Chapter 12
The Usage of GIS in Realizing Engineering Education Quality

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ABSTRACT

The chapter has considered research and instructional methodology aspects for development of methodological, informational, and instrumental, ensuring of the education quality management system which are necessary to be taken into account in modern conditions. Mathematical bases of the geoinformation system application for monitoring of the education process realization quality have been developed. Model, method, and algorithm for quality assessment of the educational process realization in institutions have been unfolded. A way of representing some fuzzy production rules in solving application tasks of fuzzy modeling and executing the process of approximate reasoning on educational risks has been introduced. A fuzzy production system of educational risk analysis on the basis of using modified fuzzy Petri nets has been realized. Analysis of possibilities to apply suggested approaches for monitoring of institutions at various levels has been conducted.

INTRODUCTION

Process of monitoring and quality assessment of the education service provision is important for contemporary educational systems. It is necessary to develop a monitoring system realizing specific functions of management and fitting the general system of education (Gurov, Koryachko, Taganov, Moiseenko, & Taganov, 2010) for qualitative realization of educational programs in institutions. Such system is necessary at all levels of the education management for informational support of the management decision procedure to organize, optimize, modernize and increase the educational program realization quality in institutions (Heyneman, & Lee, 2014).

Let's mark out specific functions of the education management system (Xin, Li, & Li, 2007):

- Prediction of quality dynamics of the educational process realization;
- Organization of the education quality management process, distribution, assignment and realization of functions;
- Control of the education process realization quality according to characteristics of its potential, current state and result (Brown, 1999);
- Regulation of the educational process realization quality, provision of related indicators;
- Quality assessment of the educational process realization and possibilities of its improvement;
- Quality research of the educational process realization in the area of historical aspects of its formation, limitations, priorities, negative influences and critical factors (Taganov & Taganov, 2006);
- Motivation for actions directed to increase the education quality.

Let's mark out main specific functions of the education quality management (Tan, 2012):

- Professional and teaching staff quality management;
- Student teaching quality management;
- Educational process realization technology quality management;
- Informational and methodological provision quality management;
- Material and technical support quality management;
- Institution infrastructure quality management.

Function composition characterizes a specific nature of the management object and real problems of its functioning and development (Glebova, & Kuznetsova, 2012).

PROCEDURE

Assessment of the education quality is suggested to be accomplished by estimating and monitoring quality of educational program realization in institutions, so a crucial task is to develop a system executing a collection, processing and analysis of information on state of educational programs in order to monitor educational programs (EP) periodically (Dohmen, 1999).

Monitoring of EP refers to a collection, processing and provision of data in relation to set criteria and indices aimed at ensuring efficiency and increase of the educational process quality. Taking into account feedback on the basis of intermediate results for corresponding criteria allows making alterations in educational programs promptly (Attfield, & Vu, 2013).

Criteria and Function of the Education Quality Assessment

All criteria of EP realization quality assessment can be divided into 2 groups (Kolesenkov, & Taganov, 2015):

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