Database Integration for the Needs of the Educational Process and its Reports

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Abstract – **This paper presents the results of different databases integration for the purposes of educational process. An environment using data about students, courses, curricula and academic schedule for reporting workload of teachers and grading has been created. The environment allows for full control over the time and reduces the likelihood of mistakes. There are also elements of activities automation.**

Keywords – **education, database integration, student marks**

I. INTRODUCTION

There are different approaches to create and use databases. One can make different classifications of databases depending on the platform [1], data content (e.g. financial [2]), period of use, access [3] and others. In the field of education different databases with different orientation and accomplishment [4] are also used. The latter can be divided into two major groups - database for immediate use in educational process and databases for its managing. The approaches and implementation of the second kind are reviewed in this paper.

II. THE EDUCATIONAL PROCESS

Besides databases containing learning materials (materials in various scientific fields), there are data that are common to all educational processes. These are the data related to the operation, management of the process and reporting of the workload.

The central database contains information about students, curricula, courses, faculties and departments of the university. The existing University Student Information System (USIS) at the Technical University of Sofia is based on Oracle Database [3] and is a client-server windows desktop application. The system is designed to store data for university students and to provide basic references. It is designed to store data for university students and provide reference information. The

system is integrated with a second system providing data from admission campaign. The system uses TCP/IP protocol over the existing intranet for connection with the database server.

A fragment of data available through this system is shown in Fig. 1. - student's personal page (Fig. 1a), schedule of an exam session (Fig. 1b).
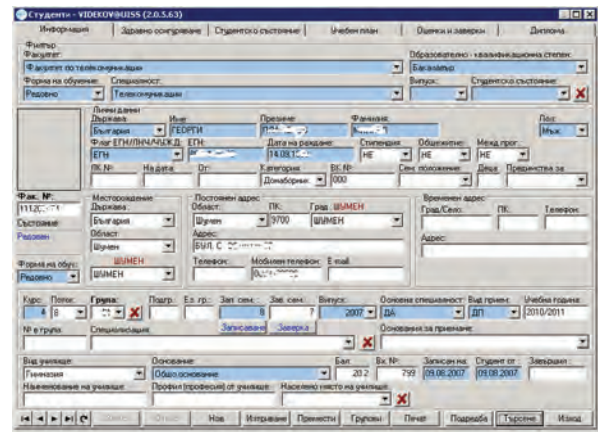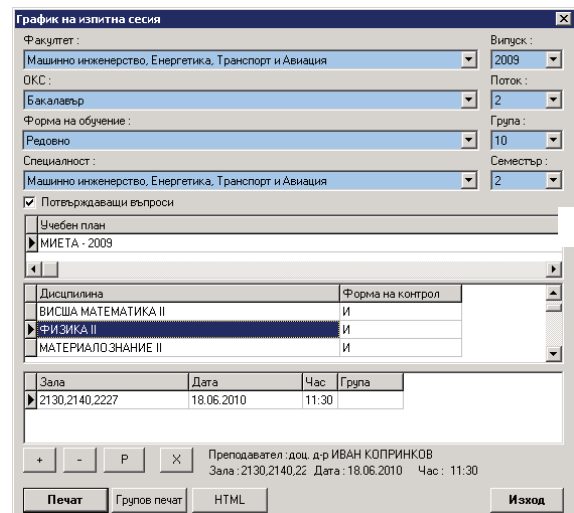

Fig. 1a. Personal page of a student with data.

Fig. 1b. Schedule of an exam session.

The presence of a central database for the educational process allows the creation of specialized local databases in separate directions and activities. Such typical activities are the evaluation of knowledge and completion of grades reports, formation of specialized study groups, preparing reports on the progress of ongoing studies (performance report) and others.

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III. The Task

The accelerating and facilitating the grading, reporting the workload and other activities, which are being carried out by the teacher are of particular interest. At the same time securing the necessary identification data in respect to the origin and timing performance is needed.

In connection with the above digital certificates were generated for the teachers at the Technical University of Sofia for the purposes of the educational process. The certificates can be used for identification and completion of relevant data. The electronic report system was created first. It is used for completion of grades in students' data records by the teachers without the participation of student offices. One of student offices' tasks is to generate the examination reports, which could be accessed by the teachers through that system - Fig.2.

Fig. 2. Examination reports for a teacher.

A teacher can choose an examination report, examine the data, fill in some or all grades and review old completed reports. After completing the grades they are being automatically transferred to students' data records within one hour, and the students can see them. The reports have a deadline for completion, after which they are locked. A verification procedure, which identifies students who failed or did not attend exams is carried out. The system automatically generates examination reports for those students. Those reports are available for the teachers without the intervention of student offices.

All grades in students' data record are being identified in respect of time of completion, reason for grading (examination protocol number) or an officer from student office, who has filled it in.

The second system which is linked with the central database is the one for reporting the workload of teachers. It is also being accessed through identification by digital certificates. A teacher logs on and selects the relevant classes, which are being retrieved from the central database. A fragment of such selection is shown in Fig. 3.

Fig. 3. Completion of a workload report.

The completion of records in a database consistent with a single central database system allows to make summaries for various sections and to monitor implementation of the curriculum in real time A summary of workload reports is shown in Fig. 4.

Fig. 4. Summary of workload reports.

IV. Conclusion

The approach that is described in this paper, related to the integration of different databases with a central one allows more flexible data usage at different levels of management while maintaining the unity of information. The application of digital certificates for accessing the databases increases the accuracy of information and improves mobility in the deployment and use. The system was tested with completion of over 80000 grades and over 48000 monthly workload reports.

References

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