov	6030018	Electronics	1	44	
7	Emil	Simeonov	Simeonov	6030032	Electronics	1	44	
8	Daniel	Lozkov	Georgiev	6030044	Electronics	1	44	

Fig. 3. Part of a table with data for students enrolled in 2001.

The table is an MS Excel worksheet. Each group occupies a separate worksheet, and the name of the file is constructed from the name of the faculty and the academic year, for example FETT2001. There are separate columns in the worksheet for each subject. They have different colors for the different semesters. Fig. 4 shows part of such a table for the second semester of the worksheet, shown in fig. 3. The 'practicum' column during the second semester contains the names files with the scanned images of the protocols of each student. For example TP449392 means Technology Practicum, group number 44, student with a faculty number that ends with 9392.

	PRM2			TD2	
grade	data	certificate	grade	data	certificate
	TP449392				
	TP449847				
	TP449873				
	TP449974				
	TP449986				
	TP440018				
	TP440032				
	TP440044				
	TP440335				
	TP440448				

Fig. 4. Part of a table containing names of files with data for technology practicum.

6. Protection coding, if necessary.

7. After completing all records, data is recorded on a CD-ROM.

Baring in mind that there are about 50 subjects and 500 students, about 15000 completed fields are necessary. In 30% of all cases, these records contain names of image files. It is estimated that one CD-ROM could save the information for one semester.

5. DATA PROTECTION MEASURES.

There are a number of methods for data protection from unauthorised changes of the information. One of them, which could be applied to image files, is to insert a group of pixels, the color of which is predefined. Such group could be inserted into the lecturers signature, for example.

Another one is the MD5 message-digest algorithm. The algorithm takes as input a message of arbitrary length and produces as output a 128-bit "fingerprint" or "message digest" of the input. It is conjectured that it is computationally infeasible to produce two messages having the same message digest, or to produce any message having a given prespecified target message digest. In that manner a file could have its message digest that is compared each time the file is accessed.

The disk with the original files is stored according to the rules defined.

6. DATA ACCESS LEVELS.

There are different suggestions for data access. A part of them is as follows:

- Access for all lecturers via passwords. In this way the control objectiveness that prevents signature frauds is increased. The educational process is more traceable.
- Access for all lecturers and students. In this way the publicity of Education is increased and the chance for subjective completion of educational process document is decreased.
- Full data access. This is a chance for all who finance the education to have a better idea what is happening with their money. Parents and Electronic companies would also be interested.

When there is a full access students are motivated for a better performance. An investigation shows that more than one quarter of them have become highly motivated when their results are revealed to Electronics companies.

7. DATA PROCESSING AND USAGE.

The implementation of electronic tables makes it possible to do a statistical processing, which also is an element of the Quality Management Systems. It is easy to get the average value of student's grades.

8. CONCLUSION.

Data archiving procedure and the useage of the Internet that are described in the paper make it possible for the improvement of the quality of Education. The elements of the Quality Management System, which are the basis for the standards from the ISO 9000 group, are implemented effectively with that approach.

9. REFERENCES

1. ISO 9001-2000
2. QS 9000
3. ISO 9004-2:1991
4. ISO 10015

Рецензент: доц. д-р инж. Марин Христов Христов