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IMPACT OF RESILIENCE, ICT SUPPORT AND QUALITY OF STUDENT'S LIFE ON QUALITY OF HIGH EDUCATION PROCESS

Abstract: *Answers to the questions of how and in what way the quality of life of students, resilience and ICT support affects the quality of high education we will get through this work where main objective is to define a network of processes and process management ensuring more quality and more innovative managing and service provision, therefore satisfying the needs of service users - in this case the students of the university. To collect the relevant data in the thematic analysis of this paper, the method of interviewing by questionnaires was applied. The sample survey was conducted among undergraduate students, teachers and staff of the Teacher Training Faculty in Uzice.*

Keywords: *ICT, quality in higher education, quality of life, models*

1. Introduction

Quality is often uttered word in everyday communication. The reason for this is its many uses. The quality is being argued in various places, written about daily, mentioned in reports and discussions. We are constantly improving the quality and quality assurance is considered a key activity of any quality management system. The education system must be continually improved and changed in accordance with changes in the competitive environment factors. Education and knowledge are becoming more and more primary development resources to create competitive advantage in any organization or institution. Application of the concept of integrated management systems in higher education represents a new way of organization that can ensure the institution to

achieve sustainable competitive advantage in the long term.

2. Quality in higher education

The definition of quality (according to ISO standards): the degree of fulfillment of the requirements. The quality of higher education has more definitions and some of them are:

- The quality of higher education in the broader sense - is the compliance of higher education (of results achieved) with the needs and requirements of users, goals, norms and standards.
- The quality of higher education in the narrow sense (quality of the preparation of highly educated professionals) - this is the compliance of the preparation of

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highly educated professionals (the result of the process) with the needs and requirements of the stakeholders (state, society, employers, knowledge market, personality), goals, norms and standards.

In evaluating the quality of higher education, special emphasis is placed on the level of satisfaction of stakeholders – education customers. Therefore, the basic direction to a high level of quality of higher education is built through a high degree of satisfaction and loyalty of both customers as well as staff and all employees in the higher education institution.

Higher education institutions are among the most complex to manage, provision and improvement of quality. The characteristic of higher education institutions is a high level of personnel, complexity of the process of education, high social significance of the results of work (training of future graduates who will form the structure of employees), long cycle of education and training, teacher's independence and freedom in the choice of

teaching methods and so on. Other characteristics can be pointed out, that hinder the development and introduction of QMS in higher education institutions.

3. Model of the process of higher education

Business process modeling (BPM) is making a diagram that will show the business activities in order in which they occur. Modeling replaces experimentation "live", which requires a lot of time, has a high cost and a repetition of the experiment is expensive and can be "dangerous". Process modeling is a skill, not a science. Requires common sense, the power of abstraction, systematic approach, discipline and experience. For these reasons, modeling is increasingly becoming necessary in the companies and institutions that use complex and very demanding processes (Arsovski *et al.*, 2012; Nestic *et al.*, 2015; Stefanovic *et al.*, 2015).
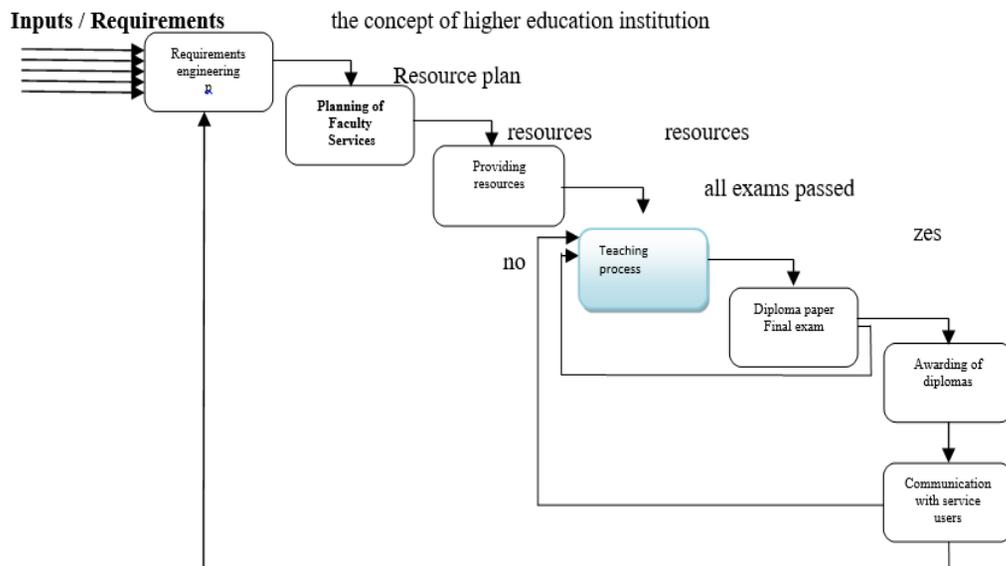

Figure 1. Map, network processes in higher education institutions

Quality according to ISO standards is the degree of fulfillment of requirements. The quality of higher education is affected by many requirements and some of them are requirements by (Lazic, 2007):

- beneficiaries of higher education - stakeholders
- Bologna process, international standards and international organizations (international requirements)
- requirements of national standards for accreditation,
- quality management system requirements,
- requirements of the standard of work and higher education institutions and
- requirements of technological standards of work or pedagogical subsystem.

Orientation towards customer education and research is one of the basic principles of the Bologna Declaration. Feedback from customers and attention on their priority needs is useful in directing the curricula of faculties. (Spasic, 2007)

University education is a process in which certain resources are engaged and on the basis of the input, the process is carried out (graduate students and other university services). Each of the participants in this process has its own goals, and the university

as recipient and the service provider. Designing university education must be approached strategically so that the university as a process can respond to customer's requirements. The University as an institution that carries out processes of training and development, directly affects the process of quality improvement over the exit of the process (students, publications, projects) for all levels of society. (Funda, 2008)

On the map or network processes, basic processes of faculty are graphically represented with the order from the input through the first processing task to the last process with its output as feedback to the first process, which thus represents a new entry into the process as stakeholder's requirement (Tadic *et al.*, 2014).

4. Resilience and ICT support in higher education

A higher education process is related to a lot of hazards and risks. On this way it is high vulnerable and must be resilient.

In literature in this area there are different approaches. Based on research of (Sallis, 2005; Arsovski, 2008; Arsovski *et al.*, 2009; Sofranac and Damjanovic, 2010; Aleksić *et al.*, 2014; Arsovski *et al.*, 2015) is defined base model of vulnerabiltity and resilience in higher education process (Figure 2).
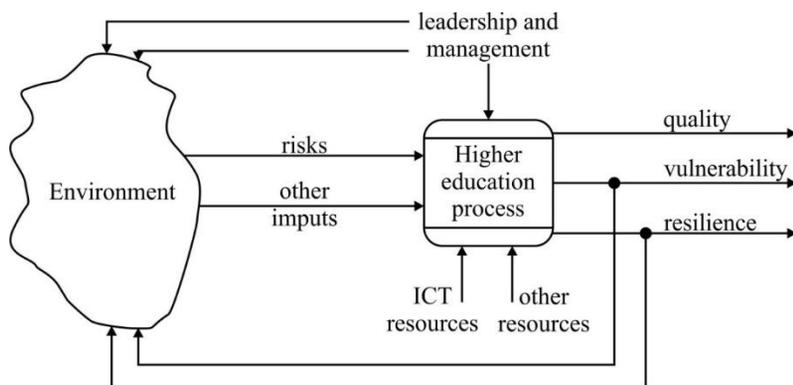

Figure 2. Model of impact of environment and leadership and management on vulnerability and resilience of higher education

Impact of environment is related to students number and their needs, legislative in higher education, changes in population, sectors needs, technologies, globalisation aspects, etc. The most important input is identified risk and related hazards and its impacts.

A leadership and management have impact on high education process and also as feed-back on environment. Also, these processes are related to risks for choosing right and timley realized decisions based on appropriate techniques (Rankovic *et al.*, 2014; Rankovic *et al.*, 2012; Rankovic *et al.*, 2012)

Impact of ICT resources on higher education process is viewed through using appropriate ICT support, as learning (Kalinic *et al.*, 2011; Stefanovic *et al.*, 2009), or using clond technology (Arsovski *et al.*, 2015), or using cloud technology (Janovac, 2014), or using appropriate information systems for higher education institution or instilions in supply chains in higher education (Arsovski *et al.*, 2012; Rankovic *et al.*, 2012a; Rankovic *et al.*, 2012b).

5. Testing of the model at Teacher training faculty in Uzice

The modeling was done on the basis of an analysis of all the activities in the current organization of the faculty. Each process can be decomposed or branched to subprocesses.
Inputs of the process:
I1. The Law on Higher Education
I2. Statute of Faculty
I3. The strategy of quality assurance Teacher Training Faculty in Uzice
I4. Ordinance on standards for self-assessment
I5. The requirements of service users of faculty
The basic processes of faculty:
P1. Requirements engineering
- Users' Expectations
- Information from employers (preschools and primary schools)
- Requirements for the service

- Plan of the process model
- The organization of the process
- Defining responsibilities and authorities for processes
- The concept of the Faculty

P2. Planning of faculty services
- Planning teaching activities
- Planning of scientific-research activities
- Construction of Student Services
- Construction of legal and economic financial services

P3. Providing resources
- Human resources - teaching and non-teaching staff, students, administrative staff
- Financial Resources
- Material resources

P4. Teaching process
- The teaching process
- The learning process
- Lectures
- Exams

P5. Diploma paper / final exam
- All exams passed
- Practice completed
- A survey of final work conducted
- Making of final work

P6. Awarding of diplomas
- Certificate on completion of higher education
- Diploma Supplement

P7. Communication with service users
- Satisfaction of graduates
- The level of skills of graduates
- Requirements of preschools and elementary schools

The output from the process is the result of inputs arising from the implementation of the process. From the model of process of higher education institutions arise:
O1. Graduates - teachers, educators
O2. New experts
O3. New projects, publications
O4. New performances, knowledge, skills, competencies

The process of teaching was evaluated through a questionnaire in which 147 students participated of the second, third and fourth year, both study programs (educator, teacher). The following presents the analysis of the results obtained from the part of the questionnaire related to the quality of teaching, the quality of the study program, study conditions, the quality of teaching process.

The quality of teaching process refers to the process components, namely: preparation of classes, classes: lectures and exercises, textbooks, assessment, exams, term papers and diploma papers of students.

Strategy of quality assurance for Teacher Training Faculty in Uzice, rules that ensure the quality of the teaching process are defined. The quality of the teaching process is provided by the quality programs and syllabi, quality work plan, lectures and exercises, teaching publications, quality assessment procedures and quality professional performance of teachers and staff.
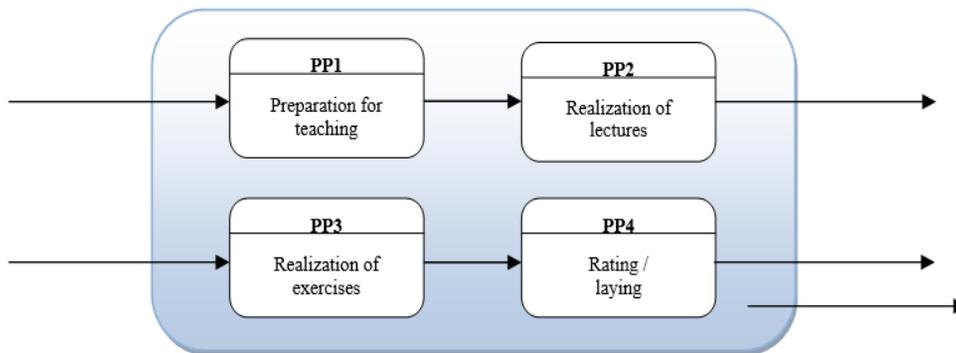

Figure 3. The decomposition process of teaching

The process of teaching can be decomposed into subprocesses, namely: preparation for teaching, realization of lectures, realization of exercises and student evaluation (Figure 3).

Preparation for Teaching PP1, (terms and premises) involves the schedule publication on the notice board and website of the faculty, according to the formed groups for certain aspects of the pre-exam activities (laboratory exercises, practical work, defense of seminar papers and student projects). Preparation of seminar papers and student projects require the organization of computerized classrooms and installed computerized systems.

Subject teachers are responsible for the preparation of teaching materials that students need to use in the teaching process. Textbooks for lectures and practicum for the exercises, in addition to vocational work should include defined objectives and expected learning outcomes of particular cases, the structure of matter, methods of teaching, manner of evaluation of pre-exam activities and final evaluation, and other related activities.

Planning exams, terms and the hall is a responsibility of an institution of higher education in order to inform the students in the right way and on time. The evaluation criteria must be known to students in advance through the text syllabus of subjects. In preparing for the exam interaction of students and teachers is required, electronically or through direct consultations. Exam results are public and are published in the prescribed manner.

Figure 4. shows decomposed process of preparation for teaching, which includes sub-processes, organization of teaching, students notice about performance, preparing professors for class (rendition, presentation, presentations, teaching materials...), preparation of amphitheater and lecture halls

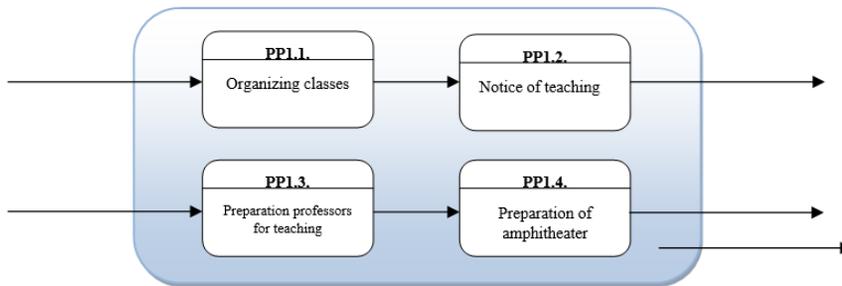(preparation of video presentation, interactive labs; computer...).

Figure 4. Decomposed process: Preparation for Teaching

Realization of lectures PP2. Each item in the module or program, as well as teaching unit within the spesific subject is constantly analyzed and prepared by the appropriate teachers for possible modification and customizing to trends of improving higher education and the demands of consumers. Teaching materials should be illustrated by examples and evidence to make it easier to understand and remember the presented material.

The choice of teaching methods is the next level which depends on the teaching material, maturity and abilities of students, group size, environment ii professional commitment of teachers. Oral presentation is the most common form of lectures, which can be followed by writing and drawing on the blackboard or using slides as visual information, power point presentations. T the speed of exposure and the amount of material that can be exposed to students depends on the method applied, and also the method of monitoring the lectures by students, which is decided by the teacher while preparing the appropriate teaching materials.

Figure 4. shows decomposed process of realization of lectures, with its sub-processes, the choice of teaching methods, use of teaching materials, prepared presentation materials, attending courses by students.
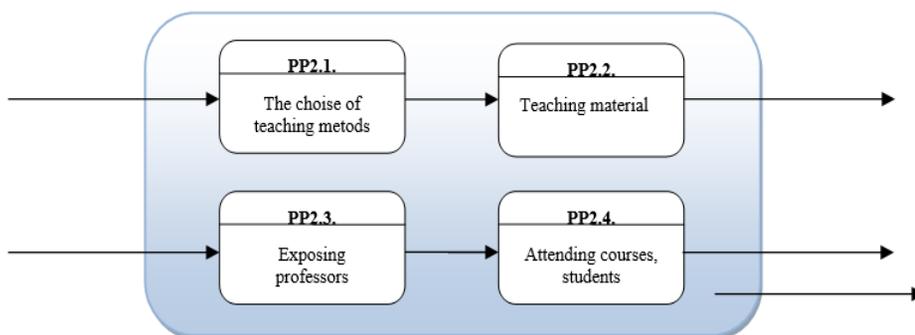

Figure 5. Decomposed process of realization of lectures

Realisation of exercises PP3 is conducted so the students acquire practical skills working on the proposed equipment or facilities provided. Students' working areas should be set up so that everyone can use equipment with the help of assistants or operators. Each exercise should have an introduction with the explanation of the task and objective of the

exercise. It is recommended to write reports with exercises and their interpretations by the students.

Figure 5. displays decomposed process of realization of exercises, with their sub-processes, the choice of methods for performing exercises, preparation of teaching materials, realization of exercises with active participation of students, writing reports with exercises that are included in the final evaluation of the subject (Figure 6).
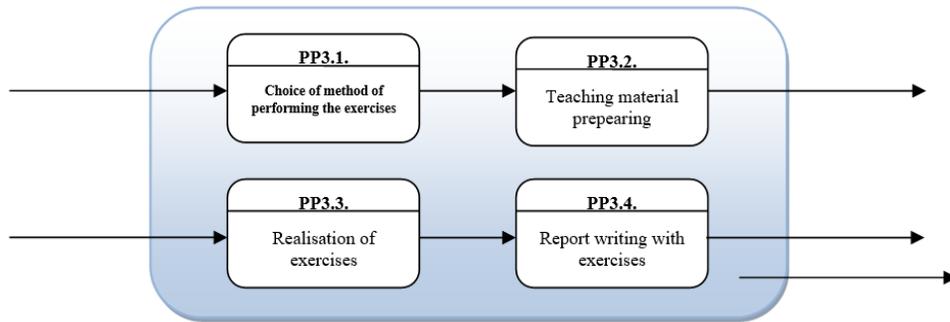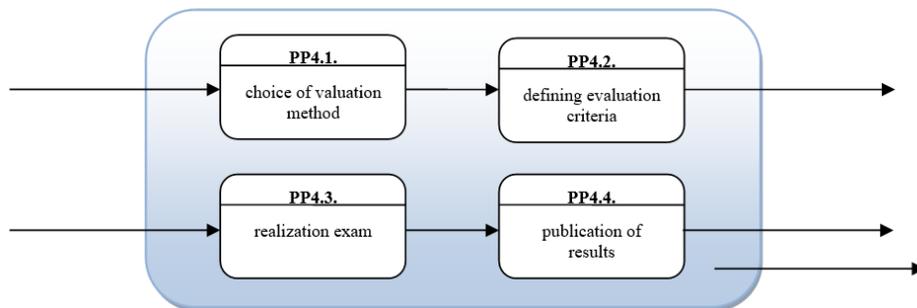
Figure 6. Realisation of exercises

Figure 7. Decomposed process evaluation

Student evaluation PP4 is an academic activity of testing the knowledge in the teaching process when determining the level of acquired knowledge and skills acquired in relation to the defined and anticipated outcomes of learning. The evaluation procedure provides important feedback on the results of the teaching and learning process, which in the reference system of higher education define the quality achieved. There are different methods of assessment, whose procedures should be ensured by the college. Evaluation must be transparent, fair and documented by statistical analysis of data with the adopted format reports. The evaluation procedure should include:

- Selection of reliable methods of evaluating and defining evaluation criteria
- Pre-publication of schedule, dates and places of tests
- Harmonization of the evaluation criteria with the results of learning
- Automated updating of a database / knowledge in the system of monitoring the progress of studies
- Internal and external publication of results of evaluation and appropriate reports (Figure 7).

6. Quality of life of students

The concept of **quality of life** refers to the overall well-being within the society, and is focused on allowing each member of society to realize its objectives (as we know from the theory of management systems, if not contrary to the law or detrimental to the member or environment). This means that the quality of life is measured through a variety of economic, but also non-economic indicators. Approach to the concept of quality of life depends not only on indicators of material living standards, but also to various subjective factors that affect human life. Analysis of the quality of life typically includes the following areas (Jašic and Kaluđerović, 2015)

- Political and social environment (political stability, crime rates, the rule of law ...)
- The economic environment (economic stability, banking services ...)
- Socio-cultural environment (censorship, limitations of personal freedom ...)
- Health and sanitary environment (availability of medical services and medicines, infectious diseases, sewage, waste, air pollution ...)
- Schools and education (standard of schools, the availability of schools ...)
- Public services and transportation (electricity, water, public transport, traffic jams ...)
- Leisure (restaurants, theaters, cinemas, sport ...)
- Funds consumer (availability of food and daily items, cars ...)
- Home (houses and apartments, appliances, furniture, maintenance ...)
- Natural environment (climate, record of natural disasters ...).

Students are a group that is exposed to unusual pressures, such as the adjustment of the new social and physical environment and changes in the social network. Theay are facing high academic requirements in order to achieve the desired goals in their career. As a result, students can have more confidence and more willingness to acknowledge conflict, fear or doubt in themselves and in their future as compared to other population groups. Students adapt to the new needs of internal and external environment and under various influences they are forming attitudes toward religion, health and risk behavior, which is the basis for the state of the quality of life in older age (Petkovic and Plancic, 2008).

7. Methods of work

The aim of this study was to assess to what extent and in what way the quality of student life affects the quality of the educational process and complete higher education. Also, one of the objectives is to determine whether there is a connection and correlation with individual segments and areas of quality of student life with the processes that are implemented in higher education, then, between individual life and academic aspects (average, replenishment of the year, parenthood, place of residence etc.), quality of life, in order to identify those factors that lead to better subjective assess of the quality of life in the population of students and the quality of higher education.

In the research conducted survey of students of the Faculty of Teacher in Uzice, Kragujevac University. We used a curriculum which consisted of two parts. The first part consisted of eleven questions that are related to socio-demographic data, while the second part of the questionnaire was divided into eleven authorities subjective assessment of quality of life, through several categories, divided on matters within the area.

The study included 145 students of all years of undergraduate studies. For statistical analysis of data were used standard methods of analytical statistics.

In the analysis of research that will be presented followed by the impact of the processed data in the area of quality of life,

the quality of the teaching process decomposed.

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9. Results

The quality of teaching process and its sub-processes previously evaluated through research and carried out questionnaires, which were related to the quality of study programs, study conditions, the quality of lectures and exercises, awareness of students, availability of information systems (Figure 8).
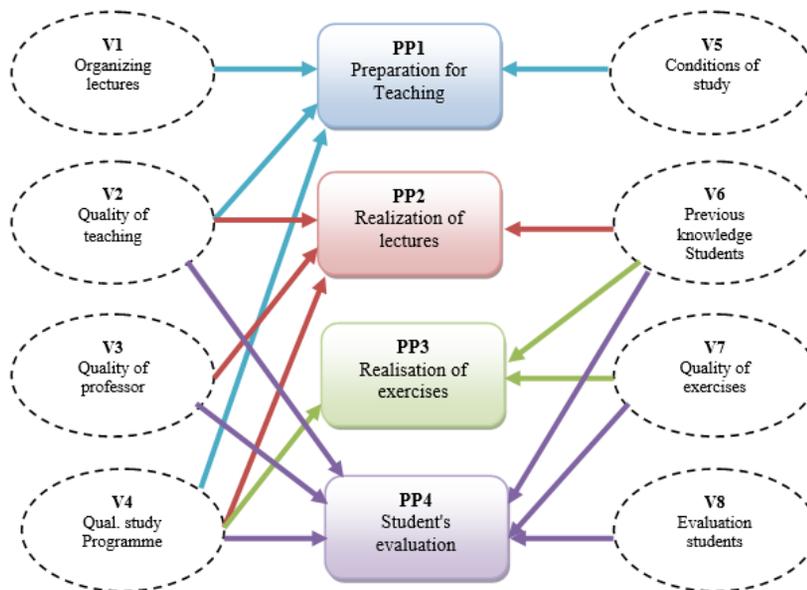

Figure 8. The impact of variables on the sub-processes of teaching

Table 1. Mean estimates of sub

PROCESS	VARIABLES								
	V1	V2	V3	V4	V5	V6	V7	V8	
PP1	7,67	8,5		7,85	8,11				**8,03**
PP2		8,5	7,5	7,85		7,25			**7,76**
PP3				7,85		7,25	8,4		**7,83**
PP4		8,5	7,7	7,85		7,25	8,4	8	**8**

Table 1 presents an overview of evaluation process, with the variables that affect the quality of the process.

The quality of student life was evaluated through a questionnaire which consisted of eleven fields from A to K. Fields were related to:

Area A: Subjective well-being
Area B: Your student life
Area C: Your neighborhood (near where you live)
Area D: Over the past week
Area E: Relations
Area F: Events in your life-descriptive
Area G: Dealing with life
Area H: More about yourself
Area I: What you expect to happen
Area J: What kind of person are you
Area K: Your life in relation to different aspects (standards).

Of the 145 students who took part in the survey, 15 students were male, while the remaining 130 students were female. The number of students in the fourth year 4 students, 62 third-year students, 45 second year students and 19 first-year students (Figure 9).
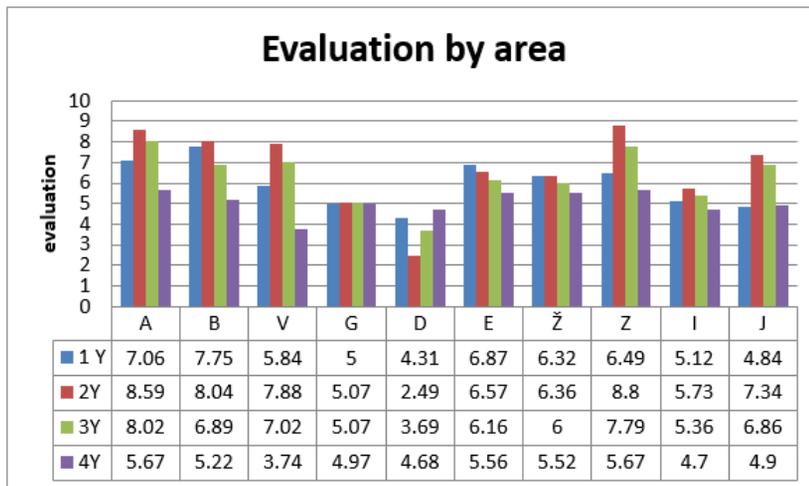

Figure 9. Assessment by areas of the questionnaire

Analyzing the results obtained from the research can come to the conclusion that only certain areas covered by the questionnaire can affect the quality of the teaching process, and this is an area B, and certain segments of other cultivated areas.

Starting from the objectives set in the context of this study a general hypothesis was developed which states:

H0 = The quality of a teaching process is affected by processes of support, quality of study programs, quality of student life,

relationship of professors and students, and teaching they accomplish.

Specific hypothesis:

H1 = the greater satisfaction with PP1, PP2, PP3, and PP4 processes will produce the greater satisfaction with overall student life.

Using this given hypothesis we will try to determine how satisfaction with student life powers gratification on a given processes.

The impact of satisfaction was observed through three variables, where testing will be conducted in order to make a final decision on whether the hypothesis is acceptable or not (Figure 10).
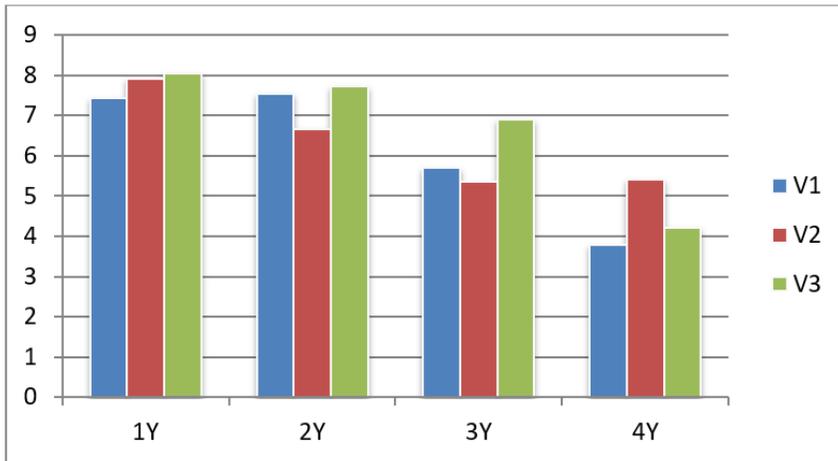

Figure 10. Assessment of variables under the year of study

Variable 1 is the part of the Areas B and refers to the quality of life at the university.

Variable 2 – the quality of academic support and services at the faculty.

Variable 3 - the quality of student's academic work at the faculty.

Table 2. Only score variables age

	1year	2year	3year	4year	
V1	7,42	7,55	5,7	3,8	6,12
V2	7,92	6,67	5,37	5,4	6,34
V3	8,04	7,73	6,9	4,2	6,72
	7,67	7,32	5,99	4,4	**6,39**

Table 2 and histogram present the estimations of the variables under the year of study where we can see that the assessments of students at 1st and 2nd years of academic studies are about the same and express a satisfactory level of quality of student life, while in the students at 3rd year of academic studies the level of satisfaction falls in relation with the younger colleagues. Regarding the students of 4th year we can conclude that the level of satisfaction with student life is not satisfactory in spite the fact that small number of students of this academic year participated in the questionnaire (Figure 11).
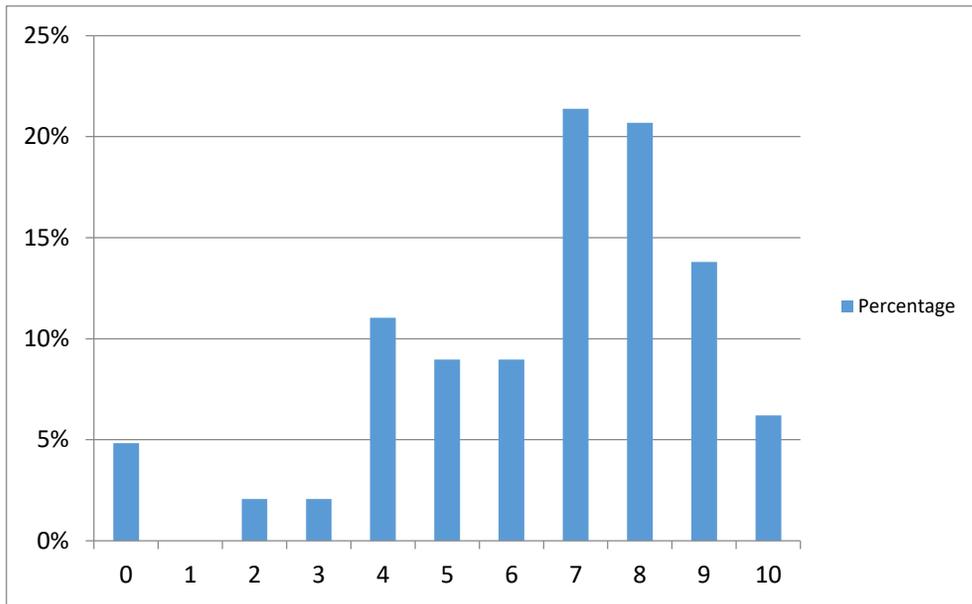
Figure 11. Assessment in per cents (%) given by students for the area B

Table 3. Assessment review upon the number of participants

Evaluation	Number of students.	Percentage
0	7	5%
1	0	0%
2	3	2%
3	3	2%
4	16	11%
5	13	9%
6	13	9%
7	31	21%
8	30	21%
9	20	14%
10	9	6%
	145	100%

Regarding the issue of the influence of student life quality to the process of teaching we can make certain conclusions on the base of the conducted survey.

When the satisfaction of students with courses management, quality of teaching, quality of exercises, and conditions of studying is great, then the same outcome is with satisfaction of student life (Figure 12).
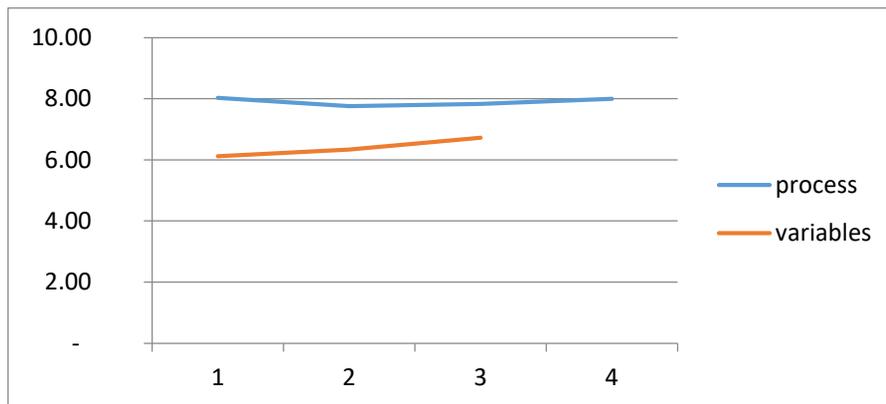
Figure 12. Relation process / variable

After the analysis of all results we can conclude that students of the Teacher Training Faculty in Uzice are satisfy with student life, which anyway could be at the higher level then now. However, we can conclude that saticfaction of students with analysed areas and processes within the education affects positively their performance and life quality in general.

10. Conclusions

The conclusion of this research provide the level in which certain variables influence the satisfaction with student life, how much affect the quality of overall life, or life satisfaction.

This kind of research can be helpful to all educational institutions when tend to improve the service delivery and better understand needs, wishes and expectations of their students.

Regarding the fact that the job market is more demanding and the competition is also higher, when education institutions are in question, it is reasonable to expect that the students' requirements will also be higher.

This research results can be relevant manifestation to which direction next research is to be performed but at the level of the entire university, and also at entire educational system in our country. With such information and results is possible to develop the process model aiming to improve existing mistakes and avoid it in future for the purpose of further development of the whole educational system.

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