INFORMATION SYSTEM IN THE FUNCTION OF A QUALITY SYSTEM AND MOBILITY DEVELOPMENT

Mladen Nikolić, Predrag Sibinović, Sanja Kovačević

Introduction

- Integration processes in the European Union are very important, especially in the sphere of education.

- On the basis of positive experiences in forming similar institutions in the European Union eight colleges of applied studies ventured into forming the first Academy of Applied Studies through the realisation of the Tempus ECBAC 517200 project

- The first steps towards forming the Academy and establishing its capacities lie in common frameworks in the fields of quality assurance, student service, IT service and international office

- Quite aware of the fact that nowadays it is necessary to comparatively and interdependently develop the systems of quality assurance and information technologies, the development team of the IT service of the Academy approached the development of a unique information system.

Information system of the Academy of the Applied Studies

□ The Academy of Applied Studies is committed to realising the Bologna Process as successfully as possible. Bearing in mind the significance of quality from the standpoint of keeping up-to-date with modern trends, the consortium of the Academy adopted the common quality assurance policy.

□ The goals of quality improvement within the Academy comprise the following:

- providing an active support for every participant in the process of education (teaching and non-teaching staff, as well as students) in their effort to improve their own quality;

- emphasising the importance of education quality improvement and defining measurable indicators of quality criteria;

- introducing a system for the assessment, monitoring and improvement of every participant;

- improving the quality of inclusion of every participant

Information system of the Academy of the Applied Studies

- The most significant characteristic of the information system is a support for the quality of the teaching process and the ability to adapt to quick changes, not only in the immediate (national), but also in the global environment.

- The role of the information system in monitoring the quality of teaching process in schools is of the utmost importance.

- The system of quality as a basis of a regulated education system represents the necessary condition for the development of a decent information system.

- The issues of defining clearly delimited responsibilities within the Academy, as well as quality assurance policy, and relying on globally recognised standards are some of the issues which represent the basis of the information system.

Technical features of the information system

- During the development of the ATEIS the main tasks were:

1. **storage and organisation of large-scale data**

2. **data security and confidentiality of information**

3. **access to data**

4. **different levels of access to data**

5. **automated data processing**

6. **different types of users**

- In this way, the data that is mutually correlated is optimally connected, and access and update could be provided from different locations and with more clients simultaneously.

- For the realisation MySql database and web programming language PHP and JavaScript were used .

Technical features of the information system

- ATEIS has multiple levels of data access, depending on the class of users. Classes of users are:

1. **Student Service**

2. **Lecturers (professors and assistants)**

3. **Quality Assurance**

4. **Students**

5. **The Ministry of Education**

- The functions of each class of users and processing capabilities of the data are clearly defined and limited.

- Because of the potential web access to the system, special attention was paid to data security. On ATEIS all existing protection systems ranging from server of certification, encryption, user names and codes over other solutions in the implementation were used.

Technical features of the information system
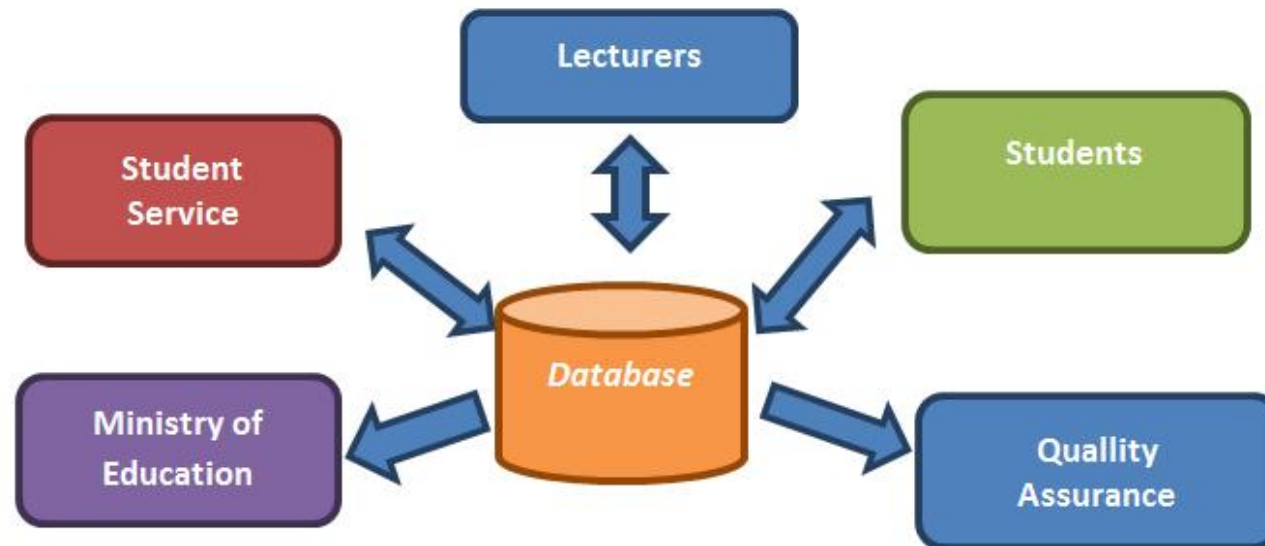
Figure 1. Organisation structure of ATEIS informational system

- The database contains more collection of data organised into different classes or interconnected. In addition to the basic master data recorded on students and their activities :

Technical features of the information system

1. **pre-exam activities**
2. **logged exams and exam results**
3. **payment**
4. **transfer of ESBP points**
5. **assessment of teaching staff and services by students**

☐ The ATEIS database represents a valuable source of information for analysis and prediction, but most of all for the advancement of education of students .

Data analysis

- **Data stored in the database are subject to further analysis and processing. Different tasks can be applied, such as the following general tasks from the domain of low-level user activities:**

1. **value retrieval** – finding of specific attribute values for data cases (e.g. find when the student passed the given exam and with what grade),

2. **filtering** – finding data cases which satisfy the given conditions in relation to their attributes (e.g. find the students that have qualified to do the final exam),

3. **compute derived value** – finding the appropriate aggregate numerical value for data cases (e.g. find the average grade for the given course in the given time),

4. **find extremum** – finding data cases with extreme attribute values (e.g. find the student with highest average grade in a school year),

5. **determine range** – finding the range of attribute values of interest for data cases (e.g. find the span of the results of pre-exam activities for a given course),

6. **characterise distribution** – finding the distribution of the quantitative attribute of interest for data cases (e.g. find the distribution of the grades for a given course at a given time),

7. **find anomalies** – identification of any anomalies with respect to a given relation or expectation, i.e. statistical outliers (e.g. find the students that did not attend any lecture for a given course),

8. **clustering** – finding clusters of similar attribute values for data cases (e.g. divide the students into two groups according to their previous grades in order to give lectures at two different levels),

9. **correlation** – finding useful relations between values of two given attributes for data cases (e.g. find the correlation between the pre-exam and the exam results).

Data analysis

- As can be seen, the suggested starting framework for the data analysis offers a very broad spectrum of useful applications which should certainly contribute to the quality of schools' functioning.

- For example, if one professor has correlated bad indicators for multiple courses (e.g. low attendance), that should probably represent a certain sign. Of course, it is possible to imagine a different scenario, where, for example, survey results from the students that did not attend the lectures would not have been taken into the consideration.

- Advanced techniques of data analysis can be relatively easily embedded into the existing general framework of the information system, if there is a specific demand.

- Various techniques from the domain of artificial intelligence aimed at expert systems are available, such as pattern recognition, neural networks, fuzzy logic etc.

- It should be emphasised that the development of these techniques can represent an academic activity per se, which can include professors and students and contribute to their mobility and to the cooperation between different institutions.

Surveying and gathering the data relevant for the Quality Assurance Service

- The ATEIS is intended for supervision, communication, archiving and student data administration during three-year vocational studies, which immensely facilitates the process of gathering relevant data connected with quality and statistical analysis.

- On request, relevant data are distributed in either original or processed form for the purposes of a specific student service. This facilitates the work immensely and increases the efficiency and productivity of the Student Service.

- The Student panel consists of four groups of links for the evaluation of the survey items connected with general questions, study, course and teacher evaluation, and the Academy Services evaluation.

Surveying and gathering the data relevant for the Quality Assurance Service

Figure 2. Apperance of the student service panel

Ankete

Pitanja za predmet:	Osnovi informaciono komunikacionih tehnologija ▾
Izvršavanjem predispitnih obaveza olakšano je polaganje ispita.	☐ 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5
Neophodna literatura potrebna za ovaj predmet nalazi se u biblioteci Akademije.	☐ 1 ☐ 2 ☑ 3 ☐ 4 ☐ 5
Literatura je usaglašena sa nastavnim planom predmeta.	☐ 1 ☐ 2 ☑ 3 ☐ 4 ☐ 5
Obim sadržaja predmeta odgovara predviđenom broju časova predavanja i vežbi u semestru:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☑ 5
Na početku semestra profesor je predstavio plan nastave sa jasno definisanim obavezama i pravima studenata	☐ 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5
Profesor redovno održava nastavu.	☐ 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5
Profesor je pripremljen za nastavu i dobro poznaje materiju koju predaje.	☐ 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5
Odgovarajućim primerima iz prakse, profesor olakšava razumevanje materije.	☐ 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5
Profesor je dostupan za konsultacije	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Profesor je otvoren za diskusiju o gradivu.	☐ 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5
Profesor je profesionalan i korektan u komunikaciji sa studentima.	☐ 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5
Profesor objektivno ocenjuje znanje studenata.	☐ 1 ☐ 2 ☑ 3 ☐ 4 ☐ 5
Profesor uslovljava polaganje ispita kupovinom njegovih knjiga-skripti.	☐ Da ☑ Ne ☐ Delimično
Primedbe:	
Pohvale:	
Preporuke:	

Pošalji odgovore i pređi na sledeći predmet

Moj dosije

Aktuelni ispitni rok i prijava ispita

Quality evaluation and presentation of the analysed statistical data

□ Application panel intended for the Quality Assurance Service comprises the following:

1. **The possibility of sending notification to the staff (according to the study programmes, modules or individually)**

2. **Monitoring of all data necessary for the Quality Assurance Service which are in accordance with the Law on Personal Data Protection**

3. **Creating and sending questionnaires to students (in case that students do not fill in the questionnaires their student panels are disabled, as well as their activities in student administration, until they fill in the questionnaire)**

4. **Overview off the results of the survey and statistical processing of all data which are of any interest for the improvement of the quality of higher education institution**

5. **Graphic display of the results of the survey**

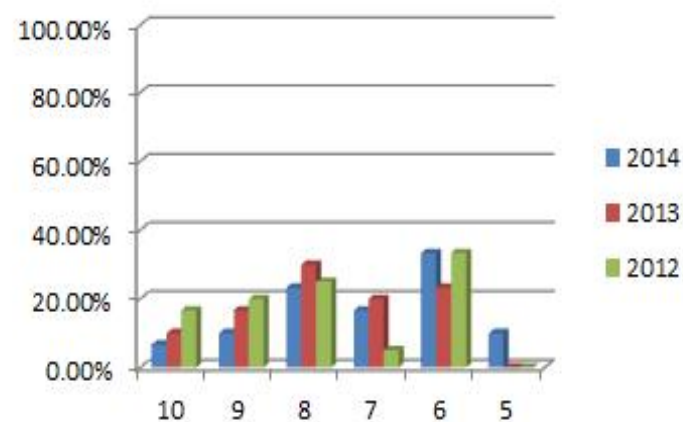# Quality evaluation and presentation of the analysed statistical data

Figure 3. Exported results of student survey

CONCLUSION

- The very first Academy of Applied Studies in the Republic of Serbia is committed to working according to the highest international standards regarding higher education by respecting the established international norms, the regulations of the Republic of Serbia, as well as the norms established by the Academy itself. The entire staff and students need to abide by the established norms, as well as to work continuously and systematically on the quality improvement.

- **By using the presented information system the management of the Academy and the Quality Service are enabled to exercise continuous and systematic control over the realisation of accepted standards and to conduct corrective measures if there should be any kind of deviation. The information system focuses on the opinion of students as the highest level of quality system abstraction. Owing to its modern structure the architecture of the information system can precisely adjust to the requests of the system of quality, and owing to its openness it can be combined with the applications defined earlier. The designed information system offers quick and efficient introduction and flexibility in future changes.**

THANK YOU FOR YOUR ATTENTION