Workshop “Cooperation at Academic Informatics Education across Balkan Countries and Beyond: The Impact of Informatics to Society"

Female Students’ Attitude Towards Studying Informatics and Expectations for Future Career - Balkan Case

Hvar, Croatia, 1-7 September 2019.

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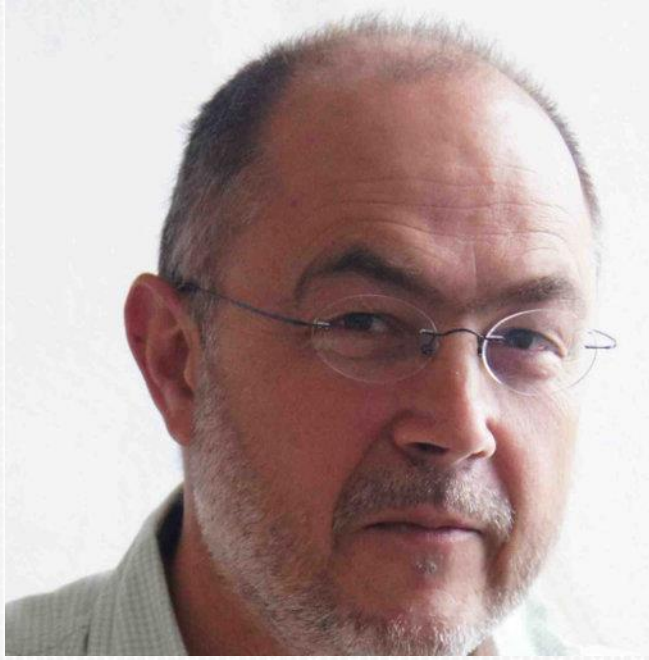
IN MEMORIAM

Zoran Putnik, Serbia
1960-2017

Ioan Jurca, Romania
1947-2014



Hussein Zedan, UK
1953-2019

AGENDA

- INTRODUCTION
- THE SUBJECT OF RESEARCH AND SAMPLE
- METHODOLOGICAL REMARKS
- RESULTS AND DISCUSSION
- CONCLUSION

- **This paper presents the results of research on female students at three different faculties of informatics: Novi Sad in Serbia, Plovdiv in Bulgaria and Tirana in Albania.**
- **The idea of this paper is to analyze and compare female students' attitudes towards studying informatics.**
- **We have collected female students' opinions, experiences, attitudes, and perspectives, on current studies, employment opportunities and expectations of future professional careers.**
- **The obtained results indicate that the opinions of female students vary, depending on the place where they study.**
- **Paper accepted at: 9th BALKAN CONFERENCE IN INFORMATICS, 26 - 28 SEPTEMBER 2019, Sofia**

- **The results of the analysis should indicate the current presence of female students in this area, but also to encourage their greater presence in the future.**
- **It is necessary to create especially for female students, the better conditions for acquiring knowledge and skills.**
- **This analysis will give us findings that could be used at different universities to improve their informatics curricula.**

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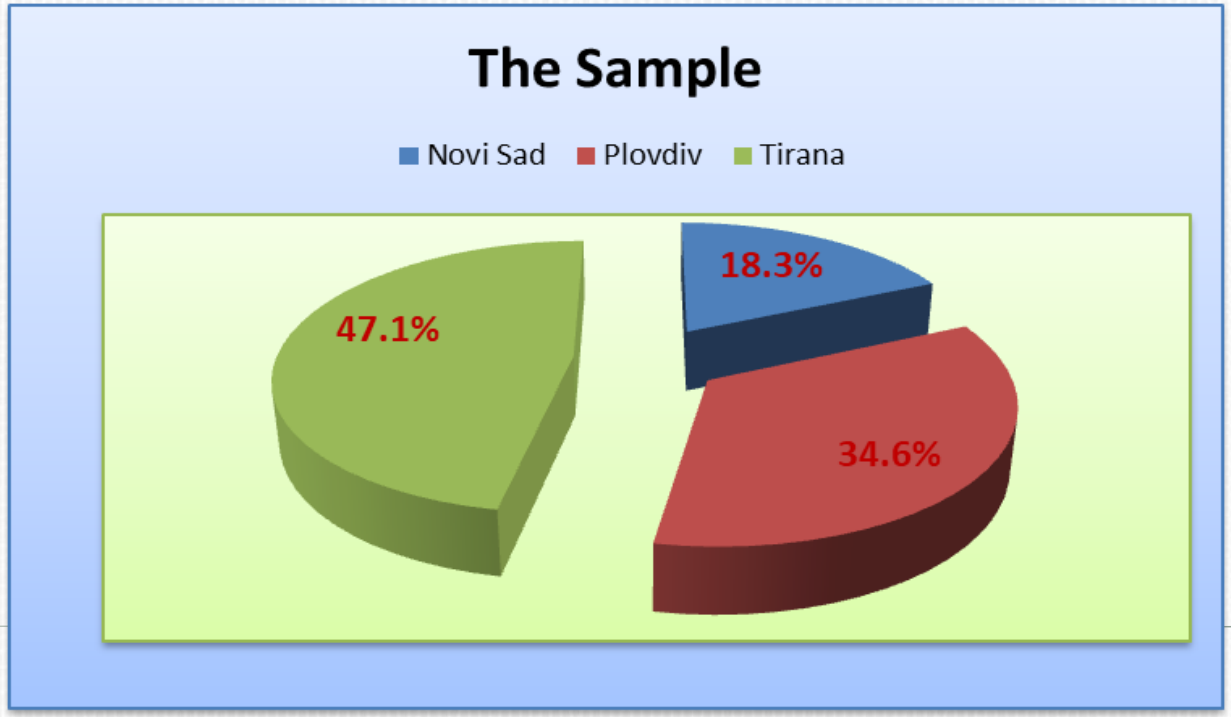
Research results presented in the paper are obtained from data sample of a total of 104 female students from 3 different cities/countries: 19 (18.3%) female students from Novi Sad, Serbia, 36 (34.6%) female students from Plovdiv, Bulgaria; and 49 (47.1%) female students from Tirana in Albania.



Female students which have participated in analysis are students from the first to the fourth year of study.

Students filled out the same questionnaire in all three countries.

The questionnaire is divided into three parts.

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THE FIRST GROUP OF QUESTIONS: the satisfaction and expectations of female students by enrolling informatics studies, and their opinions on the particular courses they were listening to.

Hypothesis 1:

There are NO STATISTICALLY SIGNIFICANT DIFFERENCES between students in different countries:
- female students prefer informatics courses comparing to general and mathematical courses
- prefer teamwork instead of individual work.

THE SECOND GROUP OF QUESTIONS: the factors that motivated the students to study informatics programs and increased their motivation to continue the studies on MSc level.

Hypothesis 2:

There are NO STATISTICALLY SIGNIFICANT DIFFERENCES that female students prefer informatics jobs as they can offer them flexible working hours and better perspectives.

THE THIRD GROUP OF QUESTIONS: determine the presence and interest of female students in the field of informatics and their expectations in a future career.

Hypothesis 3:

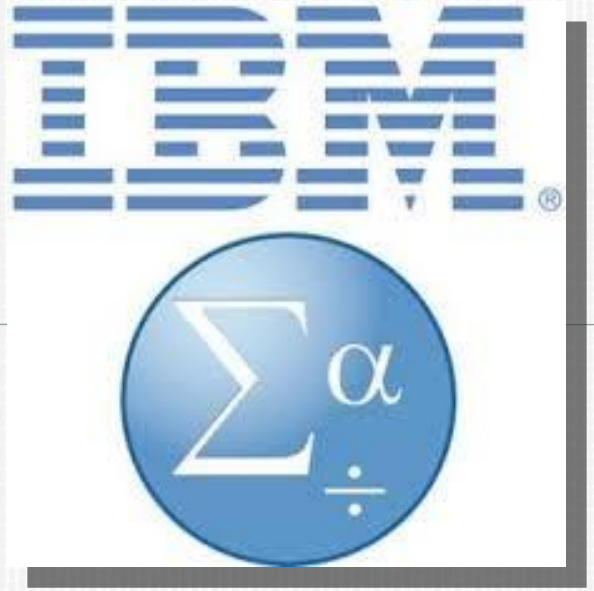
There ARE STATISTICALLY SIGNIFICANT DIFFERENCES:
-female students are willing to try to balance between family life and successful careers,

There ARE NO STATISTICALLY SIGNIFICANT DIFFERENCES:
- female students are more sensitive, but also more willing to learn in this dynamic profession in the long run

SPSS statistical package version 21 is used.

Students' responses were on the 5-point Likert scale (1 means very bad, 2 means bad, 3 means satisfactory, 4 means good, 5 means very good).

The Kruskal-Wallis H test and Mean Rank value for the average range of data were used to analyze the answers to all questions



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Discussion for Hypothesis 1:

Table 1. ***Opinions of female students from NOVI SAD, SERBIA about ACHIEVEMENTS DURING BACHELOR STUDIES.***

Novi Sad, Serbia	The best-ranked element	Mean	The worst ranked element	Mean
Quality of Courses	Informatics courses	4.16	Mathematical courses	3.63
Preparing for a future career in CS	Teamwork, communication skills, professional awareness	3.83	Contribution to society	3.61
Acquired skills	Finding the right information/sources when needed	4.00	Leadership and management abilities	3.28
Achievements in the CS area	Software Engineering	8.43	Introduction to Programming Object-oriented programming	7.50
Pay more/less attention to which courses	Informatics	4.63	Pedagogy	2.16

Discussion for Hypothesis 1:

Table 2. ***Opinions of female students from PLOVDIV, BULGARIA about ACHIEVEMENTS DURING BACHELOR STUDIES.***

Plovdiv, Bulgaria	The best-ranked element	Mean	The worst ranked element	Mean
Quality of Courses	Informatics courses	4.63	General courses	3.88
Preparing for a future career in CS	Contribution to society	4.31	Everyday life	3.61
Acquired skills	Finding the right information/sources when needed	4.22	Work on up-to-date CS	3.78
Achievements in the CS area	Introduction to Programming	8.79	Algebra	8.15
Pay more/less attention to which courses	Informatics	4.53	Pedagogy	2.24

Discussion for Hypothesis 1:

Table 3. ***Opinions of female students from TIRANA, ALBANIA about ACHIEVEMENTS DURING BACHELOR STUDIES.***

Tirana, Albania	The best-ranked element	Mean	The worst ranked element	Mean
Quality of Courses	Mathematical courses	3.71	General courses	1.71
Preparing for a future career in CS	Teamwork, communication skills, professional awareness	3.08	Everyday life	2.78
Acquired skills	Finding the right information/sources when needed	4.16	Work on up-to-date CS	2.86
Achievements in CS area	Software Engineering	8.88	Algebra	7.12
Pay more/less attention to which courses	Informatics	4.80	Philosophy	1.65

Discussion for Hypothesis 1:

Table 4. ***The presence of STATISTICAL DIFFERENCES in students' responses for INFORMATICS COURSES.***

Informatics courses				
City	Mean	Mean Rank	KW(H)	KW(p)
Novi Sad	4.11	61.63	18.282	0.000
Plovdiv	4.19	65.03		
Tirana	3.33	39.76		

Discussion for Hypothesis 1:

Table 4. ***The presence of statistical differences in STUDENTS' RESPONSES ABOUT „TEAMWORK, COMMUNICATION SKILLS, PROFESSIONAL AWARENESS“.***

Teamwork, communication skills, professional awareness				
City	**Mean**	**Mean Rank**	**KW(H)**	**KW(p)**
Novi Sad	**3.83**	**55.47**	**5.305**	**0.070**
Plovdiv	**4.06**	**59.39**		
Tirana	**3.39**	**45.30**		

Discussion for Hypothesis 1:

There ARE STATISTICALLY SIGNIFICANT DIFFERENCES in female students' responses about informatics courses.

There ARE NO STATISTICALLY SIGNIFICANT DIFFERENCES in the response to team work, communication skills and professional awareness.

OUR FIRST HYPOTHESIS IS NOT ACCEPTED.

Discussion for Hypothesis 2:

Table 6. ***Elements that have determined students TO ENROLL INFORMATICS AT THE FACULTY IN NOVI SAD.***

Novi Sad, Serbia	The best-ranked element	Mean	The worst ranked element	Mean
Factors that influenced	Interest in computers	4.26	Parents suggestion	2.53
Role Models	Worldwide famous CS and ICT scientists and professionals	3.22	Parents working in CS and ICT	1.67
Knowledge of the influencing persons	Worldwide famous CS and ICT scientists and professionals	3.81	Parents working in CS and ICT	2.19

Discussion for Hypothesis 2:

Table 7. ***Elements that have determined students TO ENROLL AT INFORMATICS AT THE FACULTY IN PLOVDIV, BULGARIA.***

Plovdiv, Bulgaria	The best-ranked element	Mean	The worst ranked element	Mean
Factors that influenced	Perspective profession for the future	4.56	Parents suggestion	2.53
Role Models	Worldwide famous CS and ICT scientists and professionals	4.03	Parents working in CS and ICT	2.25
Knowledge of the influencing persons	Male teachers and professors	3.86	Parents working in CS and ICT	2.40

Discussion for Hypothesis 2:

Table 8. ***Elements that have determined students TO ENROLL INFORMATICS AT THE FACULTY IN TIRANA, ALBANIA.***

Tirana, Albania	The best-ranked element	Mean	The worst ranked element	Mean
Factors that influenced	Perspective profession for the future	4.39	Parents suggestion	2.45
Role Models	Worldwide famous CS and ICT scientists and professionals	3.43	Parents working in CS and ICT	1.73
Knowledge of the influencing persons	Male teachers and professors	3.69	Parents working in CS and ICT	1.80

Discussion for Hypothesis 2:

Table 9. ***Difference in students' opinion for the element: „INFORMATICS AS PERSPECTIVE PROFESSION FOR THE FUTURE“.***

Perspective profession for the future				
City	**Mean**	**Mean Rank**	**KW(H)**	**KW(p)**
Novi Sad	**4.16**	**44.87**	**2.776**	**0.250**
Plovdiv	**4.56**	**57.50**		
Tirana	**4.39**	**51.79**		

Discussion for Hypothesis 2:

Table 10. *Difference in students' opinion for the elements: "FLEXIBLE WORKING HOURS, AND POSSIBLE WORK FROM HOME".*

Flexible working hours, freelancing, work from home				
City	Mean	Mean Rank	KW(H)	KW(p)
Novi Sad	4.16	61.55	15.922	0.000
Plovdiv	4.20	63.40		
Tirana	3.14	40.15		

Discussion for Hypothesis 2:

There ARE NO STATISTICALLY SIGNIFICANT DIFFERENCES in female students' responses about perspective profession for the future.

There ARE STATISTICALLY SIGNIFICANT DIFFERENCES in the response to flexible working hours, freelancing, and work from home.

OUR SECOND HYPOTHESIS IS NOT ACCEPTED.

Discussion for Hypothesis 3:

Table 11. ***Interests of female students for CS area and their EXPECTATIONS IN A FUTURE CAREER IN NOVI SAD, SERBIA.***

Novi Sad, Serbia	The best-ranked element	Mean	The worst ranked element	Mean
Female students in the CS area are:	More careful than men	3.53	Unconfident, not sure in their quality	3.00
Which position would you like to see yourself in a future career?	Programmer, project developer of IS, system administrator, networks	3.42	Not in the field of informatics	1.84
In the reality where female students can find a job?	Programmer	3.74	Not in the field of informatics	1.89
How professionally female students see themselves in the future	You will share your knowledge and experience with colleagues	4.21	Expecting fair relations with colleagues	3.83

Discussion for Hypothesis 3:

Table 12. ***Interests of female students for informatics area and their EXPECTATIONS IN A FUTURE CAREER IN PLOVDIV, BULGARIA.***

Plovdiv, Bulgaria	The best-ranked element	Mean	The worst ranked element	Mean
Female students in the CS area are:	More careful than men	3.62	Unconfident, not sure in their quality	2.62
Which position would you like to see yourself in a future career?	Programmer, project developer of IS, system administrator, networks	3.64	Not in the field of informatics	2.19
In reality where female students can find a job?	Team leader at some IT department	3.65	Not in the field of informatics	2.23
How professionally female students see themselves in the future	Being ready for lifelong learning in this dynamic profession	4.23	Being socially appreciated	3.34

Discussion for Hypothesis 3:

Table 13. ***Interests of female students in informatics area and their EXPECTATIONS IN A FUTURE CAREER IN TIRANA, ALBANIA.***

Tirana, Albania	The best-ranked element	Mean	The worst ranked element	Mean
Female students in the CS area are:	Ready to sacrifice family life in favor of the career	3.69	Unconfident, not sure in their quality	2.31
Which position would you like to see yourself in a future career?	Owner of a software development company	3.55	Project manager	1.39
In reality where female students can find a job?	Owner of a software development company	4.12	Informatics education, Teacher in schools	1.49
How professional female students see themselves in the future	Being ready for lifelong learning in this dynamic profession	4.22	Being socially appreciated	3.12

Discussion for Hypothesis 3:

Table 14. ***Whether there is a statistically significant difference for the element: „READY TO SACRIFICE FAMILY LIFE IN FAVOR OF CAREER“.***

Ready to sacrifice family life in favor of career				
City	**Mean**	**Mean Rank**	**KW(H)**	**KW(p)**
Novi Sad	**3.00**	**42.58**	**7.717**	**0.021**
Plovdiv	**3.11**	**45.66**		
Tirana	**3.69**	**60.18**		

Discussion for Hypothesis 3:

Table 15. ***Whether there is a statistically significant difference for the element: „BEING READY FOR LIFELONG LEARNING IN THIS DYNAMIC PROFESSION“.***

Being ready for lifelong learning in this dynamic profession				
City	**Mean**	**Mean Rank**	**KW(H)**	**KW(p)**
Novi Sad	**4.11**	**49.63**	**0.005**	**0.998**
Plovdiv	**4.23**	**50.06**		
Tirana	**4.22**	**50.10**		

Discussion for Hypothesis 3:

There ARE STATISTICALLY SIGNIFICANT DIFFERENCES in female students' responses about that being ready to sacrifice family life in favor of career.

There ARE NO STATISTICALLY SIGNIFICANT DIFFERENCES in the response to being ready for lifelong learning in this dynamic profession.

OUR THIRD HYPOTHESIS IS ACCEPTED.

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- **Some GENERAL CONCLUSIONS could be useful for universities and other educational stakeholders to innovate and change their curricula in informatics.**
- **To obtain MORE RELIABLE CONCLUSIONS it is necessary to REPEAT THE RESEARCH by enrolling new students each year and to monitor possible changes in their attitude.**
- **Implement research in different countries/continents, although this requires a lot of time, willingness of participants, and analysis.**
- **Participating institutions can use results to try to improve study programs and methodologies in order to attract more female students.**

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THANKS FOR ATTENTION !

Hvar, Croatia, 1-7 September 2019.

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