

DSS Module for Teaching Staff Activities

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Abstract: - The authors present various issues on state of the art decision-support processes and decision support systems (DSS), and also their own studies in designing a higher education DSS. The final section contains their outline of a DSS Teaching module, involving the results and activities of FSEGA staff, using the data from the existing ICT systems and platforms, to assist decisions for all the actors implicated in the processes, in various circumstances.

Key-Words: - decisions, higher education institutions, Information and Communication Technologies (ICT), decision support systems (DSS).

1 Introduction

Optimal decisions, solutions and strategies in all aspects of life often rely on valuable data and information and the ability to find it, and through this analysis in the direction of revealing appropriate trends. Decisions are the “coin of the realm” in business [16]. They require effective implementation of decision support tools to adequately inform the decision process and also request other desirable characteristics such as imagination and creativity [3]. Every success, every incident, every opportunity seized or loss is the result of a decision that someone made or failed to make. As a result, executive dashboards, business and other performance software have been used to enable faster decision making, identify negative trends, and better allocation of business resources.

In the last decades, support for decision making has taken a variety of forms, and as the forms evolved, the support has become more comprehensive and integrated. Currently, there are a number of alternatives that match the appropriate problem or the opportunity to create a new task for management [10]. One of the strategies is to support effective decisions through the selection, development, implementation, management and utilization of Information and Communication Technologies (ICT) in higher education.

Universities seek to apply more the accumulated data, invest more resources in tools that allow them to collect and manage information directly, in order to support managerial decision making [3]. Moreover student involvement in decisions at unit level and group education is important, together with the practice of participatory skills through involvement in various curricular and extracurricular activities [4]. One of the key issues for the management of higher education is to find a way to automate the process as possible, in order

to automatically obtain cohesion and coordination between local decisions taken by different actors [14].

In the present paper the authors present several issues in the field of decision support systems (DSS) and decision-making processes, and the continuation of their research in designing a DSS for higher education environments, based on the situation of The Faculty of Economics and Business Administration (FSEGA) at Babes-Bolyai University of Cluj-Napoca (UBB).

2 Decision Support Systems and Decision Making Processes

DSS comprise various definitions [9], but it is largely considered that they are built to assist decision processes and help to identify and resolve problems [3]. An important point most common in all DSS definitions is that decision support systems literally refer to “applications that are designed to support, not replace, decision making” [2].

An essential characterization of DSS states that it should be simple, robust, easily controlled, adaptable, comprehensive on important issues, and easy to communicate with, and offers users a flexible set of tools and capabilities for analyzing important data blocks [7]. DSS symbolize a specific class of information systems designed to help users which rely on knowledge, in a range of decision-making positions to solve the encountered problems that matter for the organization’s prosperity [9]. Many effective decision support systems are based not only on the capacity of a manager to present information, analysis, and meaningful dynamics, but also on enabling users to realize the intended use of those elements by themselves (without the developer “holding their hand”) [2].

The starting point of DSS is to provide the informational assist required to diminish the effects of limits and restrictions faced by human decision maker throughout his activities. State of the art research of the decision-making processes presents some of the factors that can contribute to successful decisions [17]:

- a) Responsibility and Transparency – there are laws and penalties to be respected by the individuals or organizations in decision making processes.
- b) Expertise – each decision should be rooted in the profound knowledge of an expert.
- c) Coordination – the best decision options are not enough if there is no synchronization to transmit the orders that should be complied with and to manage the decision-making process.
- d) Economy Factor – a decision can have a negative result or a single battle can be lost, but overall a good sense in decision making can help to make up for the loss of some encounters.
- e) Time – an abundance of time acts with a force similar to the economy factor, allowing decision factors to wait for favorable opportunities.

- f) Consensus or negotiation – when there is a complex level of a problem, a more extended analysis of the problem and negotiation or consensus among the parties concerned is required.

Another appealing approach to decision-making processes is through complex tools that are utilized to analyze decisions and offer senior management teams a method for assigning roles and involving the relevant people. RAPID (Fig.1), a decisional model formulated by Rogers and Blenko [16] focuses on the following idea: “The key is to be clear who has input, who gets to decide, and who gets it done”. The five letters in RAPID correspond to the five decisive decision-making roles: recommend, agree, perform, input, and decide. The roles are not carried out lockstep in this order, for the reason that the authors took the liberty for the sake of creating a useful acronym.

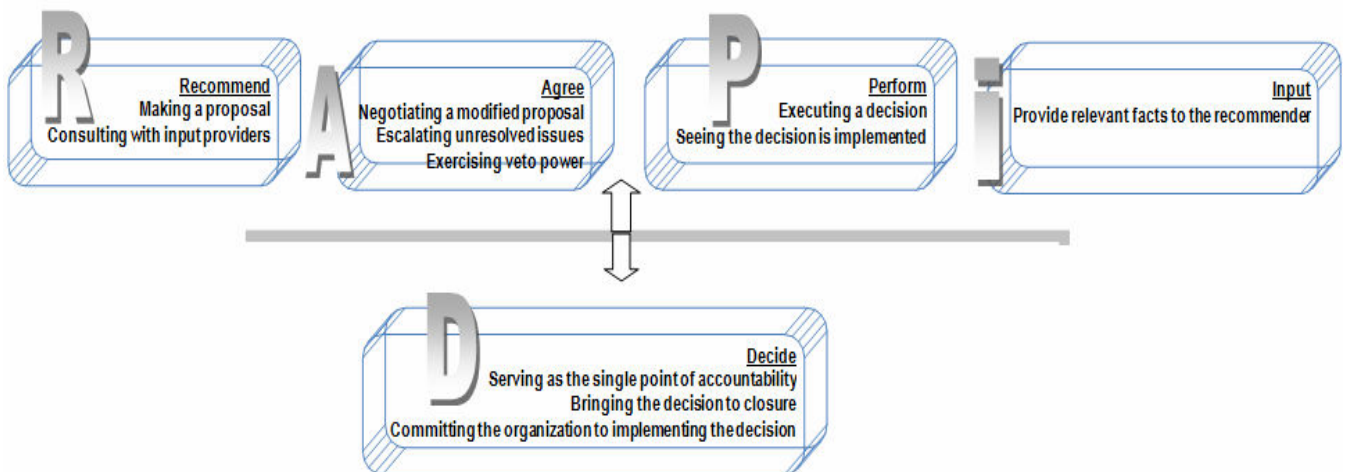


Fig.1 Representation of the RAPID decision model, based on [16]

Recent research on decision support systems regard them as wide-ranging environments for supporting efficient information processing and decision-making, founded on a finer understanding of the problem context [11].

Some of the attributes and benefits of decision support systems can be described as follows [2]:

Typical Attributes

- Eased Access (to raw distributed data; often updated in near-real time)
- Facilitated Analysis (of data often through use of automated intelligence)
- Rich Communication (of results and new ideas in a meaningful and practical form, often augmented by sophisticated graphical depictions)

Common Targeted Benefits

- Elevated Strategic Advantage
- Reduced Lead-Time to complete work
- Greater Consistency
- Smarter Response (to changes / failures)
- Worker Empowerment
- Reduced Cost.
- Greater Partner Satisfaction (both customers and suppliers)
- Increased Innovation
- Higher Retention

3 Designing a DSS Module for Teaching Activities

Decision factors in all fields face increasingly demanding environments, overloaded with information, data distributed throughout the organization, in terms of risk and uncertainty. As the universities are confronted with increasing pressures to improve the quality of education processes and management, they require the development of effective decision support tools to accurately inform and assist them. Some educational systems have long had modules for decision support, but mainly for the retrospective analyses of financial and administrative data. On account of large scale competition in attracting students and funding, higher education institutions [19] have implemented strategies that improve quality of teaching-learning and research results and provide the local community with services and support.

A DSS designed for higher education would have to be anchored in the existing data of the institution, on the databases of the all its systems (educational, research and grants, financial, accounting, eLearning portal etc.) [4]. It should gather information on academic processes, provide feedback for their improvement, and offer decision-making support with high integration and direct interaction with all the domains of the problem.

The higher education ICT based systems comprise general aspects with the design of economic systems, but also have a number of special features regarding [5]:

- the functioning and organization of educational institutions;
- academic autonomy, even in financial issues or other forms according to public and academic responsibilities;
- universities are entities that generate new knowledge and support the local and global communities;
- universities have central tasks in education, training, research etc.

Some types of decision-making problems in the educational system can be described as follows [3]:

1. Planning decisions for the programs of study and curricula, which lead to the establishment of curricula for long-term education.

2. Tactical decisions:

- a. The curricula and syllabi detailed for each specialization and year of study;
- b. Requirements for the accomplishments of the syllabi: specialized frameworks, necessary investment, software, etc.

The DSS, on whose designed we have been working, has 3 main modules: Students, Research and Teaching. The Teaching module (Fig.2), which is presented in this

paper, comprises the results and activities of FSEGA teaching staff, and is anchored in the internal procedures of FSEGA, with data extracted from: [3],[6]

- UBB and FSEGA systems: the research activity management system; administrative activities system; management of school records application; Web based grade book available online; fee management application; online and distance education (ODL) portal;
- assessments of academic quality concluded periodically;
- performance versus that of others faculties or across the university;
- learning centers;
- teaching staff evaluation;
- research versus teaching performance;
- questionnaires and surveys of graduates, master degree and PhD students, employers, departments, different longitudinal studies etc.

The resulted data may probably be used for quality assessment, to complete diagnoses and analyses on the practices of curricula and syllabi. It serves as the starting point for building and providing alternatives and suggestions in decision-making on teaching-learning, curricula, syllabi, exams-evaluation issues etc. Consequently, the data, tables, charts, results of data extraction processes can be utilized to assist decisions for all the “actors” (deanship, teaching staff, students, secretariat, etc.) implicated in the processes, in the subsequent circumstances:

- Syllabi and teaching materials
- Course schedule
- Choosing optional courses
- Tutoring activities
- Teaching-learning activities
- Students’ practical work
- Preparation for the bachelor exam
- Evaluation of the teaching staff
- Exam schedule
- Partial exams during the semester, and final exams
- Students’ grading management
- Contestation of the evaluation results
- Bachelor final exam.

The Teaching module is designed to be integrated with the other modules of the higher education DSS: Students module [4],[6] and Research module. The final DSS design model is under further development and improvement, and would be adapted to fit other universities of different local and European areas.

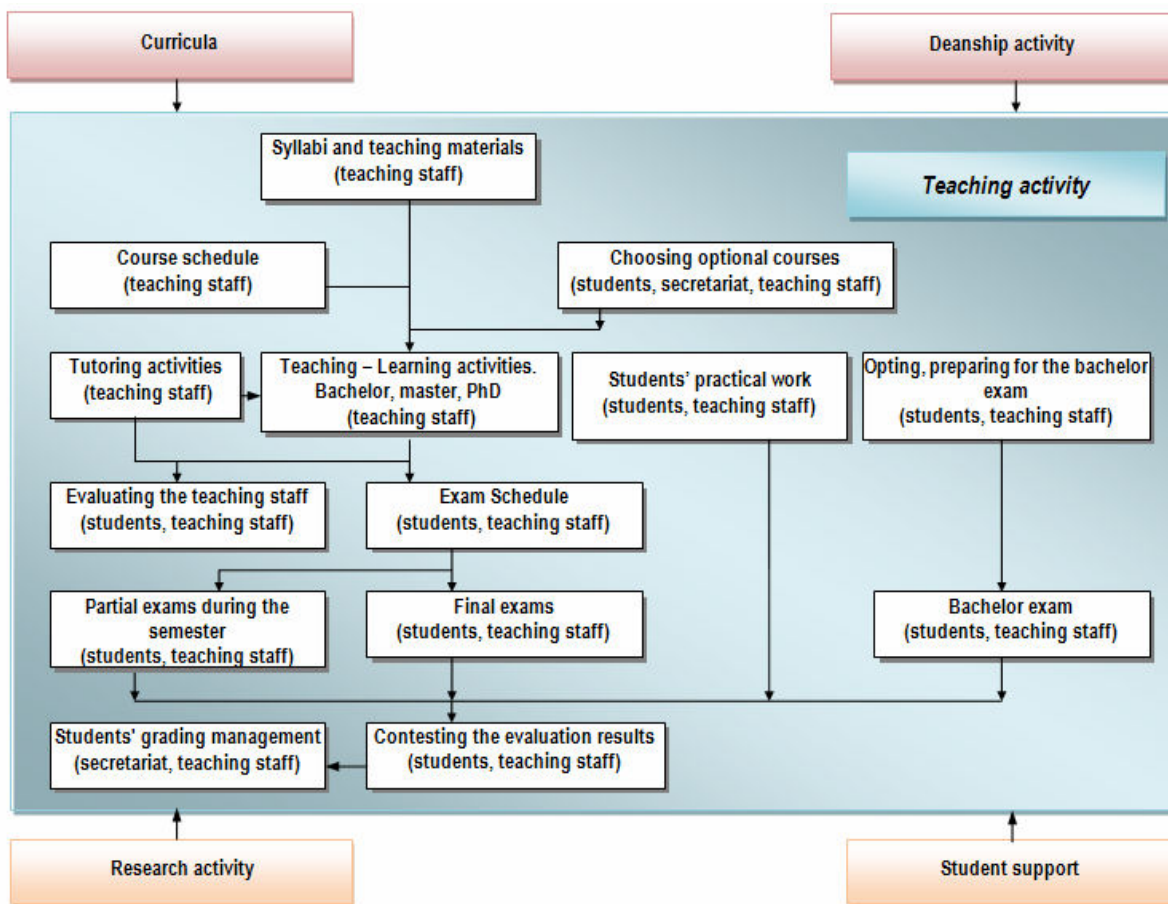


Fig.2 Teaching Activity module – processes’ map and “actors”, adapted from [20], [6]

4 Conclusions

The present work is an integrated part of our latest research, from the study of local and international aspects of ICT in education, higher education decisional issues, state of the art decision-making processes and DSS, to our own effort in the design of a decision support system to assist the higher education managers.

In this article, we presented some key figures of the DSS definitions and fundamental characterizations of DSS, highest level research of the decision-making processes with factors that can contribute to successful decisions, a newly formulated decisional model, and typical attributes and benefits of DSS from the research literature.

The final section contains our outline of a DSS Teaching module, a part of our research in putting up a higher education DSS. It involves the results and activities of FSEGA staff, using the data extracted from databases in all existing ICT systems and platforms, to assist decisions for all the “actors” (deanship, teaching staff, students, secretariat, etc.) implicated in the processes, in various circumstances. We detailed several features of the higher education ICT based systems and

particularities of decision-making problems in the higher education environments.

The designed DSS would be appropriate for the university’s educational mission, innovative research, and latest body of knowledge, academic services offered to society and community, an important mission for national and European higher education institutions. Its architecture is under further development and improvement and would be extended to other areas of a modern university: research, finance and administration etc. Additional research directions rely on the grants of the Business Information Systems department and on the general objectives of the Strategic Program of Babeş-Bolyai University of Cluj-Napoca for 2007-2011 [19].

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