# Technology of Computer Monitoring of the Quality of Educational Process

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Abstract: This research aimed at developing operational assessment tool to minimize the university risk background with the purpose to raise the quality of the educational process. The original mathematical approach is proposed as a means to solve the problem of assuring the quality of education. The method of modified risk thermometer and binary fuzzy relations composition were used as the basic methods of sociological monitoring data analysis to measure the satisfaction of students with educational process. The method of modified risk thermometer identifies the risk background of the educational process, defined by the Key Risk Indicators. The method of fuzzy analysis allows to consider and minimize the existing uncertainty of the educational process and risk background. It is shown on the example that if the university risk background is of high degree, it necessitates taking the complex of management decisions to improve the situation with the risk background. The theoretical significance of the research is in development of the methodology of educational computer monitoring. The application of this methodology raises satisfaction of students and teachers with educational process, objectivity of management decisions and their implementation into educational process in order to normalize the risk temperature, which is the practical significance of the research. The degree of this condition corresponding to the normal one is defined at the next stage and needs taking further management decisions. The described methodology is a universal and efficient tool to revaluate the activity of not only universities but also of any company at risk as well as to organize the process of risk management in social and economic systems.

## 1 INTRODUCTION

The sociological research into universities' competition for top positioning in global and national rankings demonstrates the growing demand for the ways to monitor the university performance [1, 2, 3, 4]. According to B. Williamson, the findings of the recent sociological research conducted in the United Kingdom raise 'two critical points': the traditional judgement made by experts and professionals is substituted with numerical data, and the people's understanding of the notions ‚good university' and ‚good course' is changing due to the rankings' results [5]. So, literature suggests that most attention has focused on monitoring as an instrument to improve the performance of an organisation, that Lucas H., Greely M. and Roelen K. define as 'higher frequency data collection or reporting, often using information and communication technologies, to strengthen current programme performance or to inform policy and the practice (design, scale and scope) of future service delivery' [6]. Any monitoring system aims to deal with stability and availability [7], that is why, it needs to be reliable and efficient.

One of the monitored parameters to measure the university's performance is the quality of the educational process. It needs monitoring not only for measuring progress and growth but also for negative trends and risks, which is understood as ‚the effect of uncertainty on objectives resulted in a deviation from the expected — positive and/or negative and is often expressed in terms of a combination of the consequences of an event (including changes in

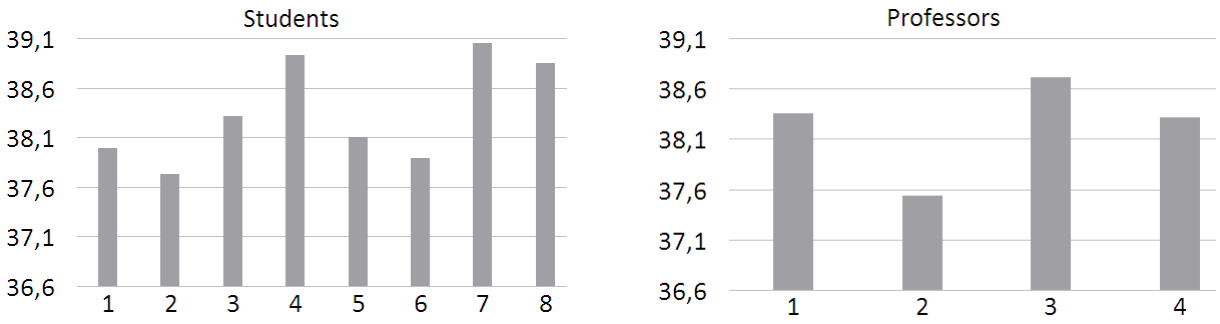


Figure 4: Risk temperature of the university students' and teachers' satisfaction.

Table 5: Temperature characteristics of satisfaction indicators.

| Indicators group (key risk indicator category) | Indicators number | Risk temperature | | | | |
|---|---|---|---|---|---|---|
| | | T, °C | N | AN | H | Cr |
| Satisfaction with different learning activities | 30 | 37,99 | 0,00 | 1,00 | 0,00 | 0,00 |
| Satisfaction with teachers' work | 7 | 37,73 | 0,00 | 1,00 | 0,00 | 0,00 |
| Satisfaction with organization of the learning process | 4 | 38,31 | 0,00 | 0,69 | 0,62 | 0,00 |
| Satisfaction with university facilities | 7 | 38,93 | 0,00 | 0,07 | 1,00 | 0,00 |
| Satisfaction with the quality of university services | 9 | 38,10 | 0,00 | 0,90 | 0,20 | 0,00 |
| Satisfaction with extracurricular activity | 5 | 37,89 | 0,00 | 1,00 | 0,00 | 0,00 |
| Satisfaction with information support of curricular and extracurricular processes | 6 | 39,05 | 0,00 | 0,00 | 1,00 | 0,00 |
| Satisfaction with studying at university in general | 11 | 38,85 | 0,00 | 0,15 | 1,00 | 0,00 |

Table 6: Educational process risk assessment.

| Identified risks | Fuzzy characteristics | | | | Risk probability |
|---|---|---|---|---|---|
| | N | AN | H | Cr | |
| 1 Risk of knowledge obsolence | 0,00 | 0,14 | 0,00 | 0,00 | 0,30 |
| 2 Mismatching of the stakeholders interests | 0,00 | 0,14 | 0,00 | 0,00 | 0,30 |
| 3 Technical system malfunctioning | 0,00 | 0,64 | 0,20 | 0,00 | 0,37 |
| 4 Risk of the key personnel dependence | 0,25 | 0,45 | 0,25 | 0,25 | 0,43 |
| 5 Personnel depletion | 0,00 | 0,14 | 0,17 | 0,00 | 0,46 |
| 6 Stagnation of research | 0,00 | 0,07 | 0,00 | 0,00 | 0,30 |
| 7 Devaluation of personnel creativity | 0,00 | 0,33 | 0,00 | 0,00 | 0,30 |
| 8 Lack of identity and uniqueness | 0,37 | 0,75 | 0,37 | 0,37 | 0,41 |

# 5 CONCLUSIONS

The new idea of organizing social monitoring of the quality of university educational process as the assessment by the key players of educational relations – students and teachers has been discussed in the article. The method of representation of assessment grades as the university risk background characteristics by means of fuzzy composition allows to calculate probability measures for educational process risks.

The pilot testing of the described approach was done on the basis of processing data of the pilot sociological research through the survey of students and teachers of Siberian State University of Telecommunications and Information Science. The received assessment grades of satisfaction with different aspects of the educational process demonstrated at the moment of the survey its mean level, and transformation of the grades by means of risk thermometer into temperature indicator showed fever and risk background on the 'satisfaction' segment of data, which requires taking management decisions. It should be emphasized that random combinations of the grades demonstrate high degree of uniformity (variation coefficient does not exceed 3% in average), which proves the validity of the received results.

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