

A Six-Year Case Study Evaluating the Stakeholders' Requirements and Satisfaction in Higher Educational Establishments

Ioannis I. Angeli

Abstract—Worldwide and mainly in the European Union, many standards, regulations, models and systems exist for the evaluation and identification of stakeholders' requirements of individual universities and higher education (HE) in general. All systems are targeting to measure or evaluate the Universities' Quality Assurance Systems and the services offered to the recipients of HE, mainly the students. Numerous surveys were conducted in the past either by each university or by organized bodies to identify the students' satisfaction or to evaluate to what extent these requirements are fulfilled. In this paper, the main results of an ongoing 6-year joint research will be presented very briefly. This research deals with an in depth investigation of student's satisfaction, students' personal requirements, a cup analysis among these two parameters and compares different universities. Through this research an attempt will be made to address four very important questions in higher education establishments (HEE): (1) Are there any common requirements, parameters, good practices or questions that apply to a large number of universities that will assure that students' requirements are fulfilled? (2) Up to what extent the individual programs of HEE fulfil the requirements of the stakeholders? (3) Are there any similarities on specific programs among European HEE? (4) To what extent the knowledge acquired in a specific course program is utilized or used in a specific country? For the execution of the research an internationally accepted questionnaire(s) was used to evaluate up to what extent the students' requirements and satisfaction were fulfilled in 2012 and five years later (2017). Samples of students and/or universities were taken from many European Universities. The questionnaires used, the sampling method and methodology adopted, as well as the comparison tables and results will be very valuable to any university that is willing to follow the same route and methodology or compare the results with their own HEE. Apart from the unique methodology, valuable results are demonstrated from the four case studies. There is a great difference between the student's expectations or importance from what they are getting from their universities (in all parameters they are getting less). When there is a crisis or budget cut in HEE there is a direct impact to students. There are many differences on subjects taught in European universities.

Keywords—Quality in higher education, students' requirements, education standards, student's survey, stakeholder's requirements, Mechanical Engineering courses.

I. BACKGROUND

HE is an intensive knowledge sector which is evolving rapidly and aims to enhance both learning and research, and all those aspects that affect the academic life of students.

I. I. Angeli is with the Cyprus University of Technology, Department of Mechanical Engineering and Materials Science and Engineering, P.O. Box 50329, 3606 Lemesos, Cyprus (phone: +357 25002324, fax: + 357 25002769, e-mail: ioannis.angeli@cut.ac.cy).

To this end, educational establishments should be elaborately exploiting the concept of quality and stakeholders satisfaction while always taking into account the student and his needs.

According to [5], an educational system is a component of subsystems and processes, including inputs, processes and outputs which should work together having as a result synergy. Hopefully the quality of resources, teaching or research, is considered as a framework that will provide the desired fulfilment of the expectations of all stakeholders of the institution.

The curriculum, teaching methods and the teaching materials should be designed to meet not only, in the 21st century, the needs of students but all interested parties. That is why the new International Standard for quality management systems ISO:9001:2015 [5] has been changed and one of the new requirements is paragraph 4.2

“... the organization shall determine, a) the interested parties that are relevant to the quality management system, b) the requirements of those interested parties.

The organization shall monitor and review information about these interested parties and their requirements” [6].

We cannot speak for the quality of education, if the requirements of students are not consistent with the knowledge they need to acquire. The views of students for the services offered by universities, includes their perceptions of teaching and learning, supporting facilities, learning resources (library, computers), the learning environment (lecture halls, laboratories, buildings, equipment) and the external aspects of being a student (finance, infrastructure, transportation) [5].

The early 80s began the development of the first evaluation systems of university performance, an issue that concerns both the state and the institution itself and affects all stakeholders of a university. In general, organizations may use different approaches for evaluation/self-evaluation: questionnaires, workshops, simulation, awards etc.

This joint research was initiated in 2012 [1] and repeated in 2017 [2] and now (2018-2019) is in the final stage to address the fourth question.

II. ANSWERING QUESTION 1

A. How Student's Requirements Can Be Fulfilled

This is the second time that a research of this nature is carried out in the island of Cyprus. Therefore, there are comparative data for 5 years. The main objectives of this unique research which first initiated in 2012 and repeated in

2017 was to investigate at the same time, students' requirements and satisfaction. Both researches were targeting to scientifically investigate quality levels in HE and what are the expectations and requirements of a students studying in the four major and larger universities in Cyprus. In addition, the second part of the 2017 research project, was to investigate the impact of the economic crisis on the quality of services offered by the HEE.

The requirements of students for four major universities in Cyprus were sampled: namely the Cyprus University of Technology (author's university, public), the University of Cyprus (public), the European University (private), and the University of Nicosia (private). The degree of significance/importance and satisfaction of the students was analyzed with the same questionnaire for all the issues developed in the study's questionnaire. The study was completed with the

creation of the tables and charts extracted from the questionnaires and with conclusions and suggestions for improvement of the situation in Cyprus.

A questionnaire was created through a bibliographic review and the approach was implemented in selecting the sample, analysis and presentation. The extensively developed quantitative questionnaire was given to 400 students of the four universities. Additionally, a detailed selection method is demonstrated in the main research report. In this paper only the main results will be shown. The students' answers were recorded and then inputted to MS Excel software for further analysis and presentation. This study identified areas and parameters for improvement and provided suggestions of ways to achieve them. The researchers gave their conclusions and suggestions from their analysis to properly address the crisis affecting the educational system in Cyprus.

TABLE I
AVERAGE RESULTS OF THE 30 QUESTIONS ANSWERED BY STUDENTS OF THE FOUR PARTICIPATING UNIVERSITIES IN THE TWO PERIODS OF INVESTIGATION

NAME OF PARTICIPATING UNIVERSITY	CUSTOMER IMPORTANCE				CUSTOMER SATISFACTION				DIFFERENCE	
	2012		2017		2012		2017		Mean CI-Mean CS	
	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	2012	2017
CYPRUS UNIV. OF TECHNOL.	1.128	9.216	1.478	9.039	1.976	6.176	2.016	6.724	3.040	2.315
CYPRUS UNIVERSITY	1.175	9.368	1.208	9.370	2.310	6.072	2.202	6.786	3.296	2.584
EUROPEAN UNIVERSITY	1.892	8.952	1.695	8.998	2.256	7.186	2.388	6.848	1.766	2.150
NICOSIA UNIVERSITY	1.552	8.651	1.441	9.225	1.948	7.622	2.574	6.910	1.029	2.315
FINAL AVERAGE	1.437	9.047	1.456	9.158	2.123	6.764	2.295	6.817	2.283	2.341

A gap analysis was also developed to identify the difference between the students' importance ratings with the students' satisfaction ratings. The survey was repeated with the largest sample and coverage in the first five months of 2017. Consequently, any interested party can follow the changes, trends and quantitative assessment.

B. Major Questionnaire Results for Students' Satisfaction

As mentioned earlier, the participating students from the four largest universities of Cyprus were asked to answer 30 questions in two columns (customer importance and customer satisfaction) using a scale from 1 to 10. Then they were asked to respond to another 12 questions related to the impact of Cyprus' financial crisis. All the answers were imported to MS Excel for further analysis. The questions and all the average results for the two surveys (2012 and 2017), of the four participating universities are shown on Appendix 1, Fig. 4. During the literature survey, it was decided to adopt the British questionnaire used for NSS (HEFCE Web), since it was used for national surveys for many years. Also, this allows for the results of the Cyprus universities to be compared, with those of the British ones. The UK NSS [7] survey was for the year 2016 [7], since the 2017 survey was not completed by the time the Cyprus results were processed. Looking on each year's results, there were no significant changes in the UK. Therefore, the last column on Appendix 1, Fig. 4, shows the relevant 22 answers of all universities of the main England. The eight questions (23-30) correspond to people with special needs and were extracted from the Euro barometer questionnaire 260. The next 12 questions/

statements were developed and added by the authors.

The mean of each question is shown, on Appendix 1, Fig. 4, at the last two columns on the right. The grand average of Satisfaction Number of Cyprus universities was in 2012, 6.97 and was increased to 7.3 in 2017. The British NSS was 8.7 which shows a significant difference of 1.5 units in the scale of 10. The British students were slightly more satisfied (about 0.6 units) in 2015 from their universities but in 2017 the gap is 1.5 units. Of course, the sample of the British students is much larger and the results are more reliable. In general, there is 1.5 units increase; and ALL satisfaction numbers in all questions are shown to be higher than corresponding numbers of the Cyprus universities. This is something that the Cypriot universities, secondary teachers and the ministry of Education should investigate and take, if necessary, the required measures

Table I presents all the summarized arithmetic results of the four participating universities for the 30 questions for the two periods. This is followed by the gap analysis, Fig. 3, where the averages of the four universities per question are presented for the two periods (mean of Importance Number OR customer-mean of Customer Importance and Satisfaction number OR Customer Satisfaction). A lot of important information can be extracted from the two presentations:

- For all universities (Table I) in all questions, the mean of customer importance is above 9.05 in 2012 and was increased to 9.16 in 2017. This means that the selection of the questions was correct since all of them were reported as very important for the students. The SD is approximately the same, very low and consistent. That

means that the students think the same way and the subjectivity is low. By comparing the two public universities with the two private ones, it is clearly shown

that students of public universities are more demanding or having higher expectations.

TABLE II
THE TOP 10 IMPORTANT QUESTIONS ACCORDING TO 2017 SURVEY

Y QUESTIONS	2012		2017		NSS UK 2016	Diff. 2017- 2012 IN	Diff. 2017- 2012 SN
	IN	SN	IN	SN	SN		
9 - Staff are good at explaining things.	8.98	6.59	9.18	6.80	8.8	0.20	-2.38
5 - Assessment arrangements and marking have been fair.	9.27	7.58	9.23	7.43	8.5	-0.04	-1.80
4 - Feedback on my work has helped me clarify things I did not understand.	9.04	6.61	9.25	7.05	7.9	0.21	-2.20
6- I have been able to contact staff when I needed to.	9.16	7.36	9.21	7.28	8.6	0.04	-1.93
2- Good advice was available when I needed to make study choices.	9.21	6.84	9.29	7.06	7.6	0.08	-2.23
8 - The timetable works efficiently as far as my activities are concerned.	9.15	6.77	9.18	7.16	8	0.03	-2.02
1 - The course is well organized and is running smoothly.	9.24	6.44	9.32	6.76	8.2	0.08	-2.56
7- The library resources and services are good enough for my needs.	8.91	6.78	9.19	7.15	8.4	0.28	-2.04
1 - I have been able to access general IT resources when I needed to.	9.16	7.58	9.32	7.60	8.6	0.17	-1.72
3 - My communication skills have improved.	9.02	7.23	9.28	7.48	7.4	0.26	-1.79

- Exactly the opposite is happening on the satisfaction numbers. The students of the public universities are less satisfied than the private. The mean satisfaction number was increased only by 0.05 units, which is considered negligible. However, if you take into consideration that the crisis has an impact to HEE (see the next part of this paper), the results are encouraging. Although the satisfaction number is less in public universities there is still an increase. The private universities have a higher satisfaction number but there is a drop in 2017. In all universities and all questions consistently, the degree of importance is higher than the degree of satisfaction. This means in general, students are getting less than what they expect from their particular university; or their expectations are very high.
- Looking at Table I, one can identify the consistency of the answers through the spread (standard deviation SD) of the answers. The SDs are very consistent in Customer Importance for the two periods around 1.45. The same applies to Customer Satisfaction but with a greater value of 2.2. Nevertheless, in both cases the SD was increased.
- Looking on the results of special needs, the importance number has been increased by 0.15 units. This means that students are now more concerned regarding people with special needs. The same applies on satisfaction which was increased by 0.4 units with a total average of 7.21, very close to the total average 7.3. This means that actions were taken to increase satisfaction, since societies are now more sensitive to those groups of people.
- Looking at all the results of the research (Appendix 1), there are similarities in the grading of the four universities. For instance, the top five most important questions for CI are quite the same as the top five questions of CS. Again, this leads to the conclusion that students are thinking similarly regardless of the university they are attending.
- It is important for any university to concentrate primarily, on the most important questions/ parameters, according to the students' evaluation of the Importance Number and at

the same time on those that there is a big gap between Importance Number and Satisfaction Number. A further analysis was made by the authors to address this. Table II shows the top 10 questions that receive the highest importance number by the students for the year 2017. The table also shows the difference between the Importance Number of 2017 survey minus the 2012. The last column on the right shows the difference of Satisfactory Number for 2017 survey minus 2015. Consequently, as it was mentioned above, universities' authorities should concentrate on the top most important and those where there is a big difference from importance to satisfaction. For instance, the number one in importance number (IN 2017 = 9.32) "The course is well organized and running smoothly" has the highest difference when compared to the satisfaction number -2.56; thus, they seek for 9.32 and they get 6.76.

By plotting the two columns (Cyprus mean 2017 vs. UK mean, Appendix 1, Fig. 4) in a scatter diagram, the correlation coefficient was found to be 0.045 in 2012 and -0.05 in 2017, see Fig. 1. Since the correlation coefficient is almost zero, this means that the average numbers of the two countries are very much comparable.

Looking at Fig. 2 where the gap analysis is presented for the 2017 period, the questions with the higher gap can be identified as well as the spread (standard deviation). Comparing the same graph [1] with the 2017 graph, it is clearly shown that they have identical patterns (2012 & 2017) and above all in all questions the satisfaction of students (red – dark bars) is much less than their expectations/ importance (yellow-light bars).

C. The Impact of Cyprus Economic (2013) Crisis to HE

Looking on the summary results of Table III, it can be commented that the impact is moderate (average 5.14) in a scale of 10 (high impact). The SD is very high because the subjectivity, the location, the family conditions, the loss of money and jobs etc. is quite different from student to student. For example, the University of Cyprus has the lowest impact,

4.1 and a SD 2.95, because it is in the capital (Nicosia). Therefore, the majority of students are coming from Nicosia, while it takes the best and somehow wealthier students. Given

the above, one would expect the results as they are. Full detailed results are presented in Appendix 2, Fig. 5, where all 12 questions and statistics are shown.

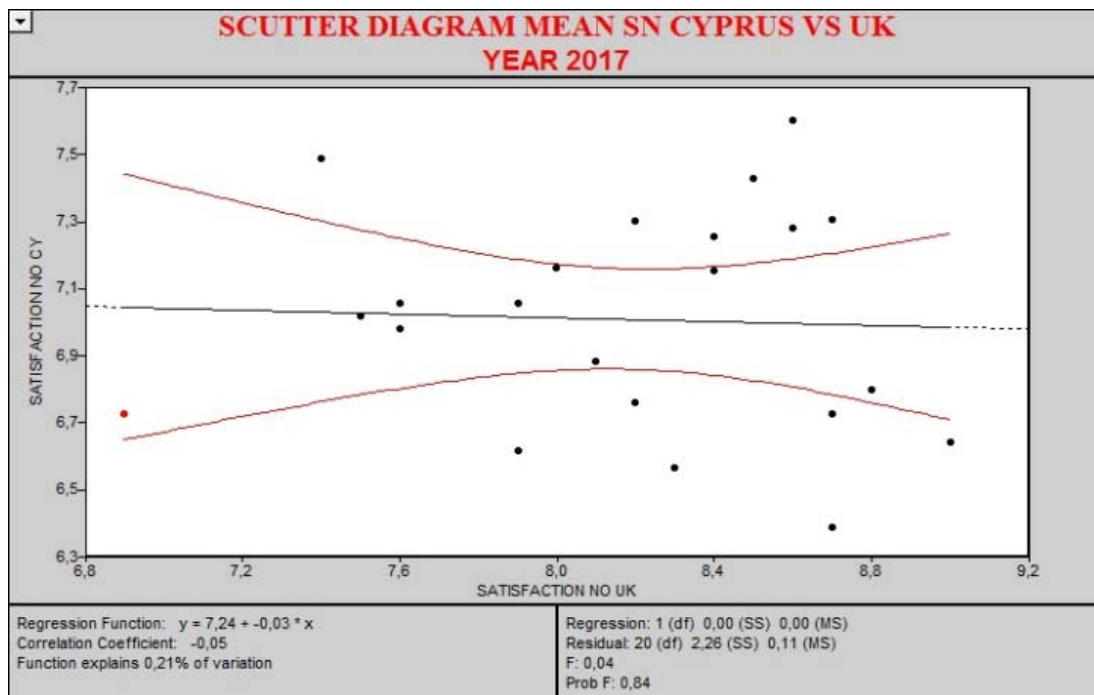


Fig. 1 Scatter diagram of mean satisfaction number of Cypriot students versus the British NSS

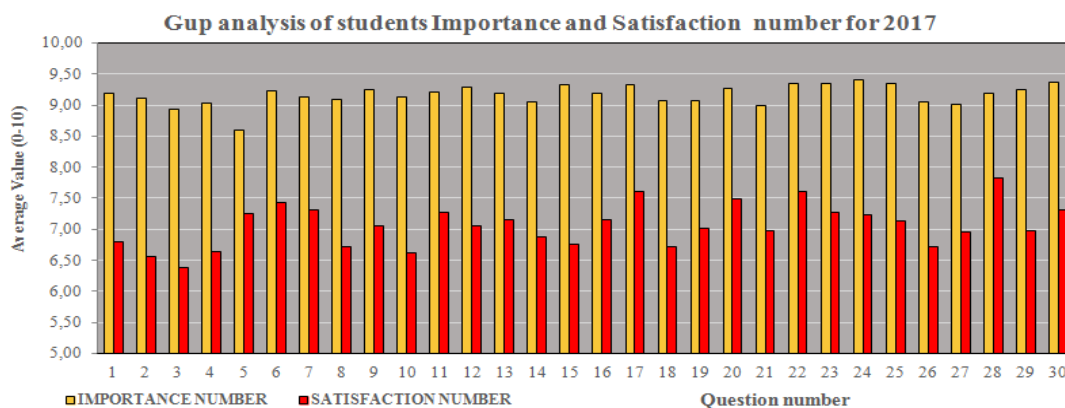


Fig. 2 Gap analysis of the averages of the four participating universities for the 30 questions for 2017

TABLE III SUMMARY RESULTS OF ECONOMIC CRISIS AFFECTS		
EFFECT OF 2013 ECONOMIC CRISIS		
UNIVERSITY	SD	MEAN
CYPRUS UNIV. OF TECHNOL.	2.88	5.56
CYPRUS UNIVERSITY	2.95	4.10
EUROPEAN UNIVERSITY	3.11	5.25
NICOSIA UNIVERSITY	3.08	5.62
FINAL MEAN VALUE	3.08	5.14

D. Main Conclusions for Question 1

It is the authors' opinion that there is no need to repeat the

main results identified previously. The results are self-explanatory and each one can extract his own conclusions. By referring to the related background shown in the first pages, the student's satisfaction or feedback is of increased importance. Going through the main researches (2012 and 2017) along with the results, many lessons and information can be extracted, not only for the participating institutions, but also for other Cyprus universities. By comparing the two assessments "Student Important index" and "Students satisfaction index", the participating universities will understand where to concentrate their efforts, i.e. to the students' requirements of high importance, and or to the

students' requirements that receive low satisfaction index. Additionally, the behavior of the educational systems was investigated through time (period of 5 years). This survey can be conducted again in five years to obtain more results and conclusions.

Foreign universities can also follow the same steps or path to identify what is happening in their university or country. By using a well-established questionnaire, they can acquire data for their university and additionally have comparable data with the UK, Cyprus and other countries.

All the results and suggestions as well as how to formulate a university or national quality strategy are presented on the main thesis report submitted by the student Panayiota Pilava to the University of Piraeus for her MSc award on TQM in August 2012.

The full results and suggestions for the second survey can be found on the main final year project submitted by the student Agathi Nicolaou to the Cyprus University of Technology for fulfilling the requirements of the Bachelor's Degree in Mechanical Engineering in May 2017 [2].

IV. ANSWERING QUESTION 2

A. Up to What Extent the Individual Programs of HEE Fulfill the Requirements of the Stakeholders? (Students Questionnaire)

In this part of the paper, it was investigated whether the curricula of the Mechanical Engineers of the Cypriot universities (total three) are in line with the contemporary requirements of the interested parties. The three universities are the same as the previous research. The extensive (total 41 questions) quantitative developed (through international literature search) questionnaire was given to approximately 400 students of the three universities offering the Mechanical Engineering course. A relative but much smaller qualitative questionnaire (five questions) was given to the officials of the Cyprus Technical Chamber, to industrialists, engineers and consultants in engineering. The results of the three universities were compared, and finally, the questions showing a wide divergence of answers and a slight divergence among universities were presented.

Students from undergraduate and postgraduate courses were asked to evaluate the 41 questions/ statements in the scale of 5 "absolutely disagree" to 1 – "absolutely agree". The most important table of all is shown in Fig. 6 that can be helpful to any interested reader to extract or take-home what is important to him (statements, averages etc.). All answers and statistics are presented in descending order based on mean average, in order to help anyone to find the questions that students are very satisfied or the opposite.

In Table IV, the grand mean and STD of the three participating universities is shown. The students of CUT are less satisfied because it is the newest of Cypriot universities; it is in the historical centre of Limassol and is still in the forming and norming stage. Final mean 3.709 out of 5 is considered medium to high degree of satisfaction.

TABLE IV
GRAND MEAN AND STD OF THE THREE UNIVERSITIES FOR THE 41 QUESTIONS

	STD	MEAN
Cyprus University Of Technology	0.96	3.52
Cyprus University	0.94	3.80
Frederic University	0.87	3.81
Final means	0.920	3.709

Further analysis of all the results was made in Table V by comparing the averages of the questions with high deviations among universities and the opposite.

B. Main Conclusions for Questions to Students

In spite of the fact that on the main research report there are many graphs, results, discussion and comparisons, the author believes that these are not so important to non-Cypriot students and universities. All questions, statistics with some important graphs were presented. This is because other foreign universities might use the same questionnaire, extract their own results and compare them with existing results from other countries like Cyprus and extract their own conclusions.

C. Qualitative Assessment to Technical Chamber, Industrialists, Engineers, Consultants Etc.

A qualitative questionnaire with four open questions (plus suggestions) was developed to get the opinion of the external interested parties. The four open questions are as follows:

- To what extent do Mechanical Engineers who have graduated from Cypriot universities meet your requirements? (E.g. ability, knowledge, perception, initiative, etc.)
- Do you believe that the curricula, learning environment, infrastructure, personnel, etc. of the Mechanical Engineering Departments of Cypriot universities need to be improved?
- Which graduates are considered to be more ready for direct entry into the industry after obtaining their qualification? Cypriot universities or those from abroad? And why?
- Are the curricula "such as the lessons taught" of the Mechanical Engineering of the Cypriot universities in line with the current needs of industry in Cyprus? If not, please specify courses, fields, directions that need to be integrated or need improvement.

Approximately 20 questionnaires were given to the Cyprus technical chamber, industrialists, consultants, mechanical engineers etc. Very briefly, the respondents are quite satisfied with the graduate engineers of the Cypriot and foreign universities, they mention that there is always ground for improvement, both foreign and local graduates are more or less ready to work to the Cyprus industry, but they all state that the industrial training/ practice should be included in the curriculum of all universities, so that students get into the industry more prepared.

TABLE V
QUESTIONS WITH HIGH AND LOW DEVIATIONS WITH RESPECT TO MEAN

Q. No	QUESTIONS WITH HIGH DEVIATIONS IN MEAN	CUT		CU		FREDERICK	
		STD	MEAN	STD	MEAN	STD	MEAN
3	Enrolment in lessons is smooth	1.17	2.74	1.04	3.82	0.87	3.94
7	Leisure facilities are of a high standard	1.15	2.76	1.01	3.74	1.25	3.48
16	I received my lesson schedule before starting a semester	1.07	3.78	0.74	4.16	1.26	3.26
18	The sports facilities are quite satisfactory	1.23	2.60	0.79	4.10	1.24	3.26
26	The rating of the teachers (by the students) is useful	1.34	2.80	0.97	3.92	0.93	3.94
37	The university covers my additional needs (e.g. lab uniforms)	1.31	2.80	1.22	3.70	1.02	3.76
41	The structure and curriculum of Mechanical engineering are satisfactory (e.g. courses, examinations, chains, timetable, etc.)	1.35	3.18	1.01	3.96	0.80	3.98
GRAND AVERAGES		1.23	2.95	0.97	3.91	1.05	3.66
Q. No	QUESTIONS WITH LOW DEVIATIONS IN MEAN	CUT		CU		FREDERICK	
		STD	MEAN	STD	MEAN	STD	MEAN
27	Lessons start at the time indicated in the timetable	0.73	4.00	0.69	4.24	0.72	4.12
24	I was given full details of how the courses are rated/ evaluated	0.91	4.10	0.71	3.94	0.65	3.90
33	The teaching staff provides office hours to solve any questions/ problems	0.74	4.24	0.95	4.30	0.61	4.00
2	I'm getting information of my results at the end of each semester	0.74	4.22	0.97	4.04	0.60	4.26
GRAND AVERAGES		0.78	4.14	0.83	4.13	0.64	4.07

V. ANSWERING QUESTION 3

A. Are There Any Similarities on Specific Programs among European HEE?

The curriculum and syllabi of five different European universities offering Mechanical Engineering courses was compared, using the descriptions as given online by their study guides. The summary conclusions of the research were presented, while reference was made to the benefits of both the students, the ministry and the universities, while some recommendations were made to improve curricula.

The five universities participated in the survey as follows:

- Cyprus University of Technology Cy (CUT)
- Cyprus University Cy (CU)
- National Metsovio Polytechnic Greece (NMP)
- Frederic University Cy (FU)
- Manchester University UK (MU)

TABLE VI
BASIC STATISTICS ACCORDING TO THE SURVEY AMONGST EUROPEAN UNIVERSITIES COMPARED WITH CUT (%)

(undergraduate courses Mech. Eng.)	CUT	CU	NMP	FU	MU
Number of academic years	4	4	5	4	4
Min. subjects for bachelors degree	42	43	65	45	45
Individual subjects full similarity %	100	60	79	65	54

Through a very laborious and time-consuming research and process, the description of the courses of all universities (offering Mechanical Engineering undergraduate courses) was made. It was noticed, that some courses in some universities are not taught at all, others are taught partially, and some are not taught at CUT (for simplicity universities were compared with CUT). Further analysis was made in Table VI. Fig. 3 shows valuable statistics such as number of subjects offered, similar subjects etc. In general, the course content (subjects in Mechanical Engineering) is similar in more than 50% in the five European Universities. After all, this is what bologna process and ENQA quidlines [3], [4] for HE were trying to achieve for many years, consistency and similarities among

European universities.

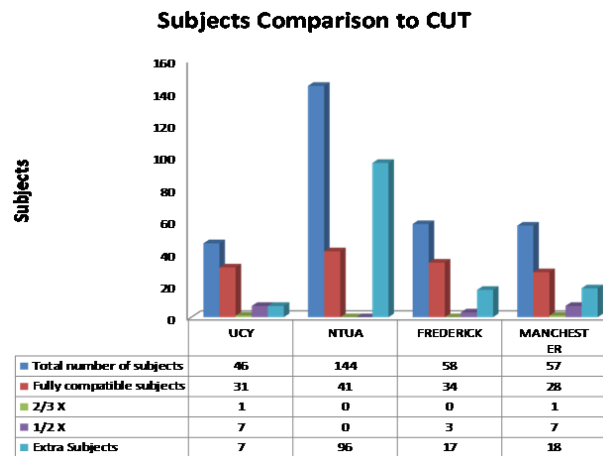


Fig. 3 Useful statistics of the five surveyed European universities

VI. ANSWERING QUESTION 4

A. Up to What Extent the Knowledge Acquired in a Specific Course Program, is Utilized or Used, in a Specific Country?

This is an ongoing research initiated in July 2018 and is the final step of this 6-year research. The whole process was to start from a general evaluation of the students' requirements and up to what extent those requirements are fulfilled by their university. This survey was repeated 4 years later to check the validity, the consistency and extract historical data. Then the third (last) year of the survey, goes in-depth, targeting specific specialization and was expanded not only to students but to all interested parties. Therefore, the final more detailed and narrow survey, aims towards the investigation of the end results; in other words, to study up to what extent the knowledge acquired by a specific program of Mechanical Engineering **is used by Cypriot stakeholders**. A final year student, who is doing a second degree, undertook this final

and most important stage of the 6-year research. The whole survey is expected to be completed by June 2019.

APPENDIX 1: AVERAGES OF ALL QUESTIONS FOR THE 4 PARTICIPATING UNIVERSITIES		CYPRUS UNIV. OF TECHN.				CYPRUS UNIVERSITY				EUROPEAN UNIVERSITY				NICOSIA UNIVERSITY				MEAN				NSS UK 2016
YEAR		2012		2017		2012		2017		2012		2017		2012		2017		2012		2017		
QUESTIONS		IN	SN	IN	SN	IN	SN	IN	SN	IN	SN	IN	SN	IN	SN	IN	SN	IN	SN	IN	SN	
The teaching on my course																						
1 - Staff are good at explaining things.		9,23	6,13	9,21	6,64	9,48	5,53	9,56	6,48	8,92	7,18	8,92	6,89	8,29	7,53	9,03	7,17	8,88	6,59	9,18	6,80	8,8
2 - Staff have made the subject interesting.		9,35	5,71	9,19	6,23	9,30	5,39	9,18	6,22	8,79	6,53	8,84	6,81	8,11	7,16	9,20	7,00	8,89	6,20	9,10	6,57	8,3
3 - Staff are enthusiastic about what they are teaching.		9,00	5,87	8,99	6,01	8,97	5,89	9,04	6,22	8,79	6,58	8,73	6,48	8,68	7,32	8,96	6,83	8,86	6,41	8,93	6,39	8,7
4 - The course is intellectually stimulating.		9,13	5,81	9,05	6,12	9,09	5,61	9,12	6,52	8,63	6,74	8,88	6,84	8,42	7,53	9,08	7,08	8,82	6,42	9,03	6,64	9
Assessment and feedback																						
5 - The criteria used in marking have been clear in advance.		9,00	7,03	8,52	7,20	8,88	7,64	8,55	7,26	8,50	7,76	8,40	6,92	8,26	7,89	8,94	7,63	8,66	7,58	8,60	7,25	8,4
6 - Assessment arrangements and marking have been fair.		9,65	7,52	9,17	7,13	9,67	7,30	9,53	7,47	8,76	7,34	9,14	7,53	9,00	8,16	9,07	7,58	9,27	7,58	9,23	7,43	8,5
7 - Feedback on my work has been prompt.		9,16	7,03	9,18	6,85	9,31	6,98	9,27	7,03	8,37	7,35	9,00	7,58	8,74	7,50	9,06	7,75	8,89	7,22	9,13	7,30	8,2
8 - I have received detailed comments on my work.		9,06	6,61	9,05	6,41	9,19	5,78	9,28	6,35	8,63	6,47	8,90	6,90	8,39	7,76	9,10	7,24	8,82	6,66	9,09	6,72	8,7
9 - Feedback on my work has helped me clarify things I did not understand.		9,13	6,19	9,19	6,93	9,44	5,86	9,51	6,56	8,71	6,74	9,11	7,14	8,89	7,63	9,20	7,59	9,04	6,61	9,25	7,05	7,9
Academic support																						
10 - I have received sufficient advice and support with my studies.		9,26	6,03	9,03	6,42	9,34	4,89	9,33	6,08	8,95	6,66	8,95	6,96	8,79	7,34	9,24	7,00	9,08	6,23	9,13	6,61	7,9
11 - I have been able to contact staff when I needed to.		9,48	7,71	9,05	7,16	9,53	6,86	9,48	6,97	8,84	6,92	9,10	7,73	8,79	7,85	9,20	7,27	9,16	7,36	9,21	7,28	8,6
12 - Good advice was available when I needed to make study choices.		9,45	6,87	9,20	6,65	9,53	6,33	9,39	6,60	8,82	6,39	9,15	7,58	9,03	7,76	9,39	7,41	9,21	6,84	9,29	7,06	7,6
Organisation and management																						
13 - The timetable works efficiently as far as my activities are concerned.		9,26	5,29	9,10	6,47	9,67	6,06	9,42	7,17	9,05	7,47	8,74	7,16	8,61	8,24	9,46	7,85	9,15	6,77	9,18	7,16	8
14 - Any changes in the course or teaching have been communicated effectively.		9,29	4,97	8,88	6,26	9,44	6,16	9,38	6,93	9,00	6,84	8,78	6,85	8,76	7,55	9,13	7,48	9,12	6,38	9,04	6,88	8,1
15 - The course is well organised and is running smoothly.		9,13	4,42	9,34	6,11	9,66	6,39	9,56	6,92	9,16	7,57	8,97	6,68	9,03	7,39	9,42	7,32	9,24	6,44	9,32	6,76	8,2
Learning resources																						
16 - The library resources and services are good enough for my needs.		9,10	7,29	9,19	7,51	8,83	4,94	9,21	5,88	9,13	6,87	9,25	7,70	8,58	8,03	9,13	7,52	8,91	6,78	9,19	7,15	8,4
17 - I have been able to access general IT resources when I needed to.		9,29	7,60	9,16	7,31	9,52	7,36	9,51	7,27	9,03	7,13	9,25	7,82	8,79	8,24	9,38	8,00	9,16	7,58	9,32	7,60	8,6
18 - I have been able to access specialised equipment, facilities or room when I needed to.		8,84	6,58	9,02	6,19	9,23	5,47	9,44	6,89	8,95	6,68	8,79	6,84	8,58	7,58	9,04	7,00	8,92	6,58	9,07	6,73	6,9
Personal development																						
19 - The course has helped me present myself with confidence.		8,77	6,10	8,77	6,75	8,88	5,13	9,40	6,46	9,03	7,08	8,90	7,44	8,74	7,71	9,24	7,42	8,85	6,50	9,08	7,02	7,5
20 - My communication skills have improved.		8,90	6,90	8,92	7,07	9,53	6,25	9,45	7,08	9,34	8,21	9,23	8,15	8,29	7,55	9,51	7,63	9,02	7,23	9,28	7,48	7,4
21 - As a result of the course, I feel confident in tackling unfamiliar problems.		8,16	6,10	8,66	6,91	9,15	6,08	9,35	6,52	9,42	7,79	8,82	7,33	8,50	7,34	9,15	7,17	8,81	6,83	9,00	6,98	7,6
Overall satisfaction																						
22 - Overall, I am satisfied with the quality of the course.		9,57	6,21	9,17	6,80	9,78	6,31	9,63	7,04	9,00	7,87	9,15	7,60	8,50	7,47	9,52	7,77	9,21	6,97	9,37	7,30	8,7
FINAL AVERAGES		9,31	6,31	9,03	6,82	9,49	6,03	9,46	6,97	9,08	7,47	9,12	7,56	8,70	7,50	9,41	7,55	9,12	6,83	9,26	7,22	
IN: Importance Number, SN: Satisfaction Number, * Top most important																						

Fig. 4 Averages and statistics of all questions of the four participating universities

APPENDIX 2. QUESTIONS FOR THE ECONOMIC CRISIS		CYPRUS UNIV. OF TECHNOL.		CYPRUS UNIVERSITY		EUROPEAN UNIVERSITY		NICOSIA UNIVERSITY		MEAN
1. How much the economic crisis effect your studies?		SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	
It has an effect		2,24	6,32	2,89	4,80	2,87	6,74	2,56	7,23	6,27
Weakness to attend lessons due disposal/ moral		2,81	4,91	2,94	3,48	3,10	4,84	2,95	4,75	4,49
Weakness to attend lessons due work/ job		3,19	4,81	3,03	3,28	3,22	5,14	3,15	5,49	4,68
Weakness to buy educational material (i.e books, photocopy)		2,77	5,36	2,92	4,20	3,19	5,81	2,98	6,44	5,45
The inability to travel due to high costs		2,90	5,38	3,07	3,93	3,17	5,52	3,13	5,97	5,20
In the loss of parenting work		3,43	4,65	2,98	3,24	3,57	5,11	3,50	5,82	4,70
2. How much the economic crisis affect the quality of your studies?										
The reduction of laboratory courses / internships		3,04	5,43	2,98	4,04	3,14	4,82	3,24	4,61	4,72
Reduce the interest of student		2,89	5,28	2,78	3,52	3,12	4,90	3,20	5,10	4,70
Reduce the interest of teachers		2,87	4,74	2,70	3,64	3,01	4,78	3,14	4,37	4,38
3. How much the economic crisis affect the Students Care of your university?										
Reduction of students benefits		2,69	6,83	3,14	5,62	2,89	5,44	3,03	5,94	5,96
The reduction of food / housing benefits		2,82	6,62	3,03	5,20	3,13	5,45	2,97	6,06	5,83
The reduction in other benefits (sports, activities)		2,86	6,42	2,97	4,28	2,91	4,48	3,15	5,73	5,23
FINAL MEAN		2,88	5,56	2,95	4,10	3,11	5,25	3,08	5,62	5,14

Fig. 5 Questions for the economic crisis in Cyprus

Quest. No	QUESTIONS IN DESCENDING ORDER WITH RESPECT TO MEAN ALL COLUMN	CUT		CY		FREDERICK		MEAN ALL	STD ALL
		STD	MEAN	STD	MEAN	STD	MEAN		
33	The teaching staff provides office hours to solve any questions/ problems	0.74	4.24	0.95	4.30	0.61	4.00	4.18	0.77
2	I'm getting information of my results at the end of each semester	0.74	4.22	0.97	4.04	0.60	4.26	4.17	0.77
27	Lessons start at the time indicated in the timetable	0.73	4.00	0.69	4.24	0.72	4.12	4.12	0.71
20	I was given the lesson plans during the first week	0.84	4.10	0.76	4.20	0.95	3.80	4.03	0.85
24	I was given full details of how the courses are rated/ evaluated	0.91	4.10	0.71	3.94	0.65	3.90	3.98	0.76
22	I am fully informed of the delivery dates of my laboratory reports and any other obligations	0.88	4.08	0.86	4.10	0.89	3.76	3.98	0.88
31	Book references are always given	0.88	4.04	0.90	3.96	0.78	3.80	3.93	0.85
30	It is essential to attend my lessons to succeed	1.14	3.80	1.03	4.04	0.81	3.96	3.93	0.99
36	You would recommend the Mechanical Engineering program to friends/ acquaintances	1.26	3.74	0.92	4.08	0.78	3.96	3.93	0.99
34	The relationship between students and teaching staff is good enough	0.74	3.94	0.91	3.84	0.88	3.92	3.90	0.84
39	The career advice is helpful	1.04	3.84	0.87	3.94	0.75	3.92	3.90	0.89
35	The quality of the Mechanical Engineering curriculum is quite satisfactory	0.94	3.82	0.94	3.88	0.78	3.96	3.89	0.89
4	Physical access to the teaching areas is easy	0.89	3.50	0.97	3.92	0.67	4.00	3.81	0.84
19	My interest in the subject of my studies has increased	0.86	3.78	0.80	3.74	0.88	3.86	3.79	0.85
23	I was given full details of how to proceed so that I can succeed in my lessons	0.93	3.60	0.74	3.90	0.80	3.82	3.77	0.82
28	You are notified when some lessons are cancelled	0.78	3.58	0.90	3.88	0.78	3.86	3.77	0.82
38	The counseling services at the university are readily available by the trainers	1.07	3.56	0.94	3.88	0.65	3.84	3.76	0.89
40	I was able to get the appropriate advice and information I needed about my lessons	0.85	3.66	1.04	3.78	0.85	3.82	3.75	0.91
16	I received my lesson schedule before starting a semester	1.07	3.78	0.74	4.16	1.26	3.26	3.73	1.02
41	The structure and curriculum of Mechanical engineering are satisfactory (e.g. courses, examinations, chains, timetable, etc.	1.35	3.18	1.01	3.96	0.80	3.98	3.71	1.05
5	The teaching areas I use provide a good learning environment	0.96	3.36	0.99	3.80	0.81	3.90	3.69	0.92
21	My lessons are well designed and organized	0.84	3.44	1.05	3.72	0.80	3.88	3.68	0.90
1	The tour of the university facilities was very important to get familiar with the university environment	0.69	3.74	0.99	3.26	0.97	3.96	3.65	0.88
29	The courses cancelled are replenished	0.90	3.26	1.17	3.66	0.75	4.04	3.65	0.94
15	The representation of the Student Union in the academic institutions is responsible and satisfactory	0.99	3.38	0.91	3.56	0.81	4.00	3.65	0.90
9	The Department of Studies and Student Welfare provides important services	0.91	3.10	0.90	3.86	0.78	3.92	3.63	0.86
14	The services of the Student Union are satisfactory	0.95	3.28	0.84	3.58	1.02	3.88	3.58	0.94
6	Specialist buildings (e.g. laboratories) are of high standard	0.85	3.26	0.97	3.46	0.86	3.96	3.56	0.89
8	Information about further studies is readily available	0.81	3.28	0.95	3.56	0.83	3.82	3.55	0.86
26	The rating of the teachers (by the students) is useful	1.34	2.80	0.97	3.92	0.93	3.94	3.55	1.08
17	All non-academic problems are treated in a positive way	0.97	3.40	0.87	3.68	1.01	3.54	3.54	0.95
10	There is easy access to IT services and computers	1.11	3.16	0.93	3.54	0.70	3.86	3.52	0.91
11	The library is well equipped with educational material for my needs	0.78	3.62	0.89	3.48	0.97	3.46	3.52	0.88
12	The library provides a good environment for you to study	0.80	3.66	0.99	3.44	1.05	3.42	3.51	0.95
3	Enrolment in lessons is smooth	1.17	2.74	1.04	3.82	0.87	3.94	3.50	1.03
25	Courses/ lessons are evaluated consistently	0.90	3.36	0.93	3.42	0.90	3.64	3.47	0.91
37	The university covers my additional needs (e.g. lab uniforms)	1.31	2.80	1.22	3.70	1.02	3.76	3.42	1.18
32	I often visit the library	1.17	3.64	1.45	3.08	1.07	3.40	3.37	1.23
13	The facilities of the Student Union meet my needs	0.77	3.18	0.86	3.54	0.98	3.32	3.35	0.87
7	Leisure facilities are of a high standard	1.15	2.76	1.01	3.74	1.25	3.48	3.33	1.14
18	The sports facilities are quite satisfactory	1.23	2.60	0.79	4.10	1.24	3.26	3.32	1.09
	STD AND AVERAGE PER UNIVERSITY	0.96	3.52	0.94	3.80	0.87	3.81	3.71	0.92

Fig. 6 How students evaluate the course attending (mechanical engineering) in their university

VII. MAIN CONCLUSIONS AND RECOMMENDATIONS

It is the opinion of the author that there is no need to repeat the main results identified previously. As for the first part of the research (students' requirements and actions), it is important to stress that mainly Cyprus universities can extract useful information out this research. Foreign universities can also follow the same steps or path or use the same questionnaires to identify what is happening in their university or country. By comparing the two assessments "Student Important index" and "Students satisfaction index", the participating universities will understand where to concentrate their efforts i.e. to the students' requirements of high importance, and or to the students' requirements that receive a low satisfaction index score.

REFERENCES

- [1] Angeli I, Pilava Y. 2012, "Identifying student's requirements and ranking systems in higher education: QFD case studies". The Nineteenth International Conference of the Israel Society for Quality, October 22-24 2012, Jerusalem, Israel.
- [2] Angeli I., Kyriacou A. 2017, "The impact of the economic crisis to the quality of services, offered d by Higher Educational Institutions with respect to student's satisfaction. A case study of gap analysis" 14th UASQ European Quality Week 2017, 23th– 24th, November, Belgrade, Serbia AND International Journal " Advance Quality 2017, V3, Serbia.
- [3] ENQA Web: <http://www.enqa.eu/files/ENQA>.
- [4] ENQA Web: <http://www.enqa.net/bologna.lasso>.
- [5] Harvey C., (2003) Critical thinking in the management classroom: Bloom's taxonomy as a learning tool, Journal of Management Education, Vol. 27 No. 5, pp. 533-555.
- [6] ISO 9001:2015, Quality Management system standard.
- [7] National Students Survey (NSS): (<http://www.hefce.ac.uk/lt/nss/results/2016/>).