Embedded Selforganizing Systems

Special Issue Topic: "International Symposium on Computer Science and Educational Technologies "

Influence Rate Evaluation by Students' Opinion: University, Library, Courses and Professors

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***Abstract*—This paper describes cooperative study of the university lecturers with focus to figure out influence factors of students' achievements in higher education. The evaluation survey is applied as main method for research. Several lecturers (research team) who teach different courses in university together developed influence factors in form of survey question, which are divided into four core groups: university, library, courses and professors. The research team plans to collect as possible more data periodically from all universities in country which is open to support this study. In this paper showed the analyses of the first step of study. 291 students from eight different universities voluntarily sent response to online survey. The collected data is processed by structure oriented evaluation (SURE) model and by standard statistic function. The SURE evaluation score calculated as 0.88 which we can read that all defined influence factors received evaluation score from students very high positive answers. The statistic maximum scores emphasized some factors influence a lot to students' achievement and students confirmed by their responses that some factors are very important for them. Further statistic ANOVA test made for case of university group with 13 factors. For ANOVA test is formulated the null hypothesis. H_0 – Null hypothesis stands for no difference between groups. No influence of study years to evaluation scores. By the ANOVA test the null hypothesis isn't proofed. This concludes first step analyses as not significant statistically. Therefore, the research team need to continue data collection and may apply some other statistical methods to compare first results.**

Keywords—higher education, student's achievement, influence factors, SURE, structure oriented evaluation model.

I. INTRODUCTION

Higher education industry plays key role in successful development of countries. By Statista company information from 2021 created first 26 countries of world by university numbers [1]. The India is in first place with 5288 universities. USA is in second place with 3216 and Indonesia is in third place with 2595 universities. The population of India is 1 413 565 115 [2], USA is 333 287 557 [3] and Indonesia is 276 400 000 [4]. The Mongolia is 124th place by population 3 420 000 [5] has 82 universities [6]. These facts proof that number of universities are comparatively high in our country. But what is the quality of universities, is we can fit to expectations of our students is some critical questions which we need to study and discuss open.

There are various scholars do study on this question. Influence factors can be very different depending on countries, cultures, study directions, type of universities even on private wishes of students. Atkinson John [7], David McClelland [8], Markova Kapitonova [9], Orlov Mikhailovich [10], Heinz Heckhausen [11] studied how motivation can influence to success of study. Vytis Viliunas [12], Nataliya Belopoplikaya [13], Sergei Rubinstein [14], Carol Dweck [15] did research on psychological influence to success of study. Yuri Babansky [16], Vasily Davydov [17], Galina Kirillova [18], Volodar Krayevsky [19], Isaak Lerner [20], Galina Ivanovna Shchukina [21] concluded that success of study depends a lot from education and teaching.

Kh.Adiyatsogt and B.Ulambayar [22] published their study on influence factors of success of study. The study showed that there are big number of factors are influence to successful study: self motvation, personal characterisc, learning attitue, learning environment, access to internet, library capacity, scholarhsip and grants, smart environments in classroom, communcation between student and professors and other. N.Jargalmaa [23] based on her influence factor study summarized that satisfaction level of students are highly influence to successful study.

The lecturers who joined in this research team teach different courses in engineering university many years. The observation of their students' study success finally united

them on main question: What really influence to successful study of student in university? The state of the art reading proofed that various research and study is necessary in this field. By this starting study the research team from Mongolian University of Science and Technology together with Chemnitz University of technology hope to add the contribution on study of influence factors for students' achievements. What is the most influencing factor? Is the main research question of this study.

II. Research Methodology

A. Qualitative approach

In the survey included several open ended questions. The open ended questions should bring answers from students which are later will process qualitative approaches [24] [25].

B. Quantitative approach

The evaluation survey is designed by the SURE model. Three different answers offered to select for students to collect their opinions on designed influence factors. The process collected data will apply quantitative approach [26] [27] and use online tool of the structure-oriented evaluation (SURE) model [28] [29]. For statistical analysis applied One-Way ANOVA test [30] [31].

III. The Design of the Evaluation Survey

The research team defined four basic dimensions to collect data.

- Group 1. University. Factors of this group focused on environments relating to university classrooms and public places. By these factors tried to figure out the general expectations of students from university. 13 factors are defined in this group.
- Group 2. Library. Capacity of the library, comfortableness and other factors which belong to library environment included here. 6 factors are defined in this group.
- Group 3. Courses. Factors relating to mandatory and optional courses are here included, by other word here focused on learning process. 10 factors are defined in this group.
- Group 4. Professors. Expectations relating to teaching staff, professors and lecturers are tried to formulate as influence factors in this group. 9 factors are defined in this group.

Measuring unit consists of three scales: "Not important, no influence" (0); "Middle important, a bit influence" (1) and "Very important and high influence" (2).

A. Data Collection

Data is collected by online survey. The online survey distributed open to private and public university students. During one month 277 responses sent from students from various universities. After pre-processing of the collected data sample size is reduced to 229.

B. Data Processing by SURE

The online tool of the SURE model computes cleaned 229 data record. Outcome of the SURE data processing is in Figure 1.

The SURE model produces four different evaluation scores in normalized format: general SURE score (C), key factors score (B), Sub factors score (A) and score of each response. The normalized evaluation scores belong to interval from 0 to 1. 0 stands for "not important, no influence". 1 stands for "Very important and high influence". And all other scores are shows influence rating to corresponding factors.

C. ANOVA analysis

The analysis on variance (ANOVA: Single Factor) is applied for data processing of "Semester" factors. Relating to requirement of ANOVA test developed the null and alternative hypothesizes.

- H_0 – Null hypothesis stands for no difference between groups. No influence of study years to evaluation scores.
- H_a – Alternative hypothesis stands for that there are difference between groups. There is influence of study years to evaluation scores.

The results of single factor ANOVA analysis are showed in Table I and Table II.

	B_1													B_2					
	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{110}	A_{111}	A_{112}	A_{113}	A_{21}	A_{22}	A_{23}	A_{24}	A_{25}	A_{26}
$Q^*(A_{ij})$	0.65	0.84	0.7	0.83	0.86	0.82	0.85	0.86	0.84	0.76	0.8	0.8	0.83	0.9	0.68	0.89	0.81	0.83	0.89
$Q_e^*(B_i)$	0.91													0.92					

B_3										B_4										
A_{31}	A_{32}	A_{33}	A_{34}	A_{35}	A_{36}	A_{37}	A_{38}	A_{39}	A_{310}	A_{41}	A_{42}	A_{43}	A_{44}	A_{45}	A_{46}	A_{47}	A_{48}	A_{49}	
0.9	0.89	0.87	0.89	0.89	0.9	0.9	0.89	0.88	0.91	0.88	0.9	0.89	0.85	0.87	0.9	0.9	0.9	0.88	$Q_e^*(C) = 0.8899$
0.93										0.93									

Fig. 1. Computation result of the SURE scores.

TABLE I. Summary

Groups	*Count*	*Sum*	*Average*	*Variance*

Column 1	34	28.3092	0.832624	0.069234
Column 2	56	50.6697	0.904816	0.065756
Column 3	69	59.7055	0.865297	0.091568
Column 4	15	13.7071	0.913807	0.069597
Column 5	25	24.2973	0.971892	0.012544
Column 6	13	12.7471	0.980546	0.00492

TABLE II. ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.446374	5	0.089275	1.366076	0.238455	2.257909
Within Groups	13.46237	206	0.065351			
Total	13.908751	211				

Column "Groups" shows semester number. Column 1 stands for 1st semester, Column 2 stands for second semester and so on up to 6th semester. Column "Count" shows number of students.

By ANOVA p=0.238455 (Table II) confirms that we cannot reject Null hypothesis. That means there are no difference between groups. p>0.05 or 0.23>0.05 shows that our result is not significant by statistics analysis.

IV. Results

In total students from eight different universities, took part of the survey. By statistics 74.9% female, 25.1% male students responded. 85.1% bachelor, 9.5% master level students and remaining small part was doctor students (Fig. 2). Here M stands for Male, F for Female; B for Bachelor students, M for Master students and D for Doctor students.

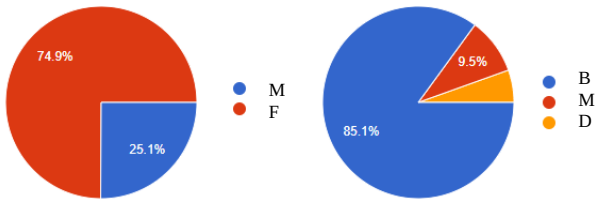

Fig. 2. Statistic data for gender and study levels

79.3% was age between 18-23, 20.3% was 24 older, 17 and younger students covered remaining parts. 14.8% students from first semester, 25.3% students from second semester, 30% students from third semester, 6.9% students from fourth semester, 9% students from fifth semester, 4.3% students from sixth semester and 9.7% students 7 and more semester studied (Fig. 3).

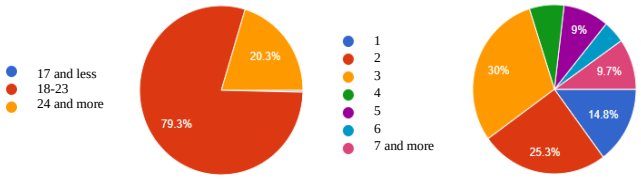

Fig. 3. Statistic data for ages and semester differences

The SURE general score for "University" group is 0.91, for "Library" group is 0.92, for "Course" group is 0.93 and for "Professors" group is 0.93. The worst evaluation score was 0.65 for A_{11} - "Outside view of the university, building architecture". Highest evaluation score 0.91 received influence factor A_{310} – "Get job position immediately after graduation".

V. Discussion on Results

A. Analysis on SURE Scores

1. *Group "University"*. A_{11}-A_{113} in total 13 factors defined in this group. Two factors received highest evaluation score 0.86: A_{15} "Enough number of classrooms in university" and A_{18}. "Free and fast internet access".
2. *Group "Library"*. A_{21}-A_{26} in total 6 factors defined in this group. A factor A_{21} "Able to read all necessary books and literatures" received highest evaluation score 0.9.
3. *Group "Courses"*. A_{31}-A_{310} in total 10 factors defined in this group. A factor A_{310} "Able to read all necessary books and literatures" received highest evaluation score 0.9: "Get job position immediately after graduation".
4. *Group "Professors"*. A_{41}-A_{49} in total 9 factors defined in this group. Four factors A_{42} "Teaching modern methodologies", A_{46} "Support own students and try to keep motivation", A_{47} "Need to be excellent in time management", and A_{48} "Open and equal communication with students" received highest evaluation score 0.9.

B. Analysis on Statistical Maximums

1. *Group "University"*. Factors: *"Comfortable university inner design and learning environment" (210), "Enough number of classrooms in university"(214) and "Free and high speed internet access" (221)* by students' opinion very important for them and influences to their study acheivement.
2. *Group "Library"*. Factors: *"Able to read all necessary books and literatures" (229), "Comfirtable enivironment in library" (229) and "Should be acceble rooms for team work" (229)* by students' opinion very important for them and influences to their study acheivement.
3. *Group "Courses"*. Factors: *"Receive knowledge on Theory and pratices both to be high" (229), "Learn high technical skills" (229), "Efficient pratical lessons" (229), and "Good preparation to labor market" (229)* by students' opinion very important for them and influences to their study acheivement.
4. *Group "Professors"*. Factors: *""Teaching modern methodologies" (229), "Support own students and try to keep motivation" (229), and "Open and equal communication with students" (229)* by students' opinion very important for them and influences to their study acheivement.

C. Analysis on Open Questions

In the survey included three open questions. “List down three key factors which influence to your successful study”, “Write down three things which have to care immediately which are most important”, and “Do you will recommend your university to others” were open questions. First question collected 245 answers. The answers covered different dimensions. After manual data processing we figure out that most part focused on professors.

- Professional communication between students and professors
- Motivation and support of students from professors’’ side
- Excellent hard and soft skills of the professors
- Teaching methods
- Balance between teaching of the theory and practices
- Time management of the professors
- Role model of the teachers

Such us issues which are related to teachers and professors repeated many times in the answers.

Second open questions received 243 opinions.

- Quality of food in student café
- Hygienic issues in restrooms
- Techniques in laboratory classes
- Library capacity
- Quality of service
- Speed of the internet connection
- Student friendly environment
- Confirmable learning environment
- Working time of the library should be until midnight

Most high light giving to hygienic issues, quality of the services and student friendly environment.

The third open questions received 287 responses. 72.5% answered “Yes” and 27.5% answered “No”.

VI. Conclusion

The aim of this study was to figure out most influencing factors to successful study of students. Research team defined factors in four core groups and prepared evaluation survey for collection of data. In this paper analyzed data from first collection, duration time for data collection was a month. The eight different university’s students are taking part of survey which showed that universities can support this study in future for data collection.

The structure oriented evaluation (SURE) model is applied as basic scientific methodology for study. The SURE evaluation scores were in between 0.65 and 0.91. It confirms that all defined factors are evaluated by students quite high. By other words defined factors by research team are can be real correct factors. But to proof this statement need to do other detailed study of each factors in future.

Main outcome shows that learning environment is very important for students and it is somehow influencing to successful study of the students. Comfortable, clean and peaceful environment maybe can support students’ motivation of study and can influence positively to their study. Next finding shows that expectations of students from their teachers and professors are mostly focus on their professional communication and role model manner. Trustful, supportive, open and equal communication between students and professors can me influence to their study positive, too.

In this study work professors from multi disciplines as one research team: Sport, Art, Computer Science, Engineering, Construction, Languages. We conclude that this kind of cooperative study improves a lot collaborative research between multi disciplines.

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