Co-funded by the
Erasmus+ Programme
of the European Union


# Tasks 1.1. and 1.2. Report on the level of PPM knowledge/skills of university teachers and on the current state of technology enhanced teaching and learning

July 2019

www.tecomp.ni.ac.rs
tecomp@ni.ac.rs
tecomp.p2018@gmail.com

| | |
|---|---|
| **Project acronym:** | **TeComp** |
| **Project full title:** | **Strengthening Teaching Competences in Higher Education in Natural and Mathematical Sciences** |
| **Project No:** | 598434-EPP-1-2018-1-RS-EPPKA2-CBHE-JP |
| **Number of grant contracts** | 2018-2467/001-001 |
| **Web address of project** | www.tecomp.ni.ac.rs |
| **Funding Scheme:** | Erasmus+ |
| **Coordinator Institution:** | University of Niš |
| **Coordinator:** | Prof. dr Jelena Ignjatović |
| **Project duration:** | 15.11.2018. – 14.11.2021. |
| **Work package:** | WP1 – Preparation for strengthening teaching competences in the field of natural sciences and mathematics at the PC HEIs |
| **Lead organization of WP1:** | P5-ECUG |
| **Task 1.1** | Quantitative analysis of teaching competences of young, newly hired university teachers at the PC HEIs |
| **Task 1.2** | Detailed analysis of the use of modern educational technologies in teaching and learning at the PC HEIs |
| **Version of the document:** | v.01 |
| **Status:** | Draft |
| **Dissemination level:** | Internal |

# Report on the Survey of Teacher Attitudes at the University of Nis

## Structure of the sample

The survey was filled in by 31 teachers, 14 (45.16%) of whom were women and 17 (54.48%) men. Teachers from six areas were present in the sample in the following way: mathematics (6), geography (4), computer science (9), physics (3), chemistry (5) and biology (4).

The survey was conducted electronically during April 2019.

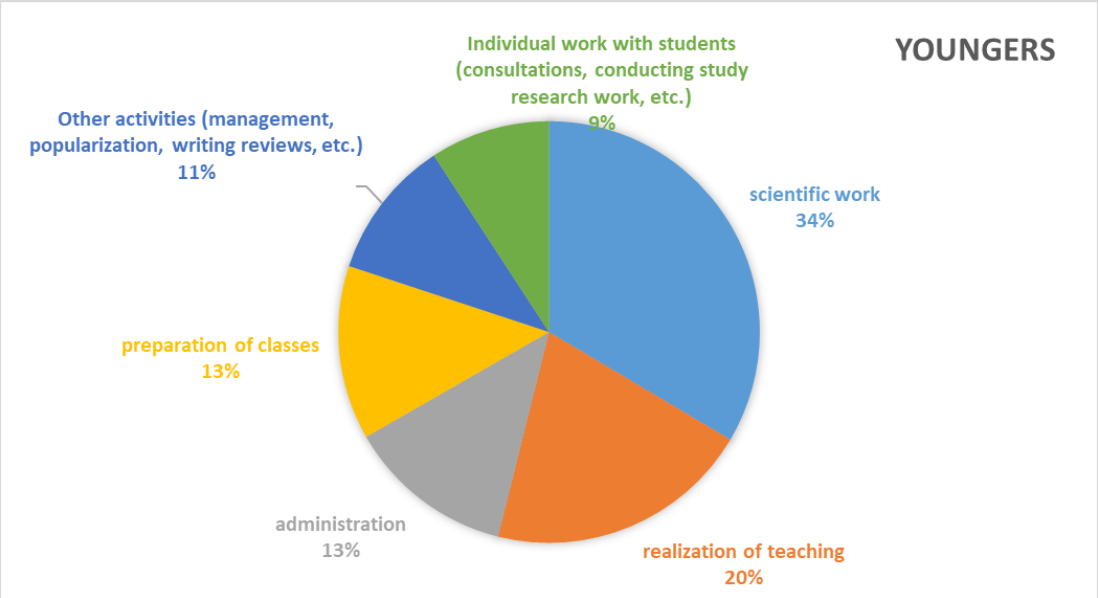
## Teaching experience at the university

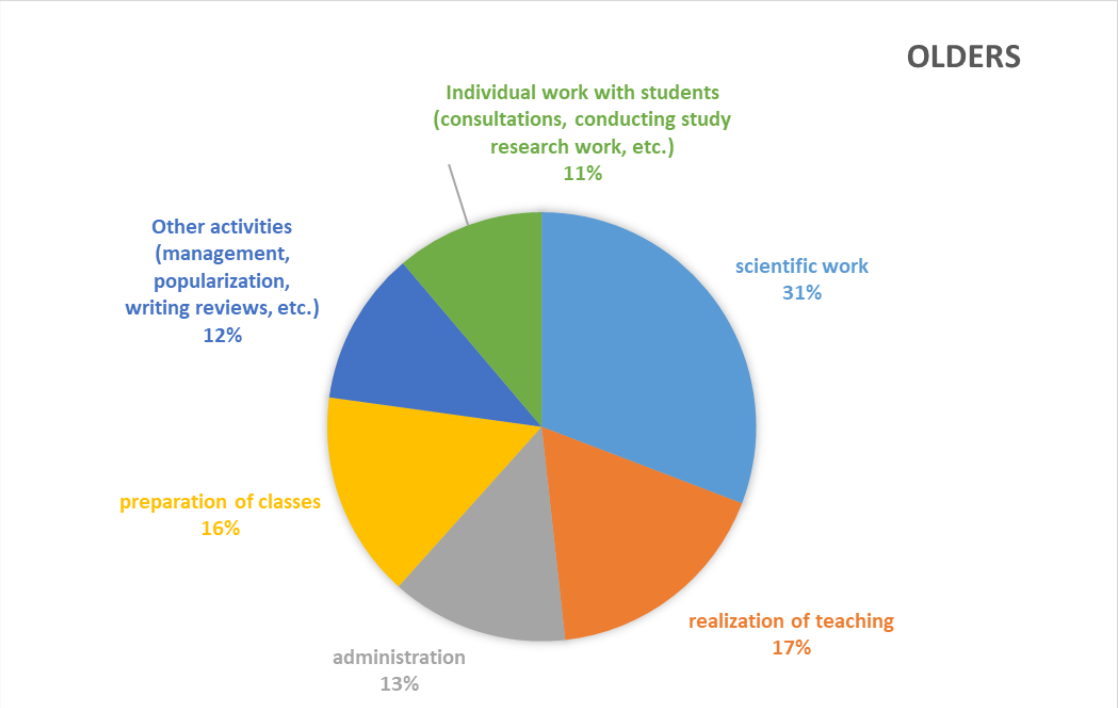
The average number of years of teaching experience is 15.26 years (the standard deviation is 6.15 years). The shortest teaching experience in the sample is 5 years, while the longest teaching experience is 30 years. In the further report, we will consider teachers and associates whose work experience is up to 12 years under the younger teaching staff, while older teachers will consider teachers with experience over 12 years. Translated to the age of the respondents, we can identify 12 years of experience with 35 years of age.

## Evaluation of weekly engagement

Work at the university allows for a significant individual distribution of time. For these reasons, teachers / associates filled out how many hours of work were active during the week and how it was arranged. Average respondents said they spend 47.15 hours of work on different activities (with a standard deviation of 12.54). Operating hours vary from 25 hours to 75 hours. The amount of time spent in the week on individual activities is given in Table 1 and Figure 1.

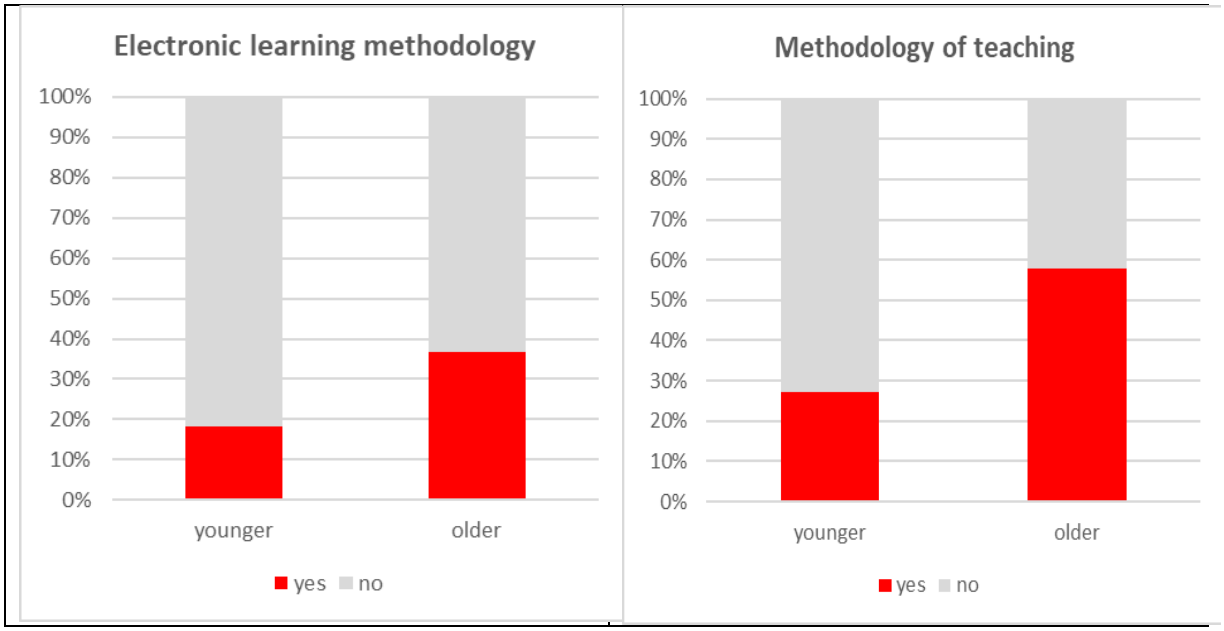
| activity | average number of hours all | average number of hours-youngers | average number of hours - olders | p-value | significance |
|---|---|---|---|---|---|
| scientific work | **15.0** (5.05) | 13.91 (4.44) | 15.63 (5.39) | 0.377 | NO |
| realization of teaching | **8.7** (3.32) | 8.45 (3.42) | 8.84 (3.35) | 0.764 | NO |
| administration | **6.25** (6.25) | 5.32 (5.87) | 6.79 (6.55) | 0.544 | NO |
| preparation of classes | **7.03** (2.85) | 5.54 (2.73) | 7.89 (2.60) | 0.026 | **YES** |
| Other activities (management, popularization, writing reviews, etc.) | **5.34** (4.48) | 4.45 (3.11) | 5.89 (5.16) | 0.413 | NO |
| Individual work with students (consultations, conducting study research work, etc.) | **5.00** (3.29) | 3.82 (2.23) | 5.68 (3.65) | 0.137 | NO |
| IN TOTAL | **47.15** (12.54) | 41.50 (7.75) | 50.42(13.76) | 0.059 | **YES** |




**Courses in methodology**

| courses | in total | younger | older |
|---|---|---|---|
| Electronic learning methodology | 9 (30.00%) | 2 (18.18%) | 7 (36.84%) |
| Methodology of teaching | 14 (46.67%) | 3 (27.27%) | 11 (57.89%) |




Since 11 respondents attended the e-learning methodology, in the following table we list which areas were listened to:

| Areas | number of respondents |
|---|---|
| Electronic publishing (Latex, HTML, XML, PDF, etc.) | 6=5+1 (1) |
| Online Technology in Teaching | 3=3+0 |
| Open source software (MOODLE, Python, GeoGebra, MOOC, etc.) | 5=3+2 |

(1) We note that there are cases and there are respondents who have declared that they have not been listening to the method of electronic learning but have listened to some of the contents listed in the previous table. The first one is the number of respondents who have attended the method of electronic learning, while the second one is the number of respondents who did not attend

At Question: *Did you give at least one lecture in English. If yes, specify when and where*, less than 15%, or 4 respondents answered yes.

At Question: *Have you prepared at least one lecture or part of the lecture on the electronic platform. If yes, specify on which platform* only 3 respondents answered yes (and they used the Moodle platform or Office 365 Education).

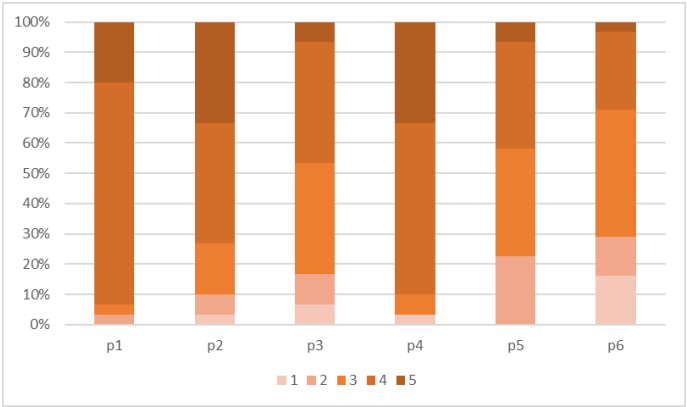
| Question | younger | older | IN TOTAL |
|---|---|---|---|
| Have you participated in a professional conference whose emphasis was on applying innovative teaching technologies? | 3 (27.27%) | 9 (47.37%) | 12 (40.00%) |
| Have you ever discussed with students about the impact of using modern technologies on the quality of teaching and learning? | 8 (72.73%) | 16 (84.21%) | 24 (80.00%) |

## Attitudes on the use of ICT in teaching

Respondents answered how much the following claims are true for them on the five-level Lihter scale (1- It's not true at all; 2 - It's not true in general; 3- Equally true and not true; 4 - Generally true. 5. Totally true).

| notation | Statements |
|---|---|
| p1 | The use of new technologies in teaching is very important for the quality of the lecture. |
| p2 | Group work, multimedia presentations and modern software capabilities save valuable teachers time. |
| p3 | Student presentations and discussions save time for the teacher. |
| p4 | You want to improve your teaching skills using information technology, because it would help you prepare lessons easier. |
| p5 | You want to improve your teaching skills using information technology, because it will bring you more respect from students. |
| p6 | You want to improve your teaching skills using information technology, because it will bring you more respect from colleagues |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| p1 | 0 | 1 | 1 | 22 | 6 |
| p2 | 1 | 2 | 5 | 12 | 10 |
| p3 | 2 | 3 | 11 | 12 | 2 |
| p4 | 1 | 0 | 2 | 17 | 10 |
| p5 | 0 | 7 | 11 | 11 | 2 |
| p6 | 5 | 4 | 13 | 8 | 1 |




Distribution of the response to the six observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mode | mean | median | mode | mean | median | mode |
| p1 | 4.1 | 4 | 4 | 4.182 | 4 | 4 | 4.053 | 4 | 4 |
| p2 | 3.933 | 4 | 4 | 3.909 | 4 | 4 | 3.947 | 4 | 5 |
| p3 | 3.3 | 3 | 4 | 3.455 | 3 | 3 | 3.211 | 3 | 4 |
| p4 | 4.167 | 4 | 4 | 3.909 | 4 | 4 | 4.316 | 4 | 4 |
| p5 | 3.258 | 3 | | 3.083 | 3 | | 3.368 | 3 | 3 |
| p6 | 2.871 | 3 | 3 | 2.917 | 3 | 3 | 2.842 | 3 | 3 |

Mean response values of the respondents

CONCLUSION: All the teachers agree that the quality of their lectures will be better if they use the contemporary technologies in teaching. If we look at the response values, we will notice that the opinion of younger and older professors is almost identical about all the issues. The least number of respondents (the average for question p6 is 2.871) consider that improving their teaching skills is important for bringing greater respect from their colleagues. The results show that the greatest score (even above 4.1) got the opinion that using ICT in teaching is very important for the quality of

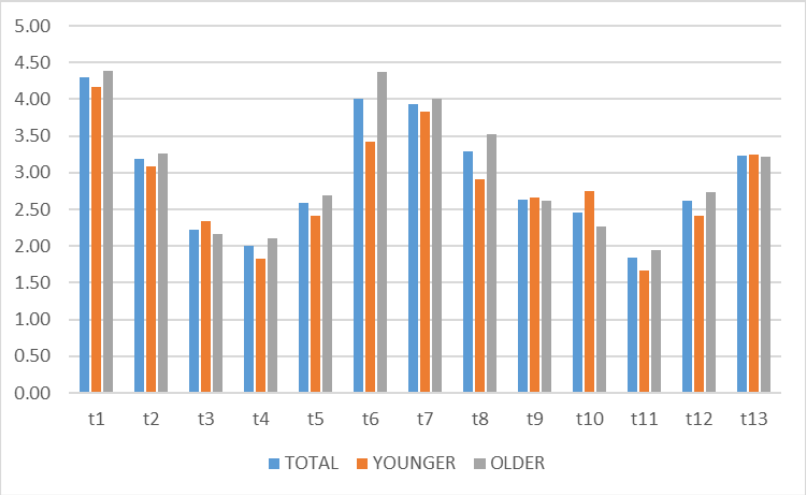
the lecture and that it helps in easier preparation lessons. Most of them have opinion that group work, multimedia presentations and modern software capabilities save valuable teachers time.

## SELF ASSESSMENTS OF ICT COMPETENCES

Respondents assessed their knowledge of ICT on the five-level Lihter scale (1- Not true 2- not true in general 3- neither not true nor true 4-true in general 5-totally true), indicating in what degree they agreed with the following claims

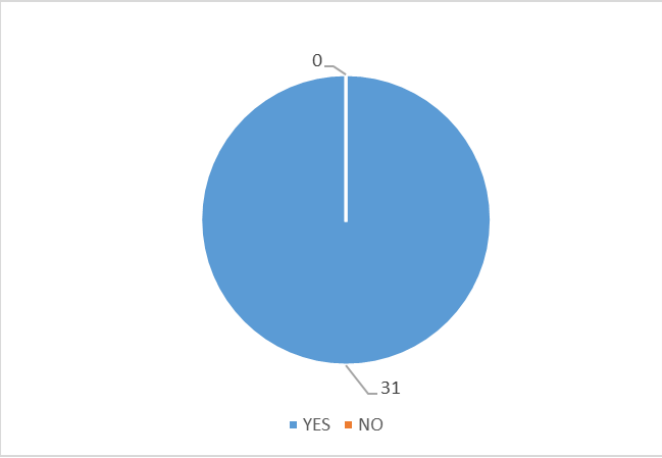
| notation | statement |
|---|---|
| t1 | The level of your knowledge and skills in applying Office software package: |
| t2 | Level of your knowledge and skills in applying Open Source software: |
| t3 | Level of your knowledge and skills in implementing Web conferencing software: |
| t4 | Level of your skills in the application of Learning Management System (LMS): |
| t5 | The level of your knowledge and skills in applying online learning platform: |
| t6 | Use electronic materials (presentations) as teaching materials. |
| t7 | Use electronic books / textbooks as teaching materials. |
| t8 | Use animations / movies as teaching material. |
| t9 | Use forums and other forms of online communication in teaching and learning. |
| t10 | Use online courses as a teaching material. |
| t11 | Use web conferences as a teaching material. |
| t12 | Use databases in teaching and learning. |
| t13 | You are open to communicating with students via social networks (Facebook, Twitter, etc.). |

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mode | mean | median | mode | mean | median | mode |
| t1 | 4.30 | 4 | 5 | 4.17 | 4 | 4 | 4.39 | 4.5 | 5 |
| t2 | 3.19 | 3 | 3 | 3.08 | 3 | 3 | 3.26 | 3 | 3 |
| t3 | 2.23 | 2 | 3 | 2.33 | 2 | 2 | 2.16 | 2 | 3 |
| t4 | 2.00 | 2 | | 1.83 | 2 | 2 | 2.11 | 2 | 1 |
| t5 | 2.58 | 3 | 3 | 2.42 | 3 | 3 | 2.68 | 3 | |
| t6 | 4.00 | 4 | 4 | 3.42 | 4 | 4 | 4.37 | 4 | 4 |
| t7 | 3.94 | 4 | 4 | 3.83 | 4 | 4 | 4.00 | 4 | 4 |
| t8 | 3.29 | 4 | 4 | 2.92 | 3 | | 3.53 | 4 | 4 |
| t9 | 2.63 | 3 | 3 | 2.67 | 3 | 3 | 2.61 | 2.5 | 1 |
| t10 | 2.45 | 2 | 2 | 2.75 | 2.5 | 2 | 2.26 | 2 | 1 |
| t11 | 1.84 | 2 | 1 | 1.67 | 1 | 1 | 1.95 | 2 | 1 |
| t12 | 2.61 | 3 | | 2.42 | 3 | 3 | 2.74 | 3 | 1 |
| t13 | 3.23 | 3 | | 3.25 | 3 | 3 | 3.21 | 4 | 4 |




CONCLUSION: As it can be seen, the assessments of young and older teachers are pretty uniform here, too. The respondents assessed their knowledge and skills related to the Office software package with very high score (4.30) as well as using of electronic materials (presentations) as teaching materials (average score for t6 is 4.00) and using of electronic books/textbooks as teaching materials (average 3.94). Very rarely teachers use web conferences as a teaching material (1.84) and most of them have undeveloped knowledge/skills on using LMS, Moodle for example (average 2.00). The self-assessment for all other questions is less than 3, or very little above 3 what indicates that improving ICT knowledges and skills in teaching process is more than necessary.

Can you notice the benefits of applying modern technology in teaching and learning?




What are these benefits?

| Benefit | YES | % |
|---|---|---|
| Save time | 14 | 45.16% |
| It facilitates the preparation of classes | 16 | 51.61% |
| Increases students' level of interest | 26 | 83.87% |
| Increases the quality of teaching materials | 23 | 74.19% |
| It makes learning easier | 21 | 67.74% |
| Improves communication between teachers and students | 20 | 64.52% |

CONCLUSION: All the teachers (100%) notice the benefits of using ICT in the teaching and learning, and they think that, the most important advantage of using modern technologies in teaching and learning, is increasing student level of interest, but the benefits like increasing the quality of teaching materials (74.19%), easier learning (67.74%) and better communicationbetween teachers and students (64.52%) are very important, too.

Do you use some free online learning platforms for courses? If your answer is YES, please indicate the platforms you are using.

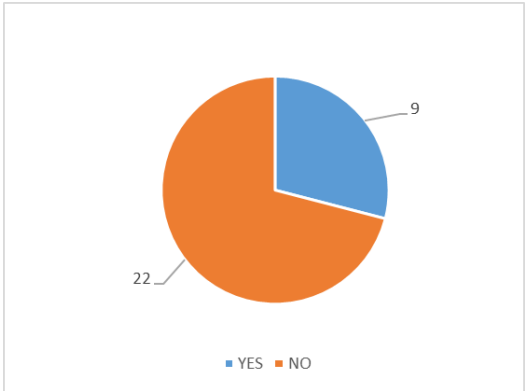
| | | |
|---|---|---|
| Moodle | 4 | 13.33% |
| Nasport | 1 | 3.33% |
| teaching platform | 1 | 3.33% |
| Coursera | 1 | 3.33% |
| No | 24 | 80.00% |

CONCLUSION: Unfortunately, most of the respondents (80.00%) do not use any learning platform. The greatest number of teachers who work on platforms use Moodle (13.33%). Using of online free learning platforms is needed to be promoted and implemented in teaching because of their importance for modernization of education.

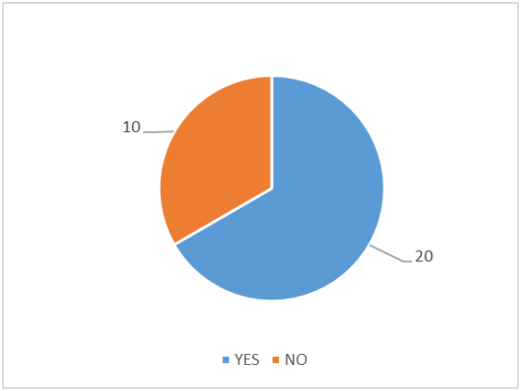
Do you think that using the online learning platform can:

| | YES | % |
|---|---|---|
| Enable students easier and faster access to learning materials | 29 | 93.55% |
| Enable students easier and faster access to relevant information | 20 | 64.52% |
| Allow students access to materials at any time | 26 | 83.87% |
| Contribute to the realization of the active role of students | 20 | 64.52% |
| Contributes to the individualisation of learning | 13 | 41.94% |
| Improves communication between teachers and students | 14 | 45.16% |

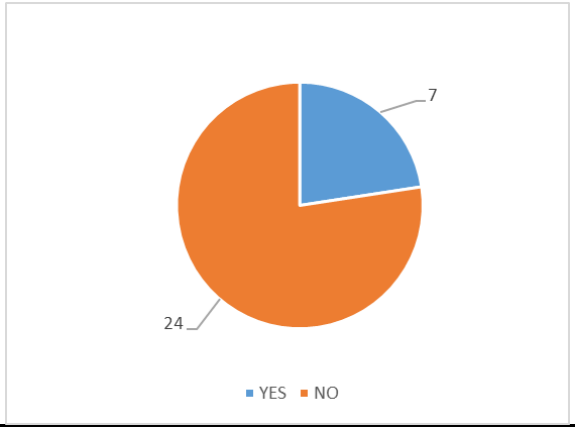
Has your institution developed a system for electronic student testing?



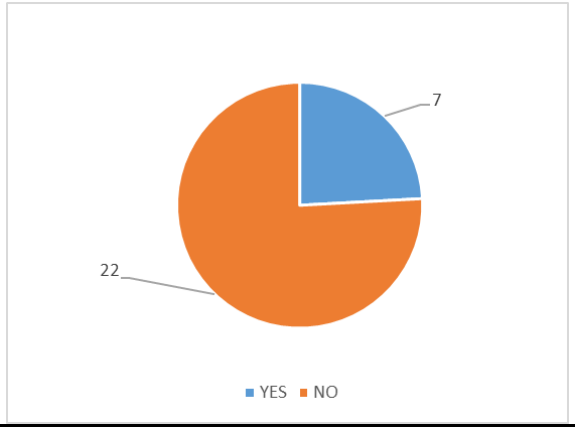

Do you think the student self test system has a positive impact on learning success?



Is your higher education institution able to provide students with high quality and expensive laboratory equipment?




Do your students have the opportunity to participate in experiments from remote locations?

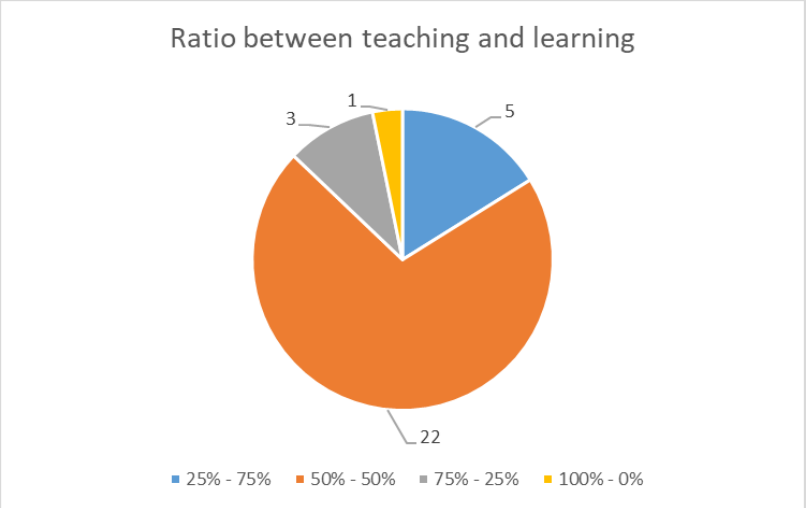



The most important barriers to applying modern teaching technologies in teaching and learning are:

| | YES | % |
|---|---|---|
| Lack of ICT skills | 19 | 61.29% |
| Lack of time | 5 | 16.13% |
| Lack of hardware | 16 | 51.61% |
| Lack of software | 21 | 67.74% |
| Inability to access computers | 8 | 25.81% |

CONCLUSION: Teachers recognize that usage of online learning platforms is very important and useful, because these platforms enable students easier and faster access to learning materials and relevant information at any time and contribute to the realization of the active role of students, but the respondents, also notice that there are significant obstacles in applying modern teaching technologies. Most of them, 67.74% recognize the lack of software and 61.29% see the lack of ICT skills as the main barriers. The lack of hardware is stated as a barrier in using modern technologies in teaching by 51.61% of the respondents, but this is purely financial problem.

In your opinion, what ratio (in percent) should be between teaching and learning in education to make education the most successful?



# *Pedagogical methods and teaching skills*

Level of skills in English

| | low | middle | high |
|---|---|---|---|
| Listening | 1 | 6 | 24 |
| reading | 0 | 8 | 23 |
| writing | 3 | 11 | 17 |
| talk | 3 | 13 | 15 |

CONCLUSION: Majority of teachers self-assessed their English language competences with high marks.

Have you ever attended a course in one of the listed disciplines during your formal education?

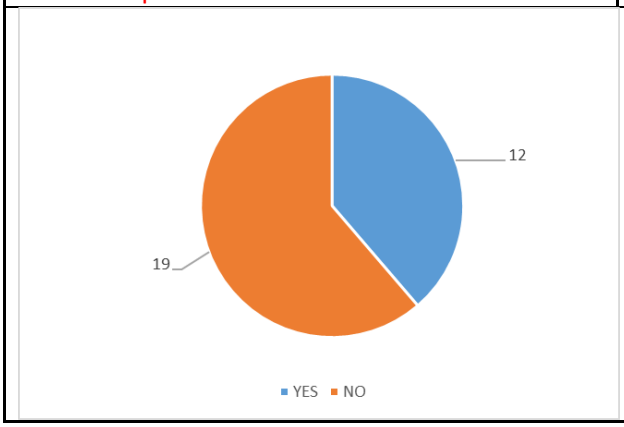
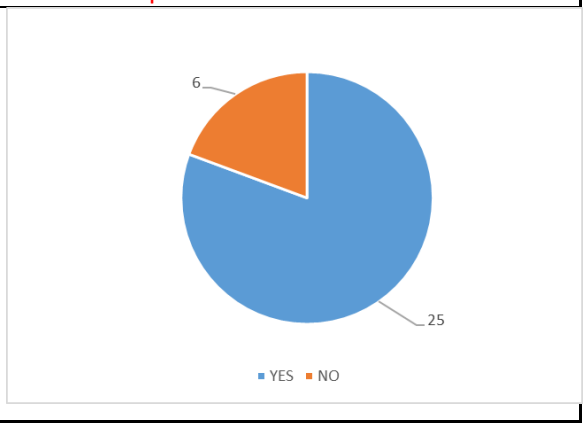
| course | YES | NO |
|---|---|---|
| Pedagogy | 14 | 16 |
| Psychology | 15 | 15 |
| Teaching methodology | 10 | 18 |
| Application of new technologies in teaching | 8 | 19 |
| English language | 27 | 4 |
| You have not attended a course of any of these disciplines | | 14 |

Have you ever held a course or have educated yourself informally (consulting some of the sources: books, articles, online resources, professional organizations, experienced colleagues, mentors, etc.) from one of the above disciplines during your career

| course | YES | NO |
|---|---|---|
| Pedagogy | 7 | 21 |
| Psychology | 10 | 18 |
| Teaching methodology | 13 | 15 |
| Application of new technologies in teaching | 17 | 12 |
| English | 14 | 13 |
| You have not taught or learned a course of any of these disciplines | | 16 |

Do you consider that the teaching skills of university professors are very important for the quality of their classes?

| | |
|---|---|
| I totally agree | 27 |
| I partially agree | 4 |
| I do not agree | 0 |

| Did you participate in a professional conference whose emphasis was on education? | Have you tried to provide feedback from students as part of the institutional evaluation |
|---|---|
|  |  |





What would motivate you to engage in improving your teaching competencies?

| | | |
|---|---|---|
| Get more respect from colleagues or students | 9 | 29.03% |
| Possibility of easier preparation of classes | 11 | 35.48% |
| Achieve better quality of teaching | 27 | 87.10% |
| Attracting more students to elective courses | 19 | 61.29% |
| Getting some financial or material compensation | 7 | 22.58% |
| You are not interested | 0 | 0.00% |

CONCLUSION: About half of the respondents attended courses Pedagogy, Psychology, while less number of them (about one-thirds) attended courses in Teaching methodology during their formal education. Very small percent of the teachers attended courses about using contemporary technologies in teaching, but most of them educated themselves in using ICT during their carrier. Only a quarter of them had a dedicated ICT course. Most of the teachers consider that the teaching skills are very important for the quality of teaching process and, also 87.10% of the respondents stated that their main goal is to achieve better quality of teaching. All responses indicate that there is a strong teachers' motivation to improve teaching, so we strongly believe that training courses and well-organized education material can give excellent results.

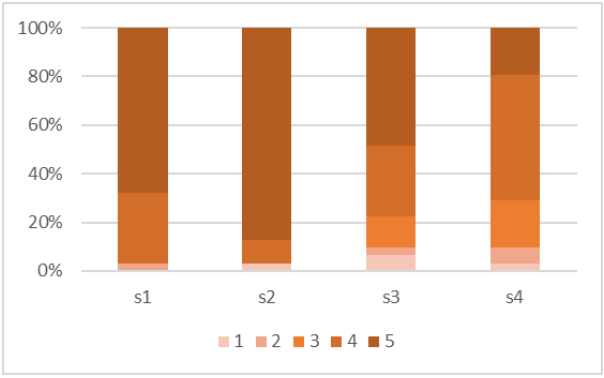
## *Application of educational strategies, English language and technology in teaching*

On the five-level Lihter scale (1- It's not true at all; 2 - It's not true at all; 3- Equally true and not true; 4 - Generally true. 5. Totally true) responded how much the following claims are true for them

### Teaching strategies involving students

| notations | statement |
|---|---|
| s1 | You provide feedback to students about test solutions, tasks, and ongoing work. |
| s2 | You provide clear information to students on how to evaluate the course they attend. |
| s3 | You give students clear instructions on how to prepare for the next hour. |
| s4 | You give students homework, short-term assignments, an obligation to read something or some other form of preparation for the coming time. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| s1 | 0 | 1 | 0 | 9 | 21 |
| s2 | 1 | 0 | 0 | 3 | 27 |
| s3 | 2 | 1 | 4 | 9 | 15 |
| s4 | 1 | 2 | 6 | 16 | 6 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mod | mean | median | mod | mean | median | mod |
| s1 | 4.613 | 5 | 5 | 4.667 | 5 | 5 | 4.579 | 5 | 5 |
| s2 | 4.774 | 5 | 5 | 4.917 | 5 | 5 | 4.684 | 5 | 5 |
| s3 | 4.097 | 4 | 5 | 4.25 | 4 | 4 | 4 | 5 | 5 |
| s4 | 3.774 | 4 | 4 | 3.583 | 4 | 4 | 3.895 | 4 | 4 |

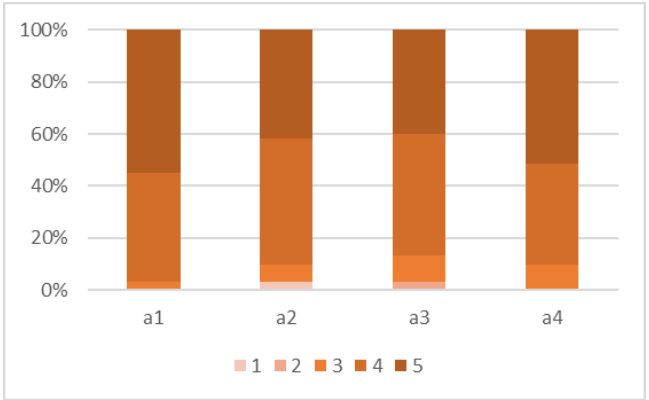
Mean response values of the respondents

CONCLUSION: All the teachers assessed with high-grade their educational strategies about involving students. About 90% of them provide clear information to students on how to evaluate the course, the truthfulness of the claim s1 is very good, too, while the smallest is number of teachers (younger as well as older) who give students homework, short-term assignments or some other form of preparation for the coming time.

## Intellectual engagement and impact on learning

| notations | statement |
|---|---|
| a1 | You motivate and encourage students to develop new ideas and find creative solutions to problems during learning. |
| a2 | You motivate students to seek more solutions to the same problem and compare them. |
| a3 | Usually, you initiate a discussion on classes, about solving complex problems. |
| a4 | You ask students to explain their ideas. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| a1 | 0 | 0 | 1 | 13 | 17 |
| a2 | 1 | 0 | 2 | 15 | 13 |
| a3 | 0 | 1 | 3 | 14 | 12 |
| a4 | 0 | 0 | 3 | 12 | 16 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| a1 | 4.516 | 5 | 5 | 4.417 | 4 | 4 | 4.579 | 5 | 5 |
| a2 | 4.258 | 4 | 4 | 4.333 | 4 | 4 | 4.211 | 4 | 5 |
| a3 | 4.233 | 4 | 4 | 4.25 | 4 | 4 | 4.222 | 4 | |
| a4 | 4.419 | 5 | 5 | 4.667 | 5 | 5 | 4.263 | 4 | 4 |

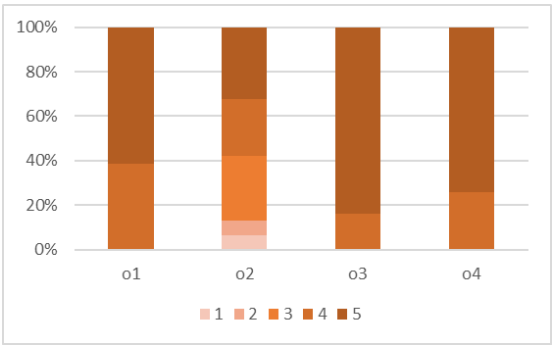
Mean response values of the respondents

CONCLUSION: The respondents rated all the claims from this group with very high grades, which means that they agree with all the claims.

**Relationship: teacher-student**

| notations | statement |
|---|---|
| o1 | Students with you communicate openly and freely. |
| o2 | You are open to various forms of electronic communication through social networks (Facebook, Twitter, etc.). |
| o3 | Relate to the students with respect. |
| o4 | You are communicating with students with a smile and a warm and friendly tone. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| o1 | 0 | 0 | 0 | 12 | 19 |
| o2 | 2 | 2 | 9 | 8 | 10 |
| o3 | 0 | 0 | 0 | 5 | 26 |
| o4 | 0 | 0 | 0 | 8 | 23 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| o1 | 4.613 | 5 | 5 | 4.667 | 5 | 5 | 4.579 | 5 | 5 |
| o2 | 3.71 | 4 | | 3.75 | 3.5 | 3 | 3.684 | 4 | 4 |
| o3 | 4.839 | 5 | 5 | 5 | 5 | 5 | 4.737 | 5 | 5 |
| o4 | 4.742 | 5 | 5 | 4.75 | 5 | 5 | 4.737 | 5 | 5 |

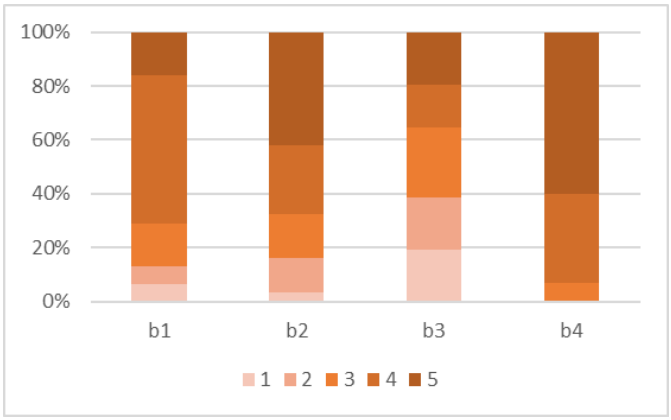
Mean response values of the respondents

CONCLUSION: The responses show that the teachers highly estimate their relations to students with respect, thy communicate with students with smile and friendly tone, while the less number is open for communication through social networks.

## Cooperation

| notations | statement |
|---|---|
| b1 | You give students group assignments that they need to finish at class or at home. |
| b2 | You motivate students to share their knowledge and help other students during classes or during the preparation of the exam. |
| b3 | Use collaborative software in communicating with students (Google Docs, Wikis, etc.). |
| b4 | You expect students to engage in discussion and express their opinion. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| b1 | 2 | 2 | 5 | 17 | 5 |
| b2 | 1 | 4 | 5 | 8 | 13 |
| b3 | 6 | 6 | 8 | 5 | 6 |
| b4 | 0 | 0 | 2 | 10 | 18 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| b1 | 3.677 | 4 | 4 | 3.333 | 3.5 | 4 | 3.895 | 4 | 4 |
| b2 | 3.903 | 4 | 5 | 3.417 | 3.5 | | 4.211 | 5 | 5 |
| b3 | 2.968 | 3 | 3 | 2.917 | 2.5 | | 3 | 3 | 3 |
| b4 | 4.533 | 5 | 5 | 4.417 | 4.5 | | 4.611 | 5 | 5 |

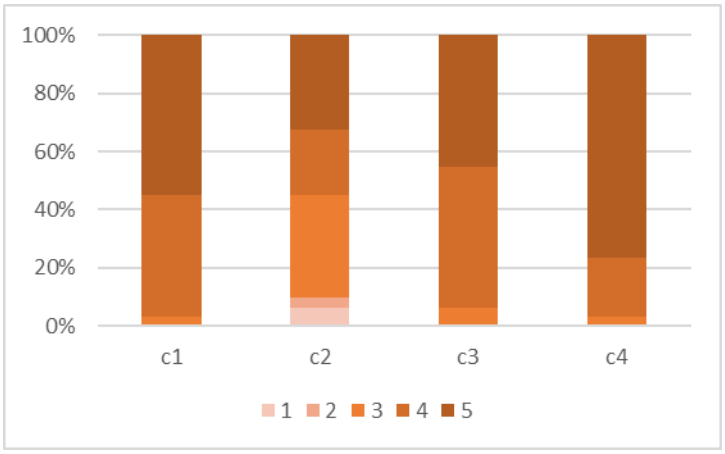
Mean response values of the respondents

CONCLUSION: In the group of claims on cooperation the teachers very poorly use collaborative software in communication with students. About all demands both younger and older respondents have almost the same assessment.

## Student-centered teaching and learning

| notations | statement |
|---|---|
| c1 | You are ready to make certain changes to the contents of your course, to accommodate it to the needs of students. |
| c2 | You respect the priorities and wishes of the students by giving them individual tasks. |
| c3 | Link the contents of your courses with previous knowledge and experience of students. |
| c4 | You are interested in the opinions of students. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| c1 | 0 | 0 | 1 | 13 | 17 |
| c2 | 2 | 1 | 11 | 7 | 10 |
| c3 | 0 | 0 | 2 | 15 | 14 |
| c4 | 0 | 0 | 1 | 6 | 23 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| c1 | 4.516 | 5 | 5 | 4.417 | 4.5 | | 4.579 | 5 | 5 |
| c2 | 3.71 | 4 | 3 | 3.417 | 3 | 3 | 3.895 | 4 | 5 |
| c3 | 4.387 | 4 | 4 | 4.25 | 4 | 4 | 4.474 | 5 | 5 |
| c4 | 4.733 | 5 | 5 | 4.545 | 5 | 5 | 4.842 | 5 | 5 |

Mean response values of the respondents

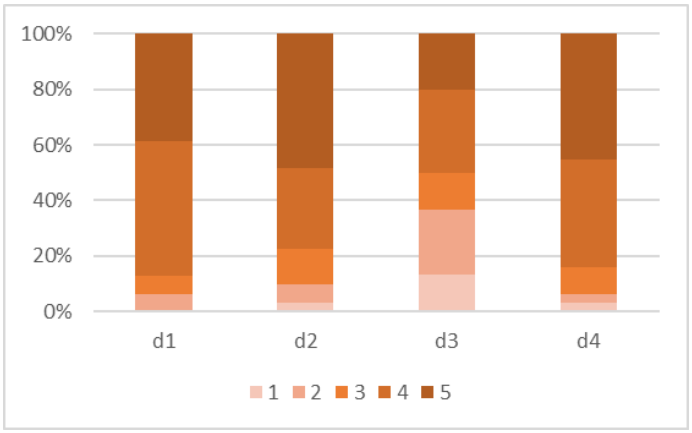
CONCLUSION: Teachers estimate that they are oriented to student-centered teaching and learning. They are very interested in students' opinion and take care of students' wishes and priorities to improve teaching process (the average for all claims is greater than 3.7). Students assessments of truthfulness of these statements are on the lower level and it would be useful to

find deeper reasons for this disagreement.

## Enthusiasm and way of teaching

| notations | statement |
|---|---|
| d1 | You change teaching methods to maintain students' interest. |
| d2 | You use electronic books, presentations, video clips, movies, and more. at their classes. |
| d3 | You use work in pairs, group work, workshops and other techniques to improve interaction during classes. |
| d4 | You motivate students to search for new learning resources beyond required materials and critically assess their reliability. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| d1 | 0 | 2 | 2 | 15 | 12 |
| d2 | 1 | 2 | 4 | 9 | 15 |
| d3 | 4 | 7 | 4 | 9 | 6 |
| d4 | 1 | 1 | 3 | 12 | 14 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| d1 | 4.194 | 4 | 4 | 4.083 | 4 | 4 | 4.263 | 4 | 5 |
| d2 | 4.129 | 4 | 5 | 3.333 | 3.5 | 4 | 4.632 | 5 | 5 |
| d3 | 3.2 | 3.5 | 4 | 2.833 | 2.5 | 2 | 3.444 | 4 | 4 |
| d4 | 4.194 | 4 | 5 | 4 | 4 | 4 | 4.316 | 5 | 5 |

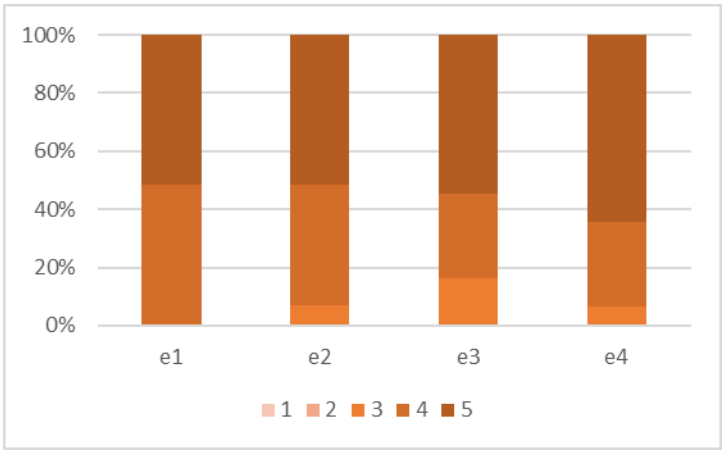
Mean response values of the respondents

CONCLUSION: Less than 50% of teachers estimate the statement d3 that refers to the work in pairs or groups, workshops and other techniques during classes with highest level marks. Majority of teachers (two-third of them) stated that in general they are in general or completely ready to adopt teaching methods to maintain students' interest adapt methods and type of work to students while 90% of respondents consider that they motivate students for active learning.

## Structure

| Notation | Statement |
|---|---|
| e1 | During the lessons you summarize the material and highlight the most important parts. |
| e2 | During the lessons you adjust the time of instruction and manage the time of the organization of the classes well. |
| e3 | Organize and structure teaching materials |
| e4 | You make sure that your classes are well organized. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| e1 | 0 | 0 | 0 | 15 | 16 |
| e2 | 0 | 0 | 2 | 12 | 15 |
| e3 | 0 | 0 | 5 | 9 | 17 |
| e4 | 0 | 0 | 2 | 9 | 20 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| e1 | 4.516 | 5 | | 4.333 | 4 | 4 | 4.632 | 5 | 5 |
| e2 | 4.448 | 5 | 5 | 4.5 | 4.5 | 4 | 4.412 | 5 | 5 |
| e3 | 4.387 | 5 | 5 | 4.333 | 4.5 | 5 | 4.421 | 5 | 5 |
| e4 | 4.581 | 5 | 5 | 4.417 | 4 | 4 | 4.684 | 5 | 5 |

Mean response values of the respondents

CONCLUSION: All the statements considering the structure of classes and teaching materials are rated high, especially by older respondents, while about 50% of students stated that majority of teachers practice the activities mentioned in the above statements. Nevertheless, a significant number of students chose the option *A few teachers* which indicates that there is space for strengthening teaching competences for a large number of teachers.

# Report on the Survey of Teacher Attitudes at the University of Belgrade

## Structure of the sample

The survey was filled in by 57 teachers, 65.45% of whom were women and 34.55% men. Teachers from three areas were present in the sample in the following way: computer science (2), physics (5) and biology (50).

The survey was conducted electronically during April 2019.

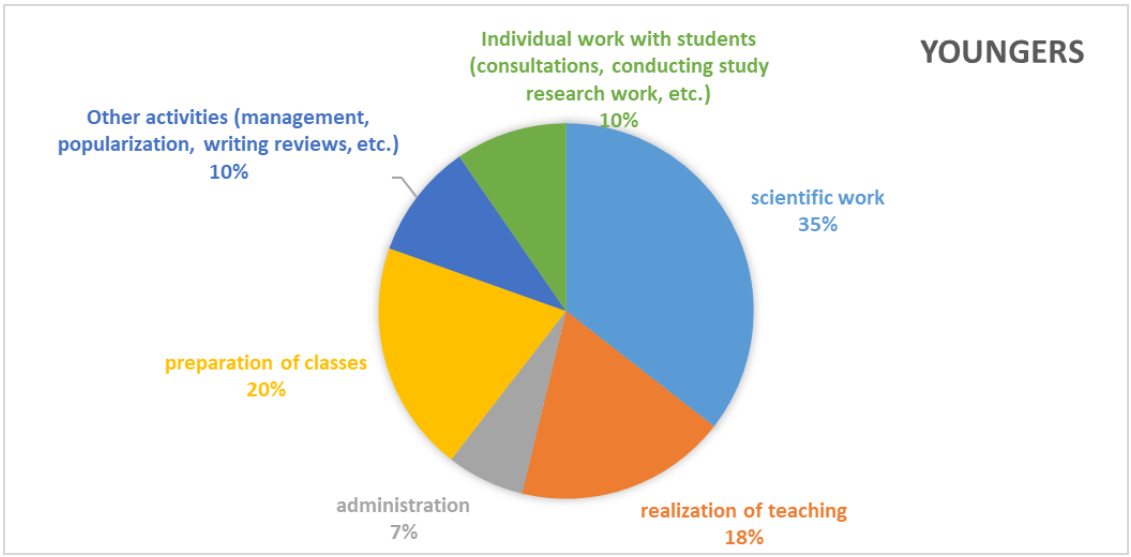
## Teaching experience at the university

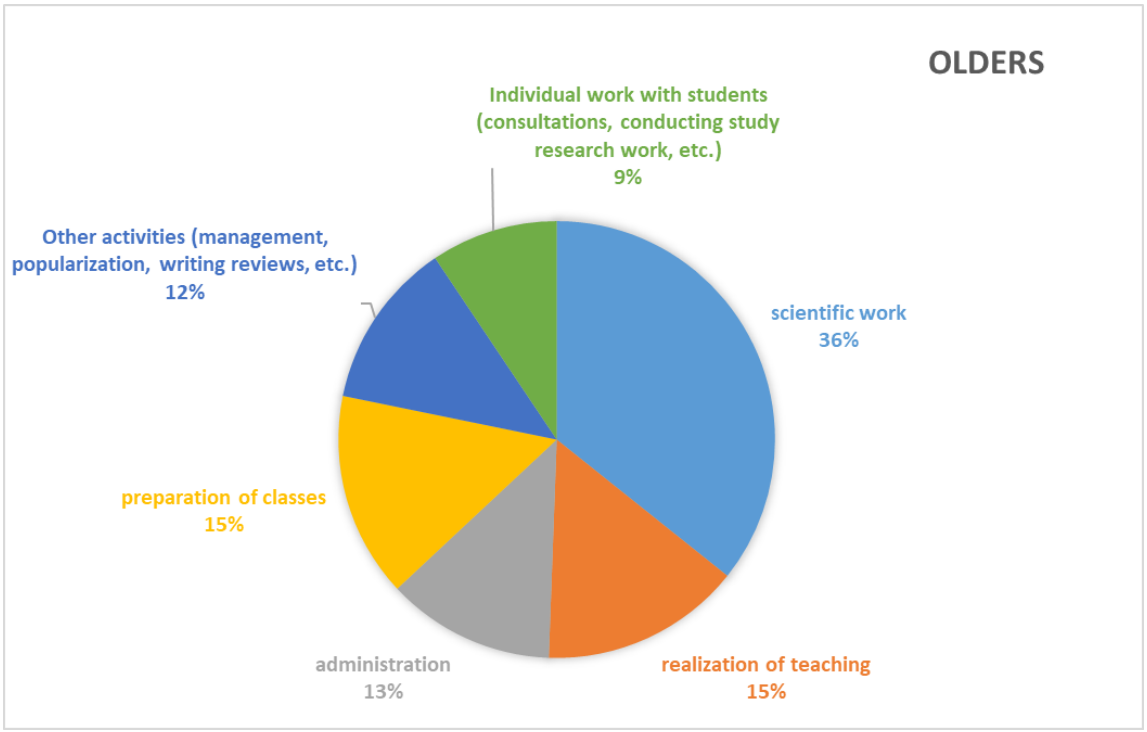
The average number of years of teaching experience is 17.04 years (the standard deviation is 10.1 years). The shortest teaching experience in the sample is 1.5 year, while the longest teaching experience is 40 years. In the further report, we will consider teachers and associates whose work experience is up to 12 years under the younger teaching staff, while older teachers will consider teachers with experience over 12 years. Translated to the age of the respondents, we can identify 12 years of experience with 35 years of age.

## Evaluation of weekly engagement

Work at the university allows for a significant individual distribution of time. For these reasons, teachers / associates filled out how many hours of work were active during the week and how it was arranged. Average respondents said they spend 49.43 hours of work on different activities (with a standard deviation of 13.43). Operating hours vary from 15 hours to 88 hours. The amount of time spent in the week on individual activities is given in Table 1 and Figure 1.

| activity | average number of hours all | average number of hours-youngers | average number of hours - olders | p-value | significance |
|---|---|---|---|---|---|
| scientific work | **17.80** (5.06) | 17.35 (5.59) | 18.13 (4.70) | 0.580 | NO |
| realization of teaching | **8.13** (4.90) | 8.91 (5.57) | 7.54 (4.34) | 0.316 | NO |
| administration | **5.03** (3.97) | 3.28 (2.31) | 6.32 (4.45) | 0.004 | **YES** |
| preparation of classes | **8.56** (5.03) | 9.73 (6.27) | 7.70 (3.79) | 0.153 | NO |
| Other activities (management, popularization, writing reviews, etc.) | **5.71** (4.74) | 4.86 (5.04) | 6.29 (4.51) | 0.289 | NO |
| Individual work with students (consultations, conducting study research work, etc.) | **4.74** (3.47) | 4.70 (3.61) | 4.77 (3.41) | 0.935 | NO |
| IN TOTAL | **49.43** (13.43) | 47.98 (13.16) | 50.52 (13.74) | 0.4974 | NO |

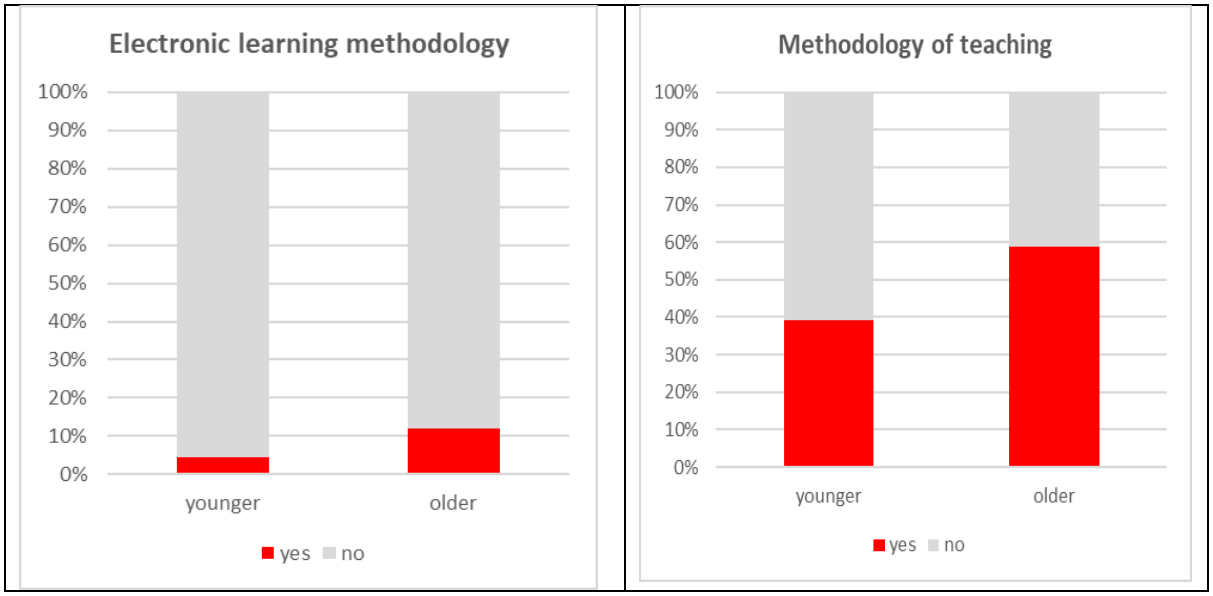



## Courses in methodology

| courses | in total | younger | older |
|---|---|---|---|
| Electronic learning methodology | 5 (8.93%) | 1 (4.35%) | 4 (12.12%) |
| Methodology of teaching | 29 (50.88%) | 9 (39.13%) | 20 (58.82%) |

CONCLUSION: Around 50% of teachers have experience in Methodology of teaching, with the prevalence of older, but only 9% of them have experience in Electronic learning methodology (once again, the older teachers have prevalence);




Since only 5 respondents attended the e-learning methodology, in the following table we list which areas were listened to:

| Areas | number of respondents |
|---|---|
| Electronic publishing (Latex, HTML, XML, PDF, etc.) | 5=3+2 [(1)] |
| Online Technology in Teaching | 8=4+4 |
| Open source software (MOODLE, Python, GeoGebra, MOOC, etc.) | 5=4+1 |

[(1)] We note that there are cases and there are respondents who have declared that they have not been listening to the method of electronic learning but have listened to some of the contents listed in the previous table. The first one is the number of respondents who have attended the method of electronic learning, while the second one is the number of respondents who did not attend

At Question: *Did you give at least one lecture in English. If yes, specify when and where*, less than 1/2, or 26 respondents answered yes.

At Question: *Have you prepared at least one lecture or part of the lecture on the electronic platform. If yes, specify on which platform* the situation is reversed, 8 respondents answered yes (and they used the Moodle platform or Google Classroom), while most of the respondents (84%) had no experience in this area.

| Question | younger | older | IN TOTAL |
|---|---|---|---|
| Have you participated in a professional conference whose emphasis was on applying innovative teaching technologies? | 2 (8.70%) | 7 (20.59%) | 9 (15.79%) |
| Have you ever discussed with students about the impact of using modern technologies on the quality of teaching and lerning? | 14 (60.87%) | 16 (48.48%) | 30 (53.57%) |

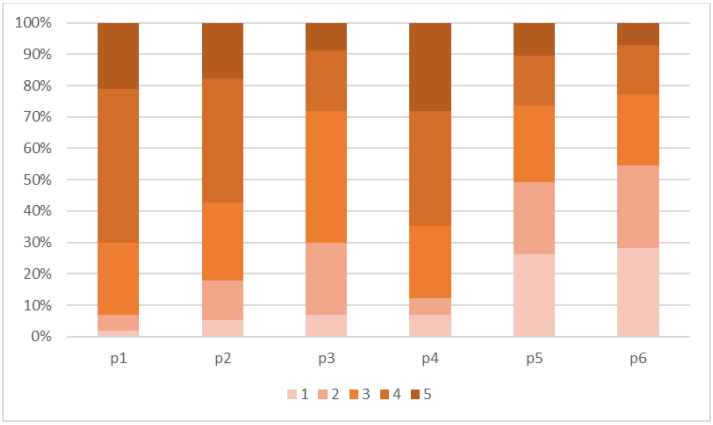
Conclusion: Around 50% of teachers have experience in giving at least one lecture in English, while 84% of them have no experience in using electronic platforms;

## Attitudes on the use of ICT in teaching

Respondents answered how much the following claims are true for them on the five-level Lihter scale (1- It's not true at all; 2 - It's not true in general; 3- Equally true and not true; 4 - Generally true. 5. Totally true).

| notation | Statements |
|---|---|
| p1 | The use of new technologies in teaching is very important for the quality of the lecture. |
| p2 | Group work, multimedia presentations and modern software capabilities save valuable teachers time. |
| p3 | Student presentations and discussions save time for the teacher. |
| p4 | You want to improve your teaching skills using information technology, because it would help you prepare lessons easier. |
| p5 | You want to improve your teaching skills using information technology, because it will bring you more respect from students. |
| p6 | You want to improve your teaching skills using information technology, because it will bring you more respect from colleagues |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| p1 | 1 | 3 | 13 | 28 | 12 |
| p2 | 3 | 7 | 14 | 22 | 10 |
| p3 | 4 | 13 | 24 | 11 | 5 |
| p4 | 4 | 3 | 13 | 21 | 16 |
| p5 | 15 | 13 | 14 | 9 | 6 |
| p6 | 16 | 15 | 13 | 9 | 4 |




Distribution of the response to the six observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mode | mean | median | mode | mean | median | mode |
| p1 | **3.825** | 4 | 4 | 3.957 | 4 | 4 | 3.735 | 4 | 4 |
| p2 | **3.518** | 4 | 4 | 3.682 | 4 | 4 | 3.412 | 4 | 4 |
| p3 | **3** | 3 | 3 | 3.087 | 3 | 3 | 2.941 | 3 | 3 |
| p4 | **3.737** | 4 | 4 | 3.913 | 4 | 4 | 3.618 | 4 | 4 |
| p5 | **2.614** | 3 | 1 | 2.696 | 2 | 2 | 2.559 | 3 | 3 |
| p6 | **2.474** | 2 | 1 | 2.435 | 2 | | 2.5 | 2.5 | 3 |

Mean response values of the respondents

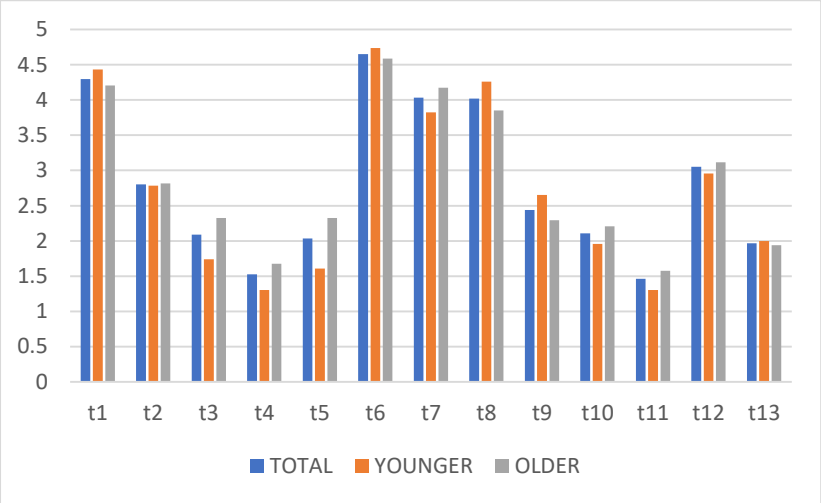
CONCLUSION: The majority of teachers agreed that use of new technologies in teaching has clear benefits for quality of the lecture and that group work, multimedia presentations and modern software capabilities may save valuable teachers time. Also, majority of teachers expressed wish to improve their teaching skills by using information technology;

## SELF ASSESSMENTS OF ICT COMPETENCES

Respondents assessed their knowledge of ICT on the five-level Lihter scale (1- Not true 2- not true in general 3- neither not true nor true 4-true in general 5-totally true), indicating in what degree they agreed with the following claims

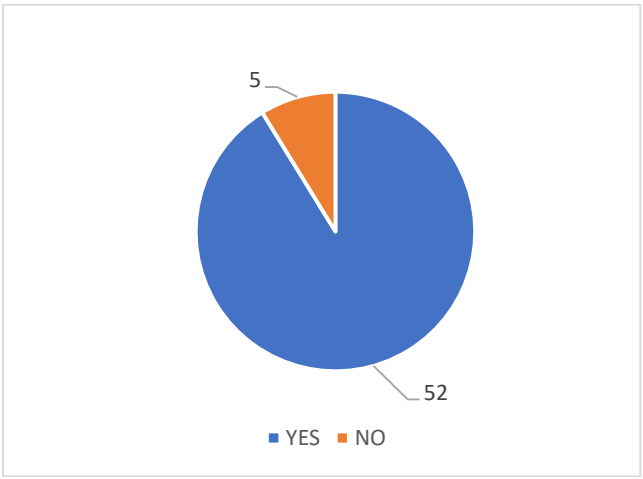
| notation | statement |
|---|---|
| t1 | The level of your knowledge and skills in applying Office software package: |
| t2 | Level of your knowledge and skills in applying Open Source software: |
| t3 | Level of your knowledge and skills in implementing Web conferencing software: |
| t4 | Level of Your Skills and Skills in the Application of Leadership Learning Software (LMS): |
| t5 | The level of your knowledge and skills in applying online learning platform: |
| t6 | Use electronic materials (presentations) as teaching materials. |
| t7 | Use electronic books / textbooks as teaching materials. |
| t8 | Use animations / movies as teaching material. |
| t9 | Use forums and other forms of online communication in teaching and learning. |
| t10 | Use online courses as a teaching material. |
| t11 | Use web conferences as a teaching material. |
| t12 | Use databases in teaching and learning. |
| t13 | You are open to communicating with students via social networks (Facebook, Twitter, etc.). |

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mode | mean | median | mode | mean | median | mode |
| t1 | 4.30 | 4 | 4 | 4.43 | 4 | 4 | 4.21 | 4 | 4 |
| t2 | 2.80 | 3 | 2 | 2.78 | 3 | 3 | 2.82 | 2 | 2 |
| t3 | 2.09 | 2 | 1 | 1.74 | 1 | 1 | 2.32 | 2 | 2 |
| t4 | 1.53 | 1 | 1 | 1.30 | 1 | 1 | 1.68 | 1 | 1 |
| t5 | 2.04 | 2 | 1 | 1.61 | 1 | 1 | 2.32 | 2 | |
| t6 | 4.65 | 5 | 5 | 4.74 | 5 | 5 | 4.59 | 5 | 5 |
| t7 | 4.04 | 4 | 5 | 3.83 | 4 | 5 | 4.18 | 4.5 | 5 |
| t8 | 4.02 | 4 | 5 | 4.26 | 5 | 5 | 3.85 | 4 | 5 |
| t9 | 2.44 | 2 | 1 | 2.65 | 2 | 1 | 2.29 | 2 | 1 |
| t10 | 2.11 | 2 | 1 | 1.96 | 1 | 1 | 2.21 | 2 | 1 |
| t11 | 1.46 | 1 | 1 | 1.30 | 1 | 1 | 1.58 | 1 | 1 |
| t12 | 3.05 | 3 | 3 | 2.96 | 3 | 3 | 3.12 | 3 | |
| t13 | 1.96 | 1 | 1 | 2.00 | 1 | 1 | 1.94 | 1 | 1 |




CONCLUSION: It seems that teachers have a good level of knowledge and skills in applying Office software package, and using electronic materials (presentations, books/textbooks, animations/movies, databases) in teaching. As opposite, they have less knowledge and skills in applying Open Source software, Web conferencing software, Leadership Learning Software (LMS), forums or social networks in teaching, and they rarely organized classes in form of online courses or web conferences;

Can you notice the benefits of applying modern technology in teaching and learning?




What are these benefits?

| Benefit | YES | % |
|---|---|---|
| Save time | 23 | 40.35% |
| It facilitates the preparation of classes | 24 | 42.11% |
| Increases students' level of interest | 40 | 70.18% |
| Increases the quality of teaching materials | 35 | 61.40% |
| It makes learning easier | 37 | 64.91% |
| Improves communication between teachers and students | 31 | 54.39% |

CONCLUSION: Teachers clearly notice the benefits of applying modern technology in teaching and learning, especially in categories of increasing students' level of interest, increasing the quality of teaching materials, making learning easier and improving communication with students;

Do you use some free online learning platforms for courses? If your answer is YES, please indicate the platforms you are using.

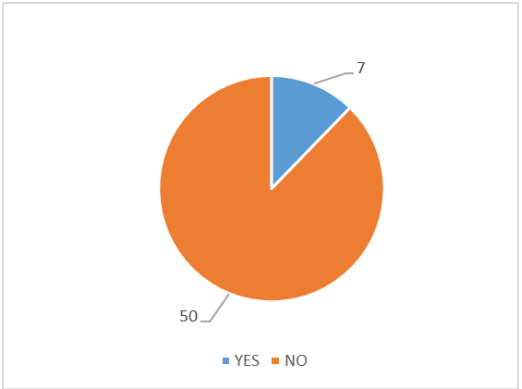
| | | |
|---|---|---|
| Moodle | 2 | 3.51% |
| google classroom | 6 | 10.53% |
| YouTube | 1 | 1.75% |
| PhysioEx | 2 | 3.51% |
| Coursera | 1 | 1.75% |
| No | 45 | 78.95% |

CONCLUSION: 70% of teachers have no previous experience with using online platforms in teaching. For the rest of 30% who have, the dominant platform is Google classroom;

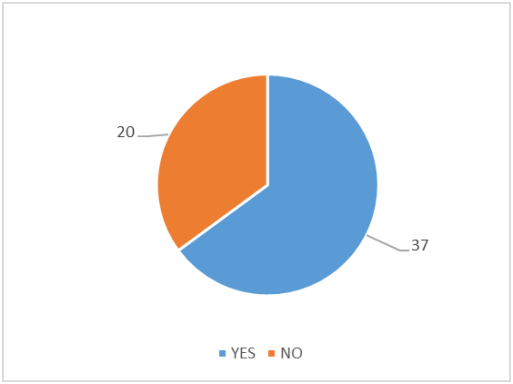
Do you think that using the online learning platform can:

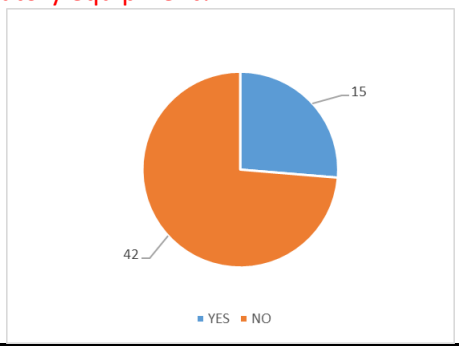
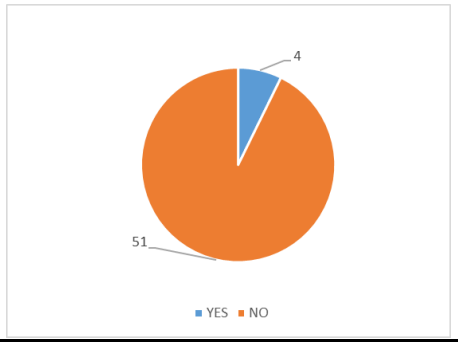
| | YES | % |
|---|---|---|
| Enable students easier and faster access to learning materials | 42 | 73.68% |
| Enable students easier and faster access to relevant information | 35 | 61.40% |
| Allow students access to materials at any time | 43 | 75.44% |
| Contribute to the realization of the active role of students | 33 | 57.89% |
| Contributes to the individualisation of learning | 31 | 54.39% |
| Improves communication between teachers and students | 26 | 45.61% |

Has your institution developed a system for electronic student testing?




Do you think the student self test system has a positive impact on learning success?



| Is your higher education institution able to provide students with high quality and expensive laboratory equipment? | Do your students have the opportunity to participate in experiments from remote locations? |
|---|---|
|  |  |





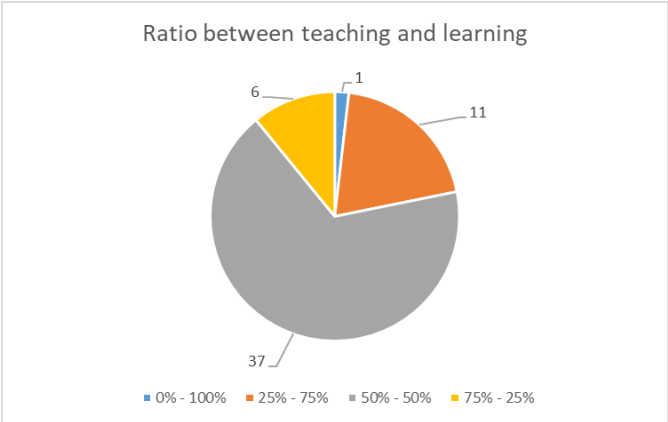
CONCLUSION: Majority of teacher agree that using online learning platform can improve students' competencies, individualization of learning, active role of students and communication between teachers and students

The most important barriers to applying modern teaching technologies in teaching and learning are:

| | YES | % |
|---|---|---|
| Lack of ICT skills | 43 | 75.44% |
| Lack of time | 18 | 31.58% |
| Lack of hardware | 28 | 49.12% |
| Lack of software | 37 | 64.91% |
| Inability to access computers | 17 | 29.82% |

CONCLUSION: Teachers claim lack of institutional support, like are systems for electronic student testing, high quality and expensive laboratory equipment, or possibility for students to remotely participate in experiments. For the majority of teachers, the main obstacle in using modern technologies is their lack of ICT skills (75%), and lack of software (65%) and hardware (49%)

In your opinion, what ratio (in percent) should be between teaching and learning in education to make education the most successful?




The best ratio between teaching and learning which makes education most successfully is 50:50;

# *Pedagogical methods and teaching skills*

Level of skills in English

| | low | middle | high |
|---|---|---|---|
| Listening | 0 | 16 | 41 |
| reading | 0 | 13 | 44 |
| writing | 0 | 29 | 28 |
| talk | 2 | 28 | 27 |

CONCLUSION: Concerning knowledge in English, teachers are better in reading and listening, than writing and speaking;

Have you ever attended a course in one of the listed disciplines during your formal education?

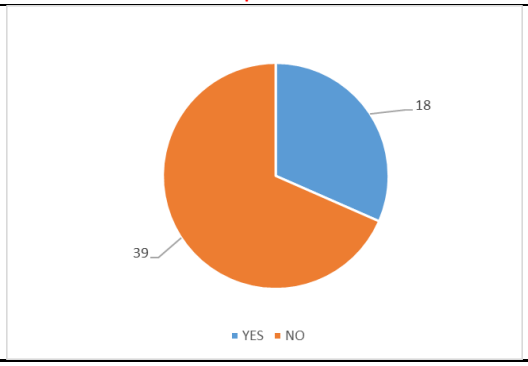
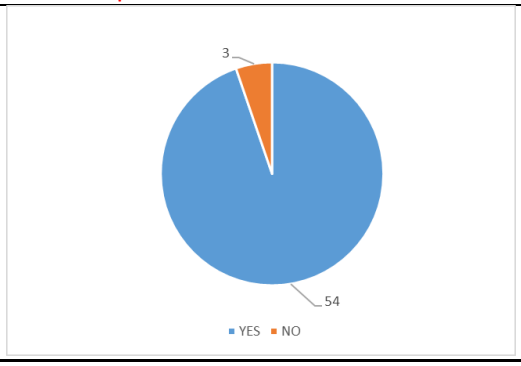
| course | Yes | No |
|---|---|---|
| Pedagogy | 24 | 32 |
| Psychology | 22 | 33 |
| Teaching methodology | 23 | 32 |
| Application of new technologies in teaching | 7 | 46 |
| English language | 43 | 12 |
| You have not attended a course of any of these disciplines | | 28 |

Have you ever held a course or have educated yourself informally (consulting some of the sources: books, articles, online resources, professional organizations, experienced colleagues, mentors, etc.) from one of the above disciplines during your career

| course | DA | NE |
|---|---|---|
| Pedagogy | 9 | 41 |
| Psychology | 13 | 36 |
| Teaching methodology | 19 | 31 |
| Application of new technologies in teaching | 13 | 35 |
| English | 25 | 24 |
| You have not taught or learned a course of any of these disciplines | | 25 |

Do you consider that the teaching skills of university professors are very important for the quality of their classes?

| | |
|---|---|
| I totally agree | 51 |
| I partially agree | 6 |
| I do not agree | 0 |

| Did you participate in a professional conference whose emphasis was on education? | Have you tried to provide feedback from students as part of the institutional evaluation |
|---|---|
|  |  |





What would motivate you to engage in improving your teaching competencies?

| | | |
|---|---|---|
| Get more respect from colleagues or students | 9 | 15.79% |
| Possibility of easier preparation of classes | 16 | 28.07% |
| Achieve better quality of teaching | 49 | 85.96% |
| Attracting more students to elective courses | 30 | 52.63% |
| Getting some financial or material compensation | 12 | 21.05% |
| You are not interested | 4 | 7.02% |

CONCLUSION: The majority of teachers had no experience to be formally or informally educated in PPM or new technologies in teaching;

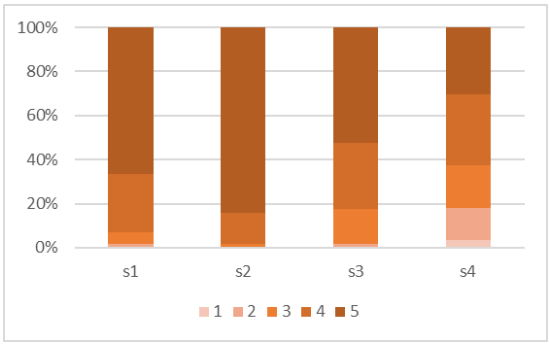
## *Application of educational strategies, English language and technology in teaching*

On the five-level Lihter scale (1- It's not true at all; 2 - It's not true at all; 3- Equally true and not true; 4 - Generally true. 5. Totally true) responded how much the following claims are true for them

### Teaching strategies involving students

| Notation | Statement |
|---|---|
| s1 | You provide feedback to students about test solutions, tasks, and ongoing work. |
| s2 | You provide clear information to students on how to evaluate the course they attend. |
| s3 | You give students clear instructions on how to prepare for the next hour. |
| s4 | You give students homework, short-term assignments, an obligation to read something or some other form of preparation for the coming time. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| s1 | 0 | 1 | 3 | 15 | 38 |
| s2 | 0 | 0 | 1 | 8 | 48 |
| s3 | 0 | 1 | 9 | 17 | 30 |
| s4 | 2 | 8 | 11 | 18 | 17 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mod | mean | median | mod | mean | median | mod |
| s1 | 4.579 | 5 | 5 | 4.565 | 5 | 5 | 4.588 | 5 | 5 |
| s2 | 4.825 | 5 | 5 | 4.913 | 5 | 5 | 4.765 | 5 | 5 |
| s3 | 4.333 | 5 | 5 | 4.652 | 5 | 5 | 4.118 | 4 | 5 |
| s4 | 3.714 | 4 | 4 | 3.957 | 4 | 4 | 3.545 | 4 | 3 |

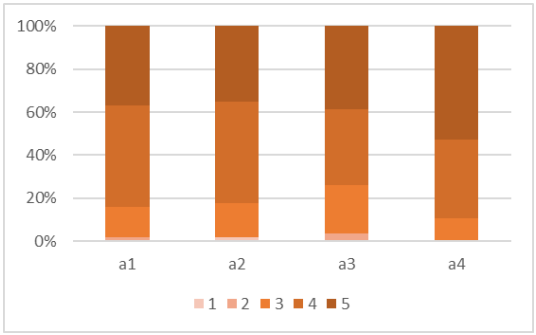
Mean response values of the respondents

CONCLUSION: .....

## Intellectual engagement and impact on learning

| Notation | Statement |
|---|---|
| a1 | You motivate and encourage students to develop new ideas and find creative solutions to problems during learning. |
| a2 | You motivate students to seek more solutions to the same problem and compare them. |
| a3 | Usually, you initiate a discussion on classes, about solving complex problems. |
| a4 | You ask students to explain their ideas. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| a1 | 0 | 1 | 8 | 27 | 21 |
| a2 | 1 | 0 | 9 | 27 | 20 |
| a3 | 0 | 2 | 13 | 20 | 22 |
| a4 | 0 | 0 | 6 | 21 | 30 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| a1 | 4.193 | 4 | 4 | 4.13 | 4 | 4 | 4.235 | 4 | 5 |
| a2 | 4.14 | 4 | 4 | 4.043 | 4 | 4 | 4.206 | 4 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| a3 | 4.088 | 4 | 5 | 4.087 | 4 | | 4.088 | 4 | |
| a4 | 4.421 | 5 | 5 | 4.565 | 5 | 5 | 4.324 | 4 | 5 |

Mean response values of the respondents

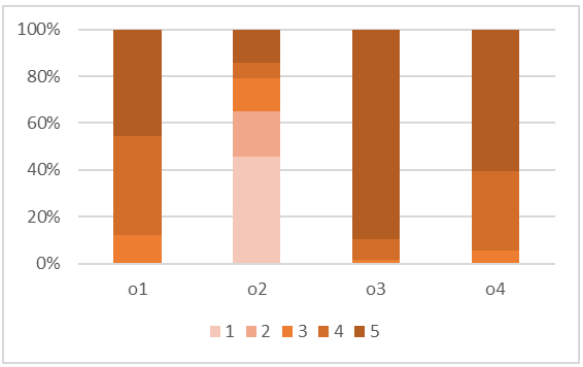
CONCLUSION: .....

.

## Relationship: teacher-student

| oznaka | tvrdnja |
|---|---|
| o1 | Students with you communicate openly and freely. |
| o2 | You are open to various forms of electronic communication through social networks (Facebook, Twitter, etc.). |
| o3 | Relate to the students with respect. |
| o4 | You are communicating with students with a smile and a warm and friendly tone. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| o1 | 0 | 0 | 7 | 24 | 26 |
| o2 | 26 | 11 | 8 | 4 | 8 |
| o3 | 0 | 0 | 1 | 5 | 51 |
| o4 | 0 | 0 | 3 | 19 | 34 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| o1 | 4.333 | 4 | 5 | 4.348 | 4 | 4 | 4.324 | 4 | 5 |
| o2 | 2.246 | 2 | 1 | 2.304 | 2 | 1 | 2.206 | 2 | 1 |
| o3 | 4.877 | 5 | 5 | 4.957 | 5 | 5 | 4.824 | 5 | 5 |
| o4 | 4.554 | 5 | 5 | 4.545 | 5 | 5 | 4.559 | 5 | 5 |

Mean response values of the respondents

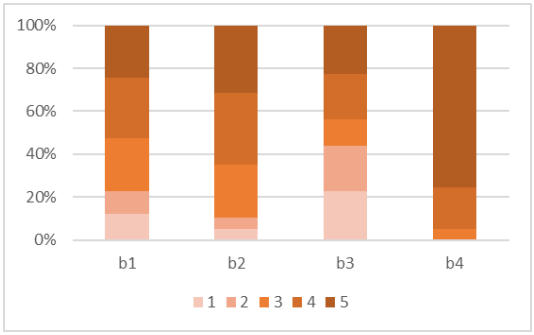
CONCLUSION: ....

## Cooperation

| notations | statement |
|---|---|
| b1 | You give students group assignments that they need to finish at class or at home. |
| b2 | You motivate students to share their knowledge and help other students during classes or during the preparation of the exam. |
| b3 | Use collaborative software in communicating with students (Google Docs, Wikis, etc.). |

| | |
|---|---|
| b4 | You expect students to engage in discussion and express their opinion. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| b1 | 7 | 6 | 14 | 16 | 14 |
| b2 | 3 | 3 | 14 | 19 | 18 |
| b3 | 13 | 12 | 7 | 12 | 13 |
| b4 | 0 | 0 | 3 | 11 | 43 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| b1 | 3.421 | 4 | 4 | 3.435 | 4 | 4 | 3.412 | 3 | 3 |
| b2 | 3.807 | 4 | 4 | 3.913 | 4 | 4 | 3.735 | 4 | |
| b3 | 3 | 3 | 1 | 3.174 | 3 | | 2.882 | 2.5 | 2 |
| b4 | 4.702 | 5 | 5 | 4.696 | 5 | 5 | 4.706 | 5 | 5 |

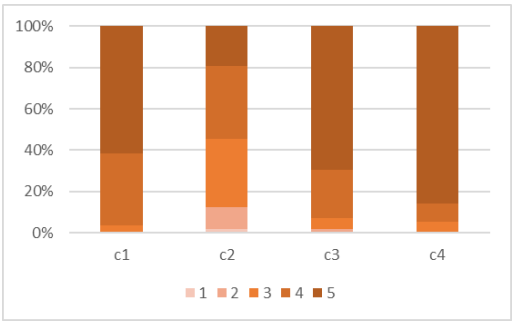
Mean response values of the respondents

CONCLUSION: .....

## Student-centered teaching and learning

| notation | statement |
|---|---|
| c1 | You are ready to make certain changes to the contents of your course, to accommodate it to the needs of students. |
| c2 | You respect the priorities and wishes of the students by giving them individual tasks. |
| c3 | Link the contents of your courses with previous knowledge and experience of students. |
| c4 | You are interested in the opinions of students. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| c1 | 0 | 0 | 2 | 20 | 35 |
| c2 | 1 | 6 | 19 | 20 | 11 |
| c3 | 0 | 1 | 3 | 13 | 39 |
| c4 | 0 | 0 | 3 | 5 | 48 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| c1 | 4.579 | 5 | 5 | 4.478 | 5 | 5 | 4.647 | 5 | 5 |
| c2 | 3.596 | 4 | 4 | 3.478 | 4 | 4 | 3.676 | 4 | |
| c3 | 4.607 | 5 | 5 | 4.522 | 5 | 5 | 4.667 | 5 | 5 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| c4 | 4.804 | 5 | 5 | 4.864 | 5 | 5 | 4.765 | 5 | 5 |

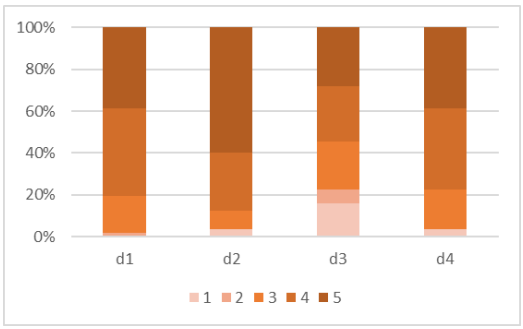
Mean response values of the respondents

CONCLUSION: .....

## Enthusiasm and way of teaching

| Notation | Statement |
|---|---|
| d1 | You change teaching methods to maintain students' interest. |
| d2 | You use electronic books, presentations, video clips, movies, and more. at their classes. |
| d3 | You use work in pairs, group work, workshops and other techniques to improve interaction during classes. |
| d4 | You motivate students to search for new learning resources beyond required materials and critically assess their reliability. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| d1 | 0 | 1 | 10 | 24 | 22 |
| d2 | 2 | 0 | 5 | 16 | 34 |
| d3 | 9 | 4 | 13 | 15 | 16 |
| d4 | 2 | 0 | 11 | 22 | 22 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| d1 | 4.175 | 4 | 4 | 4.043 | 4 | 4 | 4.265 | 4 | |
| d2 | 4.404 | 5 | 5 | 4.261 | 5 | 5 | 4.5 | 5 | 5 |
| d3 | 3.439 | 4 | | 3.522 | 4 | 4 | 3.382 | 3.5 | 5 |
| d4 | 4.088 | 4 | 4 | 4 | 4 | 4 | 4.147 | 4 | 5 |

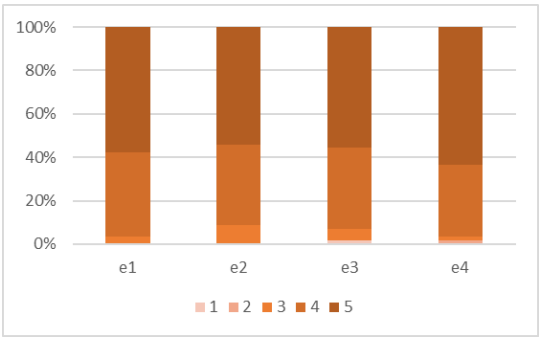
Mean response values of the respondents

CONCLUSION: ....

## Structure

| Notation | Statement |
|---|---|
| e1 | During the lessons you summarize the material and highlight the most important parts. |
| e2 | During the lessons you adjust the time of instruction and manage the time of the organization of the classes well. |
| e3 | Organize and structure teaching materials |
| e4 | You make sure that your classes are well organized. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| e1 | 0 | 0 | 2 | 22 | 33 |
| e2 | 0 | 0 | 5 | 21 | 31 |
| e3 | 1 | 0 | 3 | 21 | 31 |
| e4 | 0 | 1 | 1 | 18 | 35 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| e1 | 4.544 | 5 | 5 | 4.565 | 5 | 5 | 4.529 | 5 | 5 |
| e2 | 4.456 | 5 | 5 | 4.522 | 5 | 5 | 4.412 | 5 | 5 |
| e3 | 4.446 | 5 | 5 | 4.478 | 5 | 5 | 4.424 | 5 | 5 |
| e4 | 4.582 | 5 | 5 | 4.739 | 5 | 5 | 4.469 | 5 | 5 |

Mean response values of the respondents

CONCLUSION: These answers show that there is a both a great need and a space for the development of pedagogical competences among teachers and improvement of their work

# Report on the Survey of Teacher Attitudes at the University of Novi Sad

## Structure of the sample

The survey was filled in by 30 teachers, 22 of whom were women (73.3%) and 8 men (26.7%). Teachers from six areas were present in the sample in the following way: mathematics (13), geography (6), computer science (4), physics (3), chemistry (2) and biology (2).

The survey was conducted electronically during April 2019.

## Teaching experience at the university

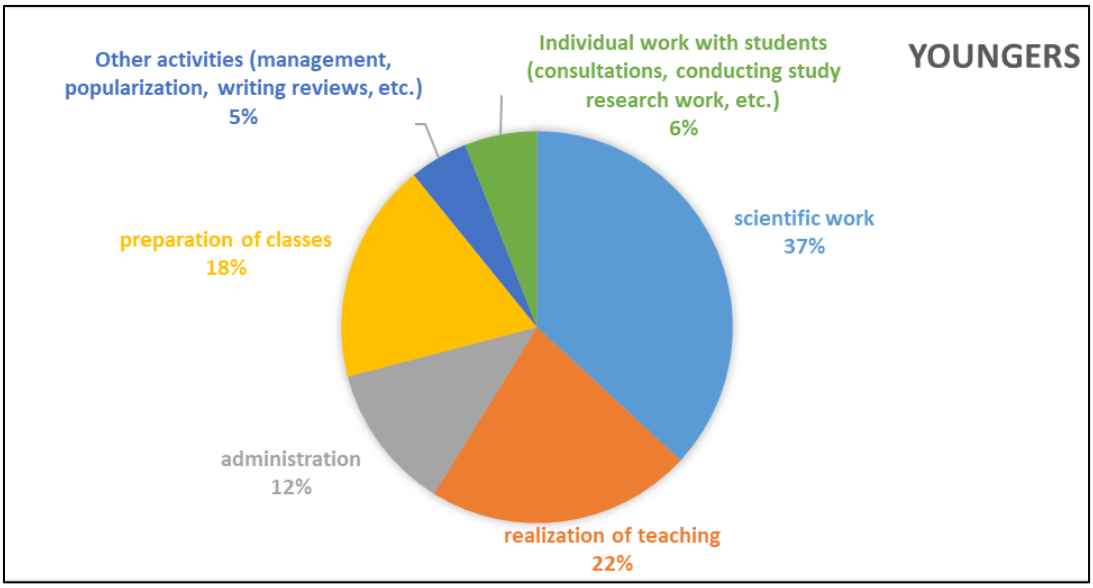
The average number of years of teaching experience is 12.87 years (the standard deviation is 9.7 years). The shortest teaching experience in the sample is 1 year, while the longest teaching experience is 30 years. In the further report, we will consider teachers and associates whose work experience is up to 12 years under the younger teaching staff, while older teachers will consider teachers with experience over 12 years. Translated to the age of the respondents, we can identify 12 years of experience with 35 years of age.

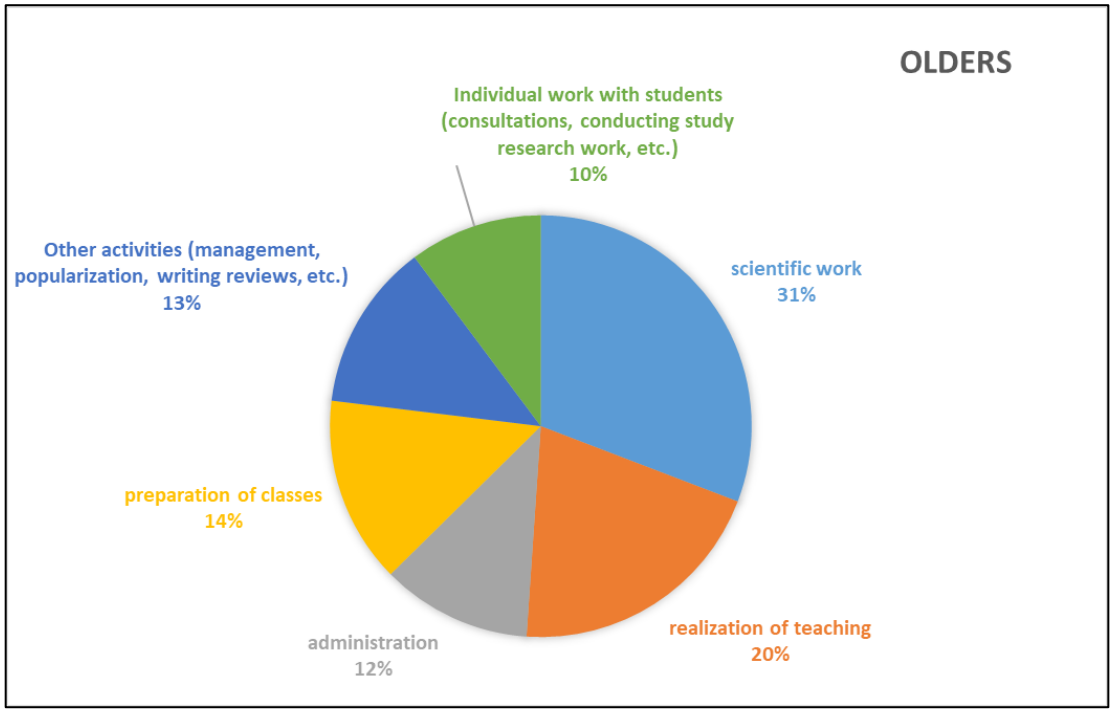
## Evaluation of weekly engagement

Work at the university allows for a significant individual distribution of time. For these reasons, teachers / associates filled out how many hours of work were active during the week and how it was arranged. Average respondents said they spend 43.4 hours of work on different activities (with a

standard deviation of 6.48). operating hours vary from 30 hours to 56 hours. The amount of time spent in the week on individual activities is given in Table 1 and Figure 1.

| activity | average number of hours all | average number of hours-youngers | average number of hours - olders | p-value | significance |
|---|---|---|---|---|---|
| scientific work | **14.87** (6.11) | 16.19 (5.75) | 13.36 (6.36) | 0.211 | NO |
| realization of teaching | **9.23** (4.23) | 9.63 (4.54) | 8.79 (3.96) | 0.597 | NO |
| administration | **5.17** (4.86) | 5.31 (5.99) | 5.00 (3.21) | 0.867 | NO |
| preparation of classes | **7.17** (4.07) | 8.00 (4.62) | 6.21 (3.26) | 0.238 | NO |
| Other activities (management, popularization, writing reviews, etc.) | **3.79** (2.88) | 2.13 (1.25) | 5.57 (3.11) | 0.0005 | **YES** |
| Individual work with students (consultations, conducting study research work, etc.) | **3.47** (1.89) | 2.63 (1.31) | 4.43 (2.03) | 0.006 | **YES** |
| IN TOTAL | **43.40** (6.48) | 43.75 (5.98) | 43.00 (7.21) | 0.758 | NO |

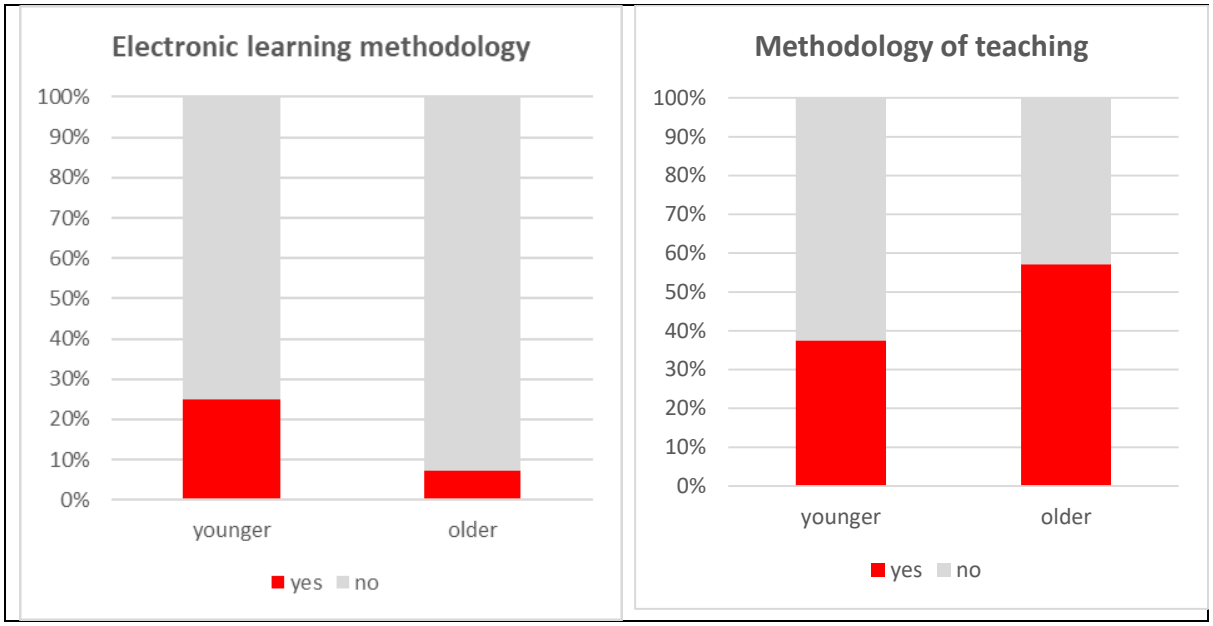





## Courses in methodology

| courses | in total | younger | older |
|---|---|---|---|
| Electronic learning methodology | 5 (16.67%) | 4 (25.00%) | 1 (7.14%) |
| Methodology of teaching | 14 (46.67%) | 6 (37.50%) | 8 (57.14%) |

Both courses were attended by 3 teachers, 2 younger and 1 older.




Since only 5 respondents attended the e-learning methodology, in the following table we list which areas were listened to:

| Areas | number of respondents |
|---|---|
| Electronic publishing (Latex, HTML, XML, PDF, etc.) | 5=4+1[(1)] |
| Online Technology in Teaching | 3=1+2 |
| Open source software (MOODLE, Python, GeoGebra, MOOC, etc.) | 8=4+4 |

[(1)] We note that there are cases and there are respondents who have declared that they have not been listening to the method of electronic learning but have listened to some of the contents listed in the previous table. The first one is the number of respondents who have attended the method of electronic learning, while the second one is the number of respondents who did not attend

At Question: *Did you give at least one lecture in English. If yes, specify when and where*, less than 1/3, or 9 respondents, stated that they did not give any lecture, while 21 teachers / associates held a lecture at a foreign university, or at conferences, or realized teaching at PMF in English language. So, it can be concluded that 70% of the respondents had the experience of using English in their profession.

At Question: *Have you prepared at least one lecture or part of the lecture on the electronic platform. If yes, specify on which platform* the situation is reversed, 9 respondents answered yes (and they used the Moodle platform), while most of the respondents (70%) had no experience in this area. Please note that some teachers / associates listed the use of LATEX tex processors as an electronic platform.

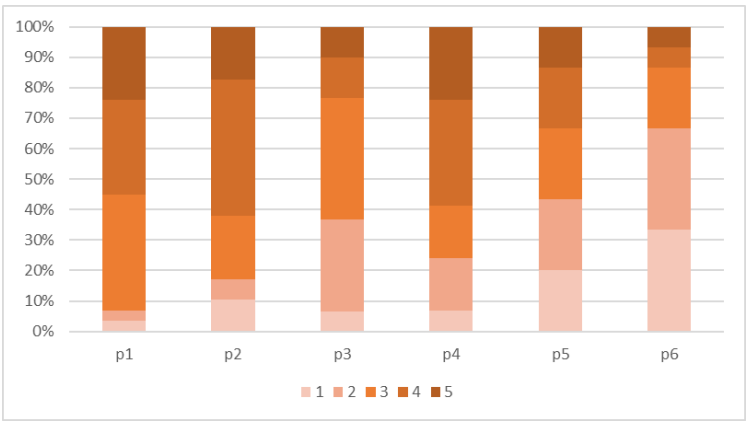
| Question | younger | older | IN TOTAL |
|---|---|---|---|
| Have you participated in a professional conference whose emphasis was on applying innovative teaching technologies? | 1 (6.67%) | 5 (35.71%) | 6 (20.69%) |
| Have you ever discussed with students about the impact of using modern technologies on the quality of teaching and lerning? | 6 (37.50%) | 8 (57.14%) | 14 (46.67%) |

## Attitudes on the use of ICT in teaching

Respondents answered how much the following claims are true for them on the five-level Lihter scale (1- It's not true at all; 2 - It's not true in general; 3- Equally true and not true; 4 - Generally true. 5. Totally true).

| notation | Statements |
|---|---|
| p1 | The use of new technologies in teaching is very important for the quality of the lecture. |
| p2 | Group work, multimedia presentations and modern software capabilities save valuable teachers time. |
| p3 | Student presentations and discussions save time for the teacher. |
| p4 | You want to improve your teaching skills using information technology, because it would help you prepare lessons easier. |
| p5 | You want to improve your teaching skills using information technology, because it will bring you more respect from students. |
| p6 | You want to improve your teaching skills using information technology, because it will bring you more respect from colleagues |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| p1 | 1 | 1 | 11 | 9 | 7 |
| p2 | 3 | 2 | 6 | 13 | 5 |
| p3 | 2 | 9 | 12 | 4 | 3 |
| p4 | 2 | 5 | 5 | 10 | 7 |
| p5 | 6 | 7 | 7 | 6 | 4 |
| p6 | 10 | 10 | 6 | 2 | 2 |




Distribution of the response to the six observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mode | mean | median | mode | mean | median | mode |
| p1 | **3.69** | 4 | 3 | 3.667 | 4 | 3 | 3.714 | 4 | 3 |
| p2 | **3.517** | 4 | 4 | 3.563 | 4 | 4 | 3.462 | 4 | 4 |
| p3 | **2.9** | 3 | 3 | 3 | 3 | 3 | 2.786 | 2.5 | 2 |
| p4 | **3.517** | 4 | 4 | 3.188 | 3 | 4 | 3.923 | 4 | 4 |
| p5 | **2.833** | 3 | | 2.625 | 3 | 4 | 3.071 | 2.5 | |
| p6 | **2.2** | 2 | | 2 | 2 | | 2.429 | 2 | |

Mean response values of the respondents

CONCLUSION: Respondents gave their opinion on the claims why they want to improve their teaching skills using information technology (claims p4-p6). The results show that the only reason that got the score slightly above 3.5 is that ICT would help make it easier to prepare classes, while greater respect for students (p5) or colleagues (p6) is largely unimportant. It is important to mention that more than

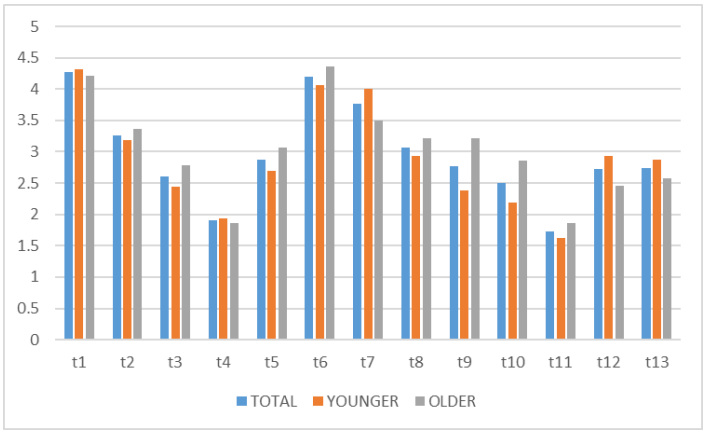
50% of the respondents pointed out that the use of ICT is important or very important for the quality of teaching.

## SELF ASSESSMENTS OF ICT COMPETENCES

Respondents assessed their knowledge of ICT on the five-level Lihter scale (1- Not true 2- not true in general 3- neither not true nor true 4-true in general 5-totally true), indicating in what degree they agreed with the following claims

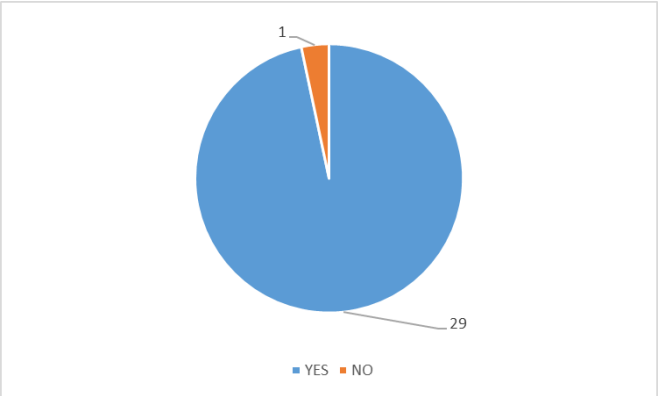
| notation | statement |
|---|---|
| t1 | The level of your knowledge and skills in applying Office software package: |
| t2 | Level of your knowledge and skills in applying Open Source software: |
| t3 | Level of your knowledge and skills in implementing Web conferencing software: |
| t4 | Level of Your Skills and Skills in the Application of Leadership Learning Software (LMS): |
| t5 | The level of your knowledge and skills in applying online learning platform: |
| t6 | Use electronic materials (presentations) as teaching materials. |
| t7 | Use electronic books / textbooks as teaching materials. |
| t8 | Use animations / movies as teaching material. |
| t9 | Use forums and other forms of online communication in teaching and learning. |
| t10 | Use online courses as a teaching material. |
| t11 | Use web conferences as a teaching material. |
| t12 | Use databases in teaching and learning. |
| t13 | You are open to communicating with students via social networks (Facebook, Twitter, etc.). |

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mode | mean | median | mode | mean | median | mode |
| t1 | **4.267** | 4 | 4 | **4.313** | 4 | 4 | **4.214** | 4 | 4 |
| t2 | **3.267** | 3.5 | 4 | **3.188** | 3 | 2 | **3.357** | 4 | 4 |
| t3 | **2.6** | 2 | 2 | **2.438** | 2 | 2 | **2.786** | 2.5 | 1 |
| t4 | **1.9** | 1 | 1 | **1.938** | 1 | 1 | **1.857** | 1 | 1 |
| t5 | **2.867** | 3 | 3 | **2.688** | 3 | 3 | **3.071** | 3 | |
| t6 | **4.2** | 5 | 5 | **4.063** | 5 | 5 | **4.357** | 5 | 5 |
| t7 | **3.767** | 4 | 5 | **4** | 4 | 5 | **3.5** | 4 | 5 |
| t8 | **3.067** | 3 | 1 | **2.938** | 3 | 1 | **3.214** | 3.5 | 4 |
| t9 | **2.767** | 2.5 | 2 | **2.375** | 2 | 2 | **3.214** | 3.5 | 4 |
| t10 | **2.5** | 2 | 1 | **2.188** | 2 | | **2.857** | 3 | 1 |
| t11 | **1.733** | 1 | 1 | **1.625** | 1 | 1 | **1.857** | 1 | 1 |
| t12 | **2.724** | 3 | 1 | **2.938** | 3 | 1 | **2.462** | 2 | 1 |
| t13 | **2.733** | 2 | 1 | **2.875** | 2.5 | | **2.571** | 2 | 1 |




CONCLUSION: respondents only assessed their knowledge and skills in applying Office with a high score (4.27), although it is not specified what part of the Office they know. It can be assumed that they know Office, Word, Excel and PowerPoint because the vast majority of respondents answered positively to t6, i.e. to question of using electronic materials. More than half of the respondents said they would use electronic books / textbooks as teaching tools (average score 3.77).
Very rarely respondents use web-based material as a teaching medium (average 1.73), and their knowledge and skills in the application of management software to students are rated negatively (average 1.9).

Can you notice the benefits of applying modern technology in teaching and learning?




What are these benefits?

| Benefit | YES | % |
|---|---|---|
| Save time | 8 | 26.7% |
| It facilitates the preparation of classes | 10 | 33.3% |
| Increases students' level of interest | 20 | 66.7% |
| Increases the quality of teaching materials | 16 | 53.3% |
| It makes learning easier | 16 | 53.3% |
| Improves communication between teachers and students | 20 | 66.7% |

CONCLUSION: Two-thirds of the respondents see benefits from the student's angle because they the most often chosen responses were: *Increases students' level of interest* and *Improves communication between teachers and students*, and as a minimal benefit, respondents chose time-saving.

Do you use some free online learning platforms for courses? If your answer is YES, please indicate the platforms you are using.

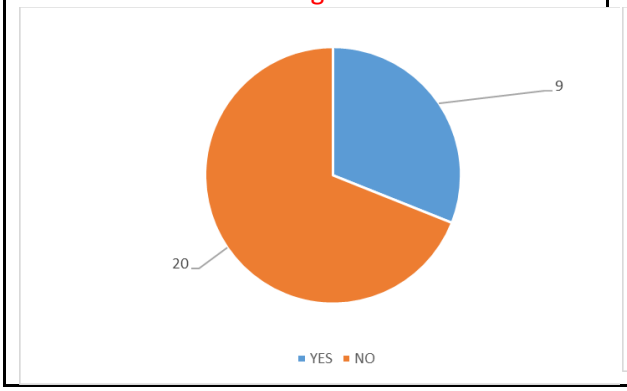
| | | |
|---|---|---|
| Moodle | 11 | 36.67% |
| Moodle, ASQ, Protus | 1 | 3.33% |
| Moodle, Khan Academy | 1 | 3.33% |
| Ne | 17 | 56.67% |

CONCLUSION: Most of the respondents do not use the platform, while Moodle is used by all respondents who worked on platforms.

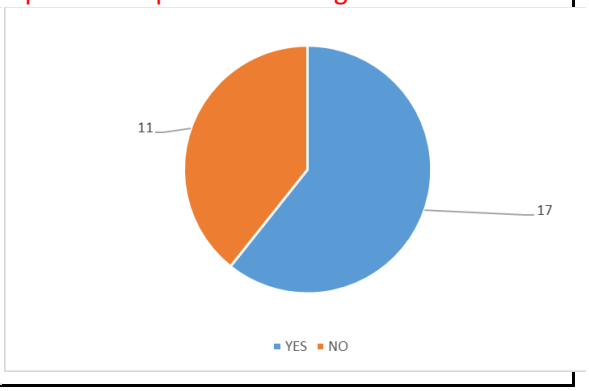
Do you think that using the online learning platform can:

| | YES | % |
|---|---|---|
| Enable students easier and faster access to learning materials | 28 | 93.3% |
| Enable students easier and faster access to relevant information | 21 | 70.0% |
| Allow students access to materials at any time | 24 | 80.0% |
| Contribute to the realization of the active role of students | 10 | 33.3% |
| Contributes to the individualisation of learning | 10 | 33.3% |
| Improves communication between teachers and students | 14 | 46.7% |

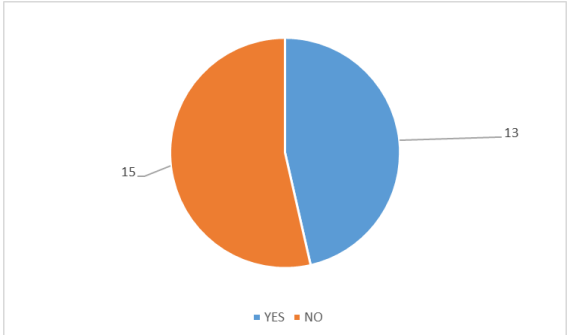
Has your institution developed a system for electronic student testing?



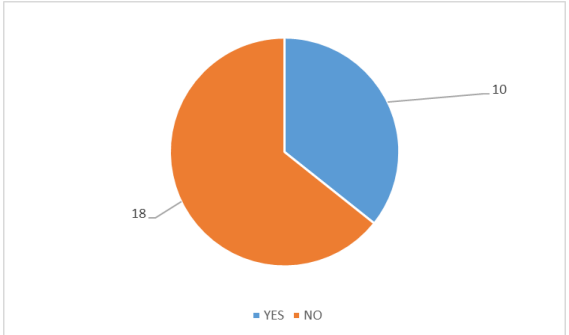

Do you think the student self test system has a positive impact on learning success?




Is your higher education institution able to provide students with high quality and expensive laboratory equipment?




Do your students have the opportunity to participate in experiments from remote locations?

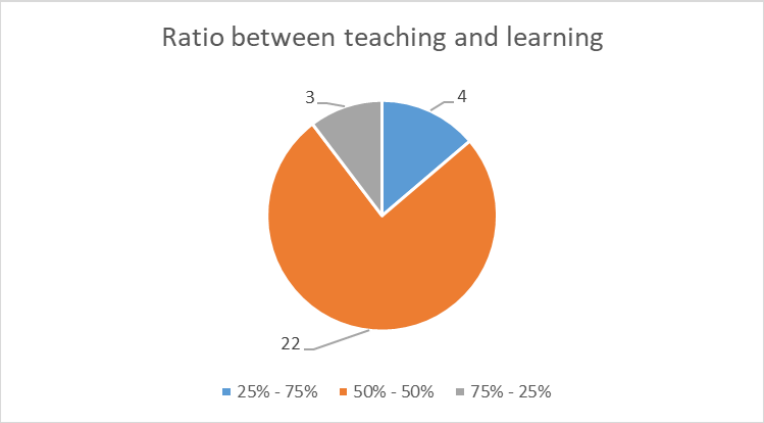


The most important barriers to applying modern teaching technologies in teaching and learning are:

| | YES | % |
|---|---|---|
| Lack of ICT skills | 19 | 63.3% |
| Lack of time | 10 | 33.3% |
| Lack of hardware | 10 | 33.3% |
| Lack of software | 12 | 40.0% |
| Inability to access computers | 0 | 0.0% |

CONCLUSION: Two-thirds of respondents see the lack of ICT skills as the most significant obstacle to the application of teaching technologies, while about a third of the respondents state the lack of software or hardware or time as a significant barrier.

In your opinion, what ratio (in percent) should be between teaching and learning in education to make education the most successful?




## *Pedagogical methods and teaching skills*

Level of skills in English

| | low | middle | high |
|---|---|---|---|
| Listening | 0 | 5 | 25 |
| reading | 0 | 5 | 25 |
| writing | 0 | 10 | 20 |
| talk | 0 | 13 | 17 |

CONCLUSION: Unlike the self-assessed knowledge and skills of ICT technologies, respondents estimated the knowledge of English language with high marks.

Have you ever attended a course in one of the listed disciplines during your formal education?

| course | Yes | No |
|---|---|---|
| Pedagogy | 8 | 21 |
| Psychology | 11 | 18 |

| | | |
|---|---|---|
| Teaching methodology | 10 | 18 |
| Application of new technologies in teaching | 4 | 24 |
| English language | 28 | 2 |
| You have not attended a course of any of these disciplines | | 15 |

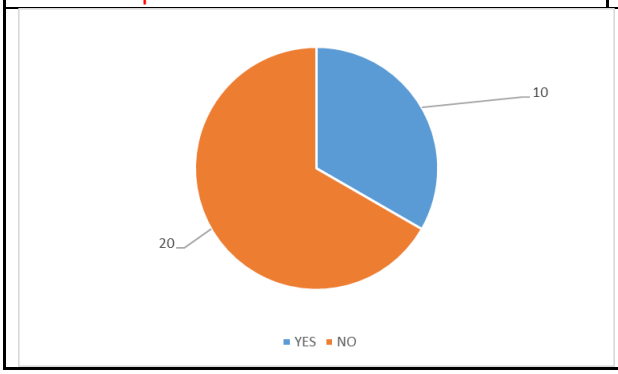
Have you ever held a course or have educated yourself informally (consulting some of the sources: books, articles, online resources, professional organizations, experienced colleagues, mentors, etc.) from one of the above disciplines during your career

| course | DA | NE |
|---|---|---|
| Pedagogy | 5 | 23 |
| Psychology | 9 | 19 |
| Teaching methodology | 10 | 18 |
| Application of new technologies in teaching | 12 | 16 |
| English | 15 | 15 |
| You have not taught or learned a course of any of these disciplines | 6 | 13 |

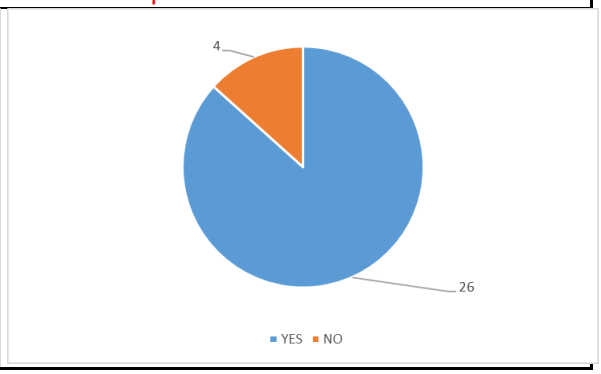
Do you consider that the teaching skills of university professors are very important for the quality of their classes?

| | |
|---|---|
| I totally agree | 22 |
| I partially agree | 8 |
| I do not agree | 0 |

Did you participate in a professional conference whose emphasis was on education?




Have you tried to provide feedback from students as part of the institutional evaluation




What would motivate you to engage in improving your teaching competencies?

| | | |
|---|---|---|
| Get more respect from colleagues or students | 5 | 16.7% |
| Possibility of easier preparation of classes | 7 | 23.3% |
| Achieve better quality of teaching | 27 | 90.0% |
| Attracting more students to elective courses | 15 | 50.0% |
| Getting some financial or material compensation | 5 | 16.7% |
| You are not interested | 1 | 3.3% |

CONCLUSION: The vast majority of the respondents (90%) said that their driving motive would be to achieve better quality of teaching, while very few respondents (5%) would have received some compensation or greater respect as motives.

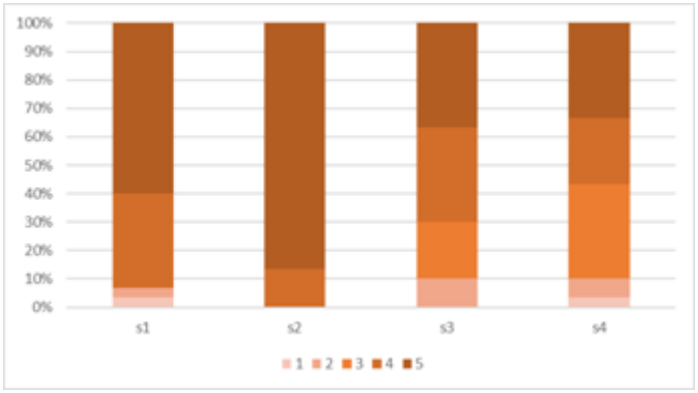
## *Application of educational strategies, English language and technology in teaching*

On the five-level Lihter scale (1- It's not true at all; 2 - It's not true at all; 3- Equally true and not true; 4 - Generally true. 5. Totally true) responded how much the following claims are true for them

### Teaching strategies involving students

| Notation | Statement |
|---|---|
| s1 | You provide feedback to students about test solutions, tasks, and ongoing work. |
| s2 | You provide clear information to students on how to evaluate the course they attend. |
| s3 | You give students clear instructions on how to prepare for the next hour. |
| s4 | You give students homework, short-term assignments, an obligation to read something or some other form of preparation for the coming time. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| s1 | 1 | 1 | 0 | 10 | 18 |
| s2 | 0 | 0 | 0 | 4 | 26 |
| s3 | 0 | 3 | 6 | 10 | 11 |
| s4 | 1 | 2 | 10 | 7 | 10 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mod | mean | median | mod | mean | median | mod |
| s1 | **4.433** | 5 | 5 | **4.438** | 5 | 5 | **4.429** | 5 | 5 |
| s2 | **4.867** | 5 | 5 | **4.875** | 5 | 5 | **4.857** | 5 | 5 |
| s3 | **3.967** | 4 | | **3.813** | 4 | 4 | **4.143** | 4 | |
| s4 | **3.767** | 4 | 3 | **3.563** | 3.5 | 3 | **4** | 4.5 | 5 |

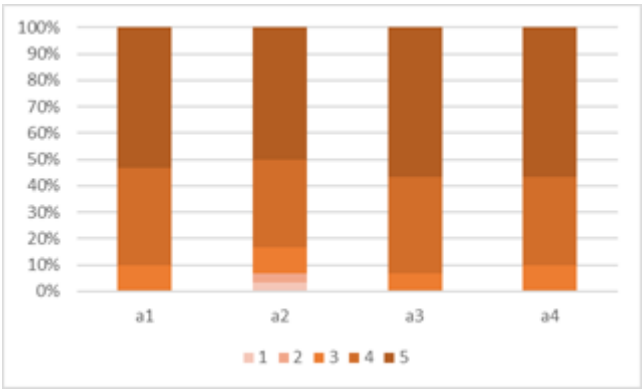
Mean response values of the respondents

CONCLUSION: All respondents highly assessed the truthfulness of all claims related to strategies involving students. This particularly applies to the statement s2. The weakest in this group is the truthfulness of the claim s4 (you give homework to students, short-term borrowings, the obligation to read something, or some other form of preparation for the next class). It can be noted that older teachers often give homework, while younger ones often give clear instructions for the next class.

## Intellectual engagement and impact on learning

| Notation | Statement |
|---|---|
| a1 | You motivate and encourage students to develop new ideas and find creative solutions to problems during learning. |
| a2 | You motivate students to seek more solutions to the same problem and compare them. |
| a3 | Usually, you initiate a discussion on classes, about solving complex problems. |
| a4 | You ask students to explain their ideas. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| a1 | 0 | 0 | 3 | 11 | 16 |
| a2 | 1 | 1 | 3 | 10 | 15 |
| a3 | 0 | 0 | 2 | 11 | 17 |
| a4 | 0 | 0 | 3 | 10 | 17 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| a1 | **4.433** | 5 | 5 | **4.563** | 5 | 5 | **4.286** | 4 | 4 |
| a2 | **4.233** | 4.5 | 5 | **4.438** | 5 | 5 | **4** | 4 | |
| a3 | **4.5** | 5 | 5 | **4.688** | 5 | 5 | **4.286** | 4 | 4 |
| a4 | **4.467** | 5 | 5 | **4.688** | 5 | 5 | **4.214** | 4 | |

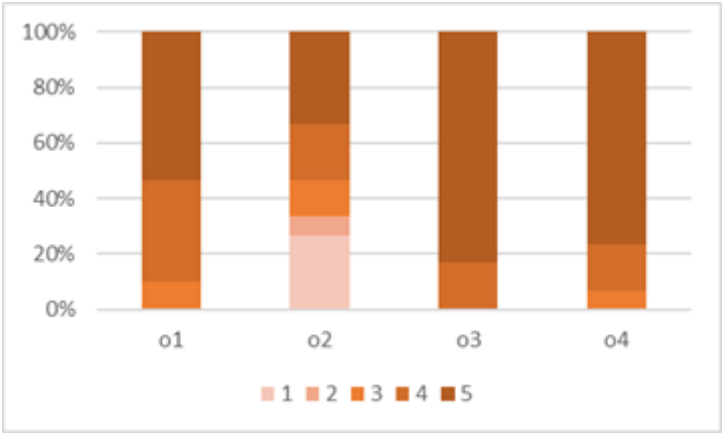
Mean response values of the respondents

CONCLUSION: The respondents rated all the claims from this group with an extremely high grade, i.e., they fully agree with all four claims. However, younger respondents more often stated that the claims were quite correct, while the older ones chose the option to be generally correct. In other words, the younger ones evaluated all the claims more strongly for one grade.

## Relationship: teacher-student

| oznaka | tvrdnja |
|---|---|
| o1 | Students with you communicate openly and freely. |
| o2 | You are open to various forms of electronic communication through social networks (Facebook, Twitter, etc.). |
| o3 | Relate to the students with respect. |
| o4 | You are communicating with students with a smile and a warm and friendly tone. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| o1 | 0 | 0 | 3 | 11 | 16 |
| o2 | 8 | 2 | 4 | 6 | 10 |
| o3 | 0 | 0 | 0 | 5 | 25 |
| o4 | 0 | 0 | 2 | 5 | 23 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| o1 | 4.433 | 5 | 5 | 4.5 | 4.5 | 4 | 4.357 | 5 | 5 |
| o2 | 3.267 | 4 | 5 | 3.438 | 4 | 4 | 3.071 | 3.5 | 1 |
| o3 | 4.833 | 5 | 5 | 4.813 | 5 | 5 | 4.857 | 5 | 5 |
| o4 | 4.7 | 5 | 5 | 4.875 | 5 | 5 | 4.5 | 5 | 5 |

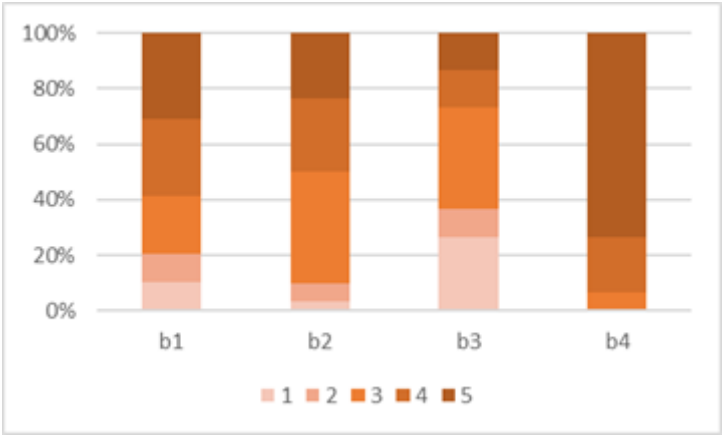
Mean response values of the respondents

CONCLUSION: Respondents highly assessed their relationship with students, stating that they are almost or completely correct to communicate with students openly and freely (o1), to respect communicate with students with respect (o3) and to welcome students with a smile and friendly tone (o4). Their only openness for various forms of electronic communication (o2) was considerably weaker.

## Cooperation

| notations | statement |
|---|---|
| b1 | You give students group assignments that they need to finish at class or at home. |
| b2 | You motivate students to share their knowledge and help other students during classes or during the preparation of the exam. |
| b3 | Use collaborative software in communicating with students (Google Docs, Wikis, etc.). |
| b4 | You expect students to engage in discussion and express their opinion. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| b1 | 3 | 3 | 6 | 8 | 9 |
| b2 | 1 | 2 | 12 | 8 | 7 |
| b3 | 8 | 3 | 11 | 4 | 4 |
| b4 | 0 | 0 | 2 | 6 | 22 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| b1 | 3.586 | 4 | | 3.5 | 3.5 | | 3.692 | 4 | 4 |
| b2 | 3.621 | 4 | 3 | 3.625 | 4 | | 3.615 | 3 | 3 |
| b3 | 2.828 | 3 | 3 | 3 | 3 | 3 | 2.615 | 3 | 1 |
| b4 | 4.655 | 5 | 5 | 4.75 | 5 | 5 | 4.538 | 5 | 5 |

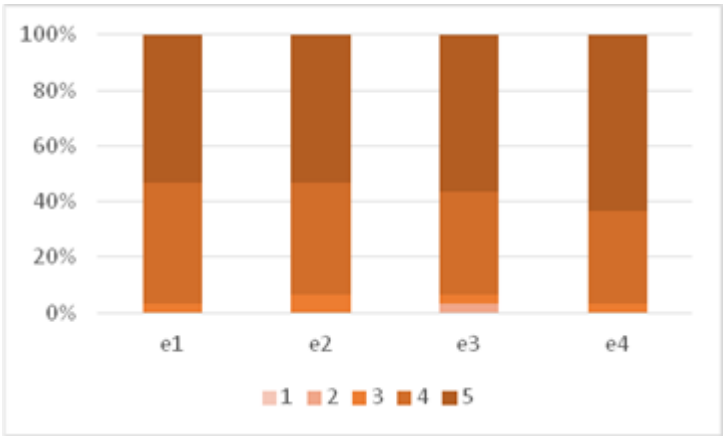
Mean response values of the respondents

CONCLUSION: In the group of claims on cooperation, the weakest assessment is the claim b3, i.e. respondents are very poorly using collaborative software. In the group of elderly respondents, most of them chose option 1 (not at all true), which indicates that older respondents are almost not using collaborative software. On the other hand, all respondents expect students to get involved in the discussion and express their opinion (average 4.65).

## Student-centered teaching and learning

| notation | statement |
|---|---|
| c1 | You are ready to make certain changes to the contents of your course, to accommodate it to the needs of students. |
| c2 | You respect the priorities and wishes of the students by giving them individual tasks. |
| c3 | Link the contents of your courses with previous knowledge and experience of students. |
| c4 | You are interested in the opinions of students. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| c1 | 0 | 0 | 2 | 12 | 16 |
| c2 | 0 | 4 | 8 | 8 | 10 |
| c3 | 0 | 0 | 3 | 9 | 18 |
| c4 | 0 | 0 | 0 | 8 | 22 |



Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| c1 | 4.467 | 5 | 5 | 4.563 | 5 | 5 | 4.357 | 4 | 4 |
| c2 | 3.8 | 4 | 5 | 3.813 | 4 | 4 | 3.786 | 4 | |
| c3 | 4.5 | 5 | 5 | 4.438 | 5 | 5 | 4.571 | 5 | 5 |
| c4 | 4.733 | 5 | 5 | 4.75 | 5 | 5 | 4.714 | 5 | 5 |

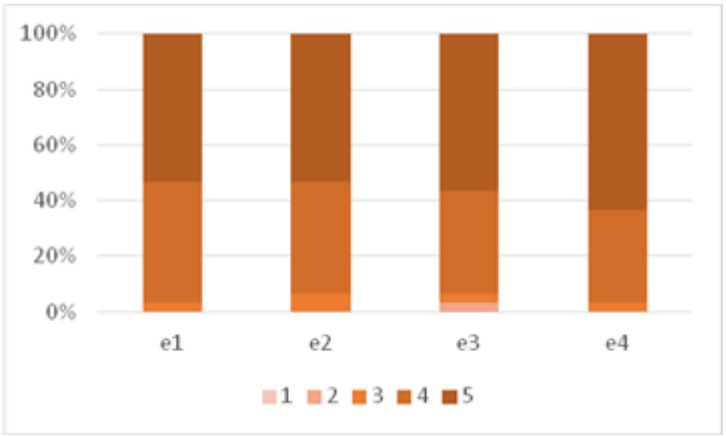
Mean response values of the respondents

CONCLUSION: In the group of assertions on teaching and learning directed at students, the respondents rated the most, that is, they fully consider the truth of c4 (*You are interested in the opinion of students*). The least agreement was found with the claim c2.

## Enthusiasm and way of teaching

| Notation | Statement |
|---|---|
| d1 | You change teaching methods to maintain students' interest. |
| d2 | You use electronic books, presentations, video clips, movies, and more. at their classes. |
| d3 | You use work in pairs, group work, workshops and other techniques to improve interaction during classes. |
| d4 | You motivate students to search for new learning resources beyond required materials and critically assess their reliability. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| d1 | 0 | 1 | 2 | 15 | 12 |
| d2 | 2 | 1 | 4 | 9 | 14 |
| d3 | 6 | 4 | 5 | 10 | 5 |
| d4 | 0 | 1 | 6 | 11 | 12 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| d1 | 4.267 | 4 | 4 | 4.25 | 4 | 4 | 4.286 | 4 | 4 |
| d2 | 4.067 | 4 | 5 | 3.938 | 4 | 5 | 4.214 | 4.5 | 5 |
| d3 | 3.133 | 3.5 | 4 | 3 | 3 | 4 | 3.286 | 4 | 4 |
| d4 | 4.133 | 4 | | 3.938 | 4 | 4 | 4.357 | 5 | 5 |

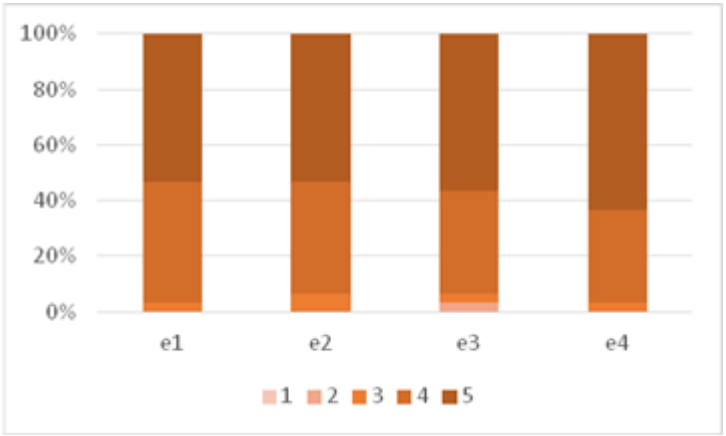
Mean response values of the respondents

CONCLUSION: The smallest agreement is observed with the statement d3 that refers to the work in pairs or group work ... which is probably the consequence or lack of time or lack of conditions (a large number of students). Significant agreement (4.27) respondents showed with the assertion that they changed teaching methods to maintain students' interest. However, the answers to these two questions are to a certain extent inconsistent.

## Structure

| Notation | Statement |
|---|---|
| e1 | During the lessons you summarize the material and highlight the most important parts. |
| e2 | During the lessons you adjust the time of instruction and manage the time of the organization of the classes well. |
| e3 | Organize and structure teaching materials |
| e4 | You make sure that your classes are well organized. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| e1 | 0 | 0 | 1 | 13 | 16 |
| e2 | 0 | 0 | 2 | 12 | 16 |
| e3 | 0 | 1 | 1 | 11 | 17 |
| e4 | 0 | 0 | 1 | 10 | 19 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| e1 | 4.5 | 5 | 5 | 4.438 | 4 | 4 | 4.571 | 5 | 5 |
| e2 | 4.467 | 5 | 5 | 4.5 | 5 | 5 | 4.429 | 4.5 | |
| e3 | 4.467 | 5 | 5 | 4.5 | 5 | 5 | 4.429 | 5 | 5 |
| e4 | 4.6 | 5 | 5 | 4.625 | 5 | 5 | 4.571 | 5 | 5 |

Mean response values of the respondents

CONCLUSION: All the claims concerning the structure are rated very high, that is, the responders consider almost all of the above claims almost or completely true.

# Report on the Survey of Teacher Attitudes at the University of Kragujevac

## Structure of the sample

The survey was filled in by 47 teachers, 29 (65.91%) of whom were women and 15 (34.09%) men. Teachers from five areas were present in the sample in the following way: mathematics (8), computer science (4), physics (10), chemistry (13) and biology (11).

The survey was conducted electronically during April 2019.

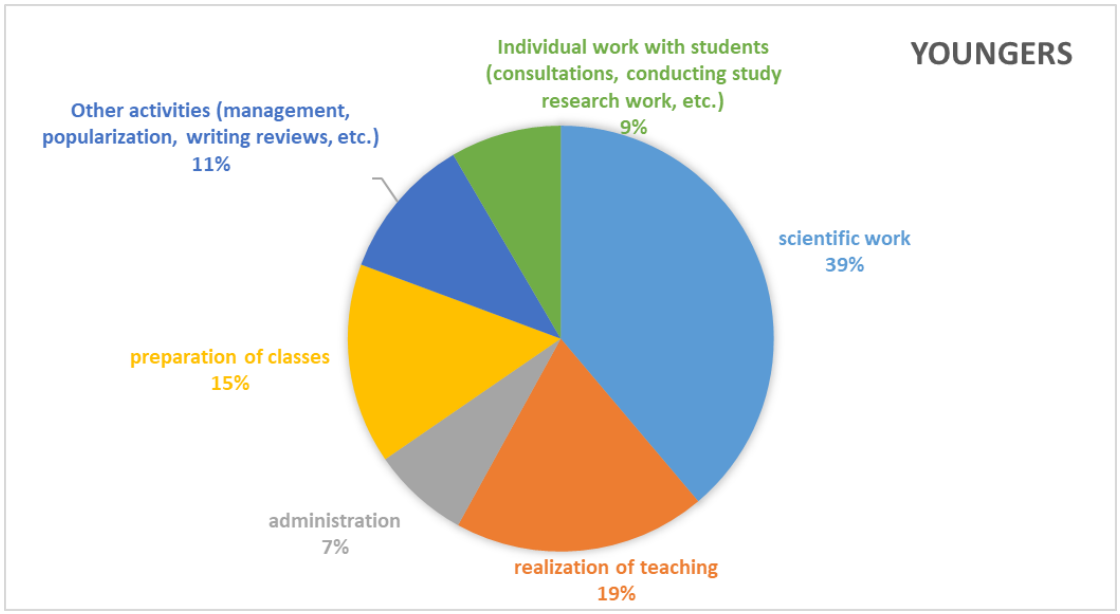
## Teaching experience at the university

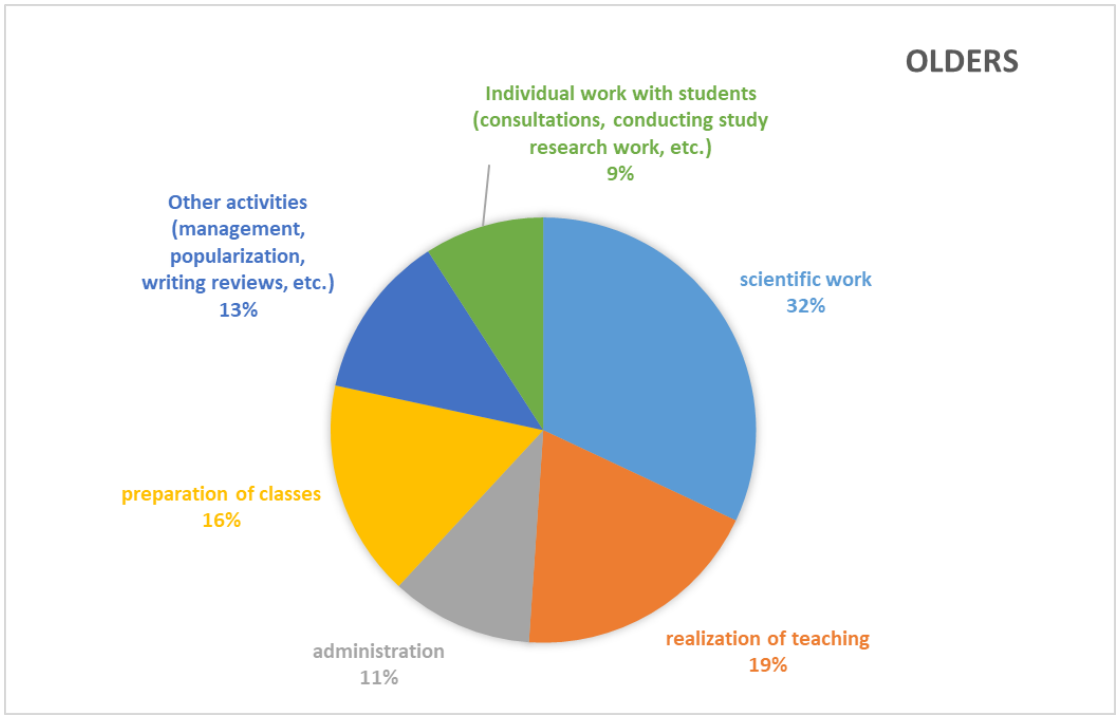
The average number of years of teaching experience is 15.69 years (the standard deviation is 11.33 years). The shortest teaching experience in the sample is 1 year, while the longest teaching experience is 40 years. In the further report, we will consider teachers and associates whose work experience is up to 12 years under the younger teaching staff, while older teachers will consider teachers with experience over 12 years. Translated to the age of the respondents, we can identify 12 years of experience with 35 years of age.

## Evaluation of weekly engagement

Work at the university allows for a significant individual distribution of time. For these reasons, teachers / associates filled out how many hours of work were active during the week and how it was arranged. Average respondents said they spend 43.72 hours of work on different activities (with a standard deviation of 17.45). operating hours vary from 8 hours to 89 hours. The amount of time spent in the week on individual activities is given in Table 1 and Figure 1.

| activity | average number of hours all | average number of hours-youngers | average number of hours - olders | p-value | significance |
|---|---|---|---|---|---|
| scientific work | **15.36** (7.08) | 16.00 (7.62) | 14.79 (6.69) | 0.320 | NO |
| realization of teaching | **8.40** (4.79) | 7.90 (4.88) | 8.83 (4.78) | 0.410 | NO |
| administration | **4.09** (4.79) | 3.05 (3.41) | 5.00 (5.65) | 0.175 | NO |
| preparation of classes | **7.00** (4.49) | 6.28 (3.61) | 7.62 (5.14) | 0.324 | NO |
| Other activities (management, popularization, writing reviews, etc.) | **5.20** (5.01) | 4.50 (3.80) | 5.79 (5.84) | 0.400 | NO |
| Individual work with students (consultations, conducting study research work, etc.) | **3.88** (2.88) | 3.47 (2.38) | 4.21 (3.26) | 0.407 | NO |
| IN TOTAL | **43.72** (17.45) | 40.83 (16.65) | 46.25 (18.09) | 0.304 | NO |

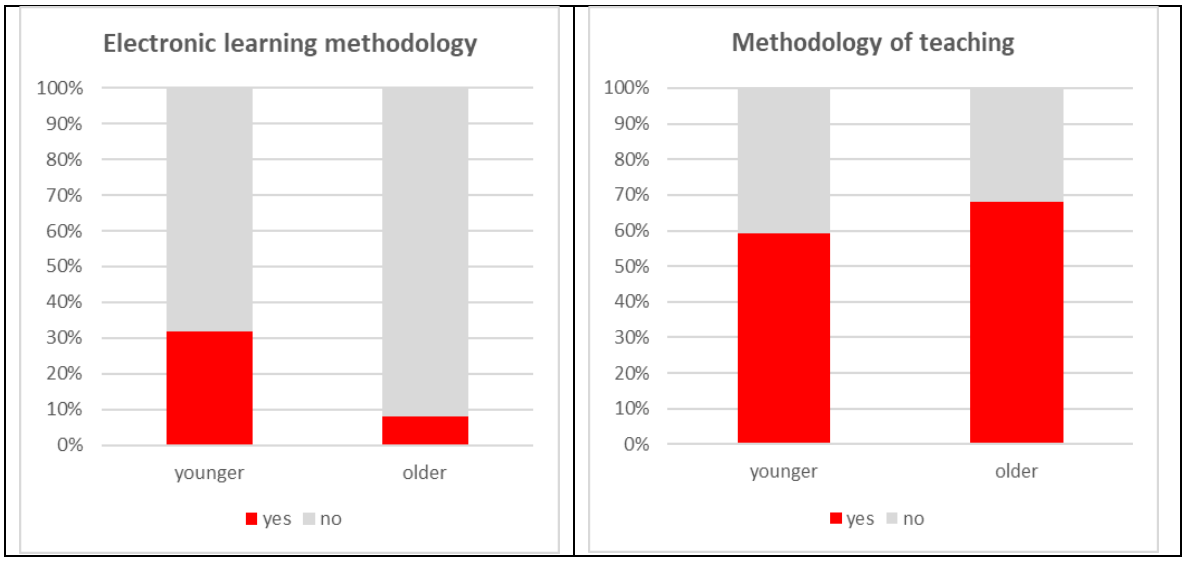



## Courses in methodology

| courses | in total | younger | older |
|---|---|---|---|
| Electronic learning methodology | 9 (19.15%) | 7 (31.82%) | 2 (8.00%) |

| | | | |
|---|---|---|---|
| Methodology of teaching | 30 (63.83%) | 13 (59.09%) | 17 (68.00%) |




Since 9 respondents attended the e-learning methodology, in the following table we list which areas were listened to:

| Areas | number of respondents |
|---|---|
| Electronic publishing (Latex, HTML, XML, PDF, etc.) | 10=5+5 (1) |
| Online Technology in Teaching | 5=2+3 |
| Open source software (MOODLE, Python, GeoGebra, MOOC, etc.) | 13=9+4 |

(1) We note that there are cases and there are respondents who have declared that they have not been listening to the method of electronic learning but have listened to some of the contents listed in the previous table. The first one is the number of respondents who have attended the method of electronic learning, while the second one is the number of respondents who did not attend

At Question: *Did you give at least one lecture in English. If yes, specify when and where*, less than 40%, or 18 respondents answered yes.

At Question: *Have you prepared at least one lecture or part of the lecture on the electronic platform. If yes, specify on which platform* 11 respondents answered yes (and they used the Moodle platform, Office Impress, but 8 respondents said “Power Point”!?).

| Question | younger | older | IN TOTAL |
|---|---|---|---|
| Have you participated in a professional conference whose emphasis was on applying innovative teaching technologies? | 4 (18.18%) | 5 (20.00%) | 9 (19.15%) |

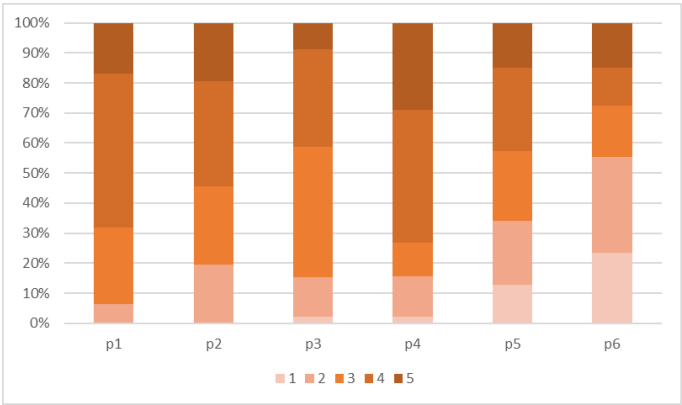
| | | | |
|---|---|---|---|
| Have you ever discussed with students about the impact of using modern technologies on the quality of teaching and learning? | 16 (72.73%) | 20 (80.00%) | 36 (76.60%) |

## Attitudes on the use of ICT in teaching

Respondents answered how much the following claims are true for them on the five-level Lihter scale (1- It's not true at all; 2 - It's not true in general; 3- Equally true and not true; 4 - Generally true. 5. Totally true).

| notation | Statements |
|---|---|
| p1 | The use of new technologies in teaching is very important for the quality of the lecture. |
| p2 | Group work, multimedia presentations and modern software capabilities save valuable teachers time. |
| p3 | Student presentations and discussions save time for the teacher. |
| p4 | You want to improve your teaching skills using information technology, because it would help you prepare lessons easier. |
| p5 | You want to improve your teaching skills using information technology, because it will bring you more respect from students. |
| p6 | You want to improve your teaching skills using information technology, because it will bring you more respect from colleagues |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| p1 | 0 | 3 | 12 | 24 | 8 |
| p2 | 0 | 9 | 12 | 16 | 9 |
| p3 | 1 | 6 | 20 | 15 | 4 |
| p4 | 1 | 6 | 5 | 20 | 13 |
| p5 | 6 | 10 | 11 | 13 | 7 |
| p6 | 11 | 15 | 8 | 6 | 7 |




Distribution of the response to the six observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mode | mean | median | mode | mean | median | mode |
| p1 | 3.787 | 4 | 4 | 3.864 | 4 | 4 | 3.72 | 4 | 4 |
| p2 | 3.543 | 4 | 4 | 3.524 | 4 | 4 | 3.56 | 4 | |
| p3 | 3.326 | 3 | 3 | 3.318 | 3 | 3 | 3.333 | 3.5 | 4 |
| p4 | 3.844 | 4 | 4 | 3.714 | 4 | | 3.958 | 4 | 4 |
| p5 | 3.106 | 3 | 4 | 3 | 3 | 4 | 3.2 | 3 | 4 |
| p6 | 2.638 | 2 | 2 | 2.636 | 2 | | 2.64 | 2 | 2 |

Mean response values of the respondents

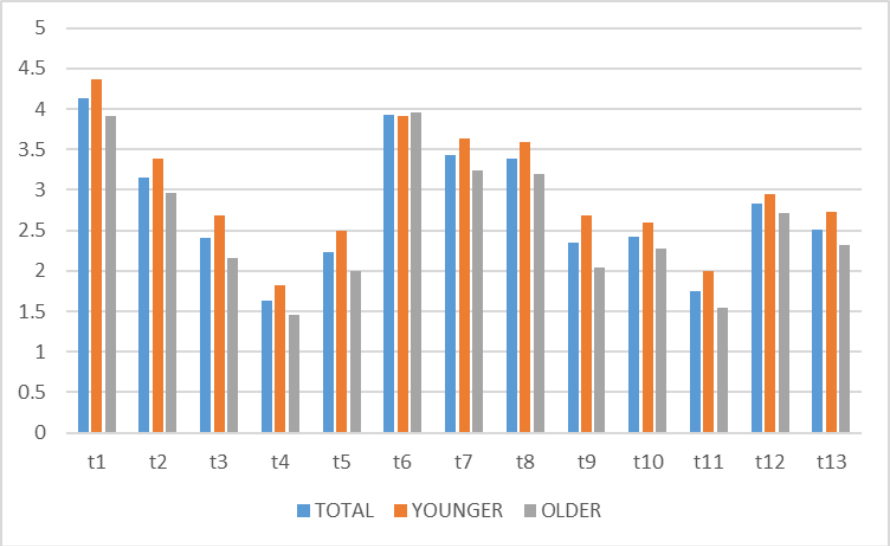
CONCLUSION: The teachers' responses indicate that they have a positive attitude towards the use of ICT in teaching. They are open for improving their ICT skills (the average for p4 is the highest, 3.844), and at the same time they consider ICT to be very important for the quality of teaching (the average for question p1 is 3.787). Notice that the answers of young and older teachers are pretty much the same.

## SELF ASSESSMENTS OF ICT COMPETENCES

Respondents assessed their knowledge of ICT on the five-level Lihter scale (1- Not true 2- not true in general 3- neither not true nor true 4-true in general 5-totally true), indicating in what degree they agreed with the following claims

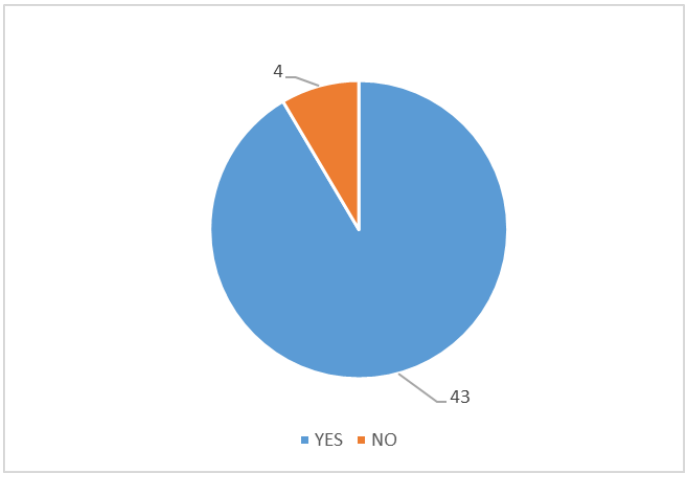
| notation | statement |
|---|---|
| t1 | The level of your knowledge and skills in applying Office software package: |
| t2 | Level of your knowledge and skills in applying Open Source software: |
| t3 | Level of your knowledge and skills in implementing Web conferencing software: |
| t4 | Level of Your Skills and Skills in the Application of Leadership Learning Software (LMS): |
| t5 | The level of your knowledge and skills in applying online learning platform: |
| t6 | Use electronic materials (presentations) as teaching materials. |
| t7 | Use electronic books / textbooks as teaching materials. |
| t8 | Use animations / movies as teaching material. |
| t9 | Use forums and other forms of online communication in teaching and learning. |
| t10 | Use online courses as a teaching material. |
| t11 | Use web conferences as a teaching material. |
| t12 | Use databases in teaching and learning. |
| t13 | You are open to communicating with students via social networks (Facebook, Twitter, etc.). |

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mode | mean | median | mode | mean | median | mode |
| t1 | 4.13 | 4 | 4 | 4.36 | 4 | 4 | 3.92 | 4 | 4 |
| t2 | 3.16 | 3 | 4 | 3.38 | 4 | 4 | 2.96 | 3 | |
| t3 | 2.40 | 2 | 2 | 2.68 | 2 | 2 | 2.16 | 2 | 1 |
| t4 | 1.63 | 1 | 1 | 1.82 | 1 | 1 | 1.46 | 1 | 1 |
| t5 | 2.23 | 2 | 1 | 2.50 | 3 | 3 | 2.00 | 2 | 2 |
| t6 | 3.93 | 4 | 5 | 3.91 | 4 | 5 | 3.96 | 4.5 | 5 |
| t7 | 3.43 | 4 | 5 | 3.64 | 4 | 5 | 3.24 | 3 | 3 |
| t8 | 3.38 | 4 | 5 | 3.59 | 4 | | 3.20 | 3 | |
| t9 | 2.35 | 2 | 1 | 2.68 | 2.5 | 1 | 2.04 | 2 | 1 |
| t10 | 2.43 | 2 | 1 | 2.59 | 2 | 2 | 2.28 | 2 | 1 |
| t11 | 1.76 | 1 | 1 | 2.00 | 2 | 1 | 1.54 | 1 | 1 |
| t12 | 2.83 | 3 | 3 | 2.95 | 3 | 3 | 2.71 | 3 | 3 |
| t13 | 2.51 | 2 | 1 | 2.73 | 2 | 1 | 2.32 | 2 | 1 |




CONCLUSION: Teachers have the highest confidence in their knowledge and skills related to the Office software package (the average for question p1 is 4.13), the use of electronic materials (presentations), electronic books and films as teaching material (averages for question p6, p7 and p8 are 3.93, 3.43, 3.38), as well as knowledge and skills related to using Open Source software (the average for question p1 is 3.16). For all other questions, the average is less than 3, which indicates that there is a significant space for improving the ICT skills of teachers. Older teachers generally assessed their ICT competences less well.

Can you notice the benefits of applying modern technology in teaching and learning?



What are these benefits?

| Benefit | YES | % |
|---|---|---|
| Save time | 24 | 51.06% |
| It facilitates the preparation of classes | 22 | 46.81% |
| Increases students' level of interest | 33 | 70.21% |
| Increases the quality of teaching materials | 27 | 57.45% |
| It makes learning easier | 23 | 48.94% |
| Improves communication between teachers and students | 22 | 46.81% |

CONCLUSION: Even more than 90% of teachers notice the benefits of using ICT in the teaching and learning, and as the most important advantage (70.21%) of this kind of teaching and learning they consider increasing student interest in the subject matter. Probably, this teacher perspective has strong influence on positive attitude of teachers towards improving their knowledge and skills in the use of ICT in the teaching process, which we already noticed.

Do you use some free online learning platforms for courses? If your answer is YES, please indicate the platforms you are using.

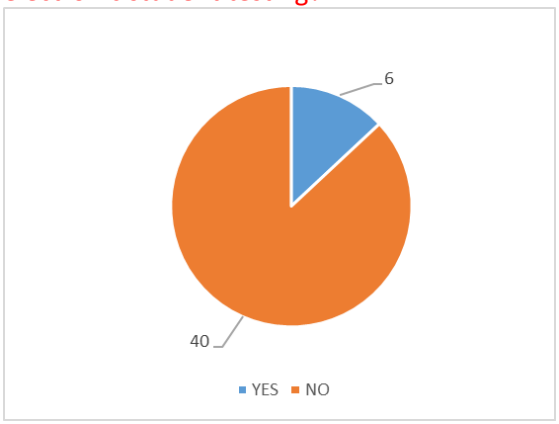
| | | |
|---|---|---|
| Moodle | 3 | 6.38% |
| Geogebra | 2 | 4.25% |
| Wolfram Mathematica | 1 | 2.12% |
| google classroom | 1 | 2.12% |
| No | 38 | 87.23% |

CONCLUSION: Unfortunately, only rare among teachers, less than 10% of them, use free online learning platforms. So, these activities of teachers need to be specially promoted and supported in order to be improved.

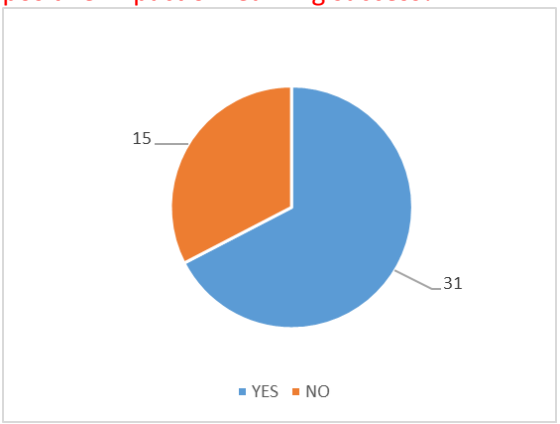
Do you think that using the online learning platform can:

| | YES | % |
|---|---|---|
| Enable students easier and faster access to learning materials | 39 | 82.98% |
| Enable students easier and faster access to relevant information | 24 | 51.06% |
| Allow students access to materials at any time | 33 | 70.21% |
| Contribute to the realization of the active role of students | 18 | 38.30% |
| Contributes to the individualisation of learning | 23 | 48.94% |
| Improves communication between teachers and students | 17 | 36.17% |

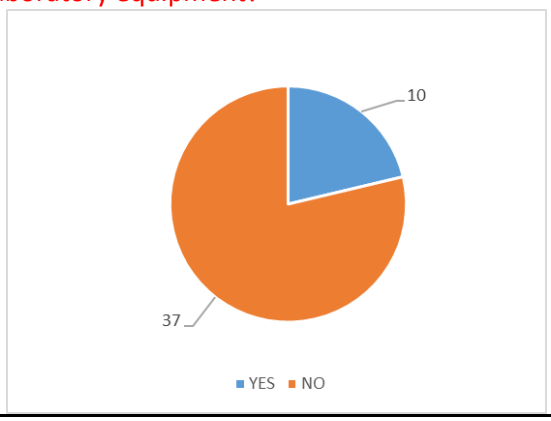
Has your institution developed a system for electronic student testing?



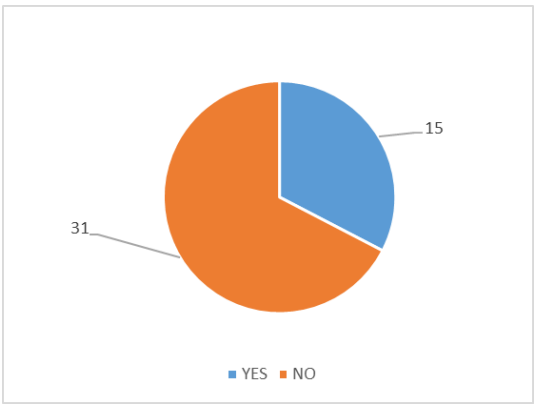

Do you think the student self test system has a positive impact on learning success?




Is your higher education institution able to provide students with high quality and expensive laboratory equipment?




Do your students have the opportunity to participate in experiments from remote locations?

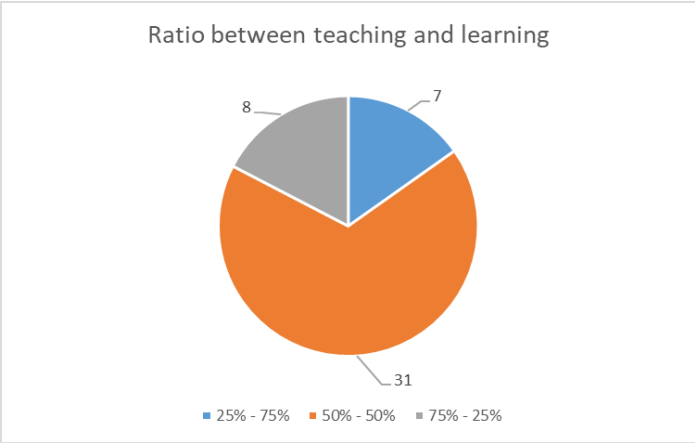



The most important barriers to applying modern teaching technologies in teaching and learning are:

| | YES | % |
|---|---|---|
| Lack of ICT skills | 22 | 46.81% |
| Lack of time | 16 | 34.04% |
| Lack of hardware | 23 | 48.94% |
| Lack of software | 23 | 48.94% |
| Inability to access computers | 13 | 27.66% |

CONCLUSION: Teachers recognize using online learning platforms as very important and useful activity, but they also admit that have significant difficulties in realizing this activity. One of the difficulties arises from lack of teacher competences (46.81%), which could be improved relatively quickly through various trainings. The second part of the difficulties are related to the equipment that institution (not)owns and this problem is purely of financial nature.

In your opinion, what ratio (in percent) should be between teaching and learning in education to make education the most successful?




## *Pedagogical methods and teaching skills*

Level of skills in English

| | low | middle | high |
|---|---|---|---|
| Listening | 3 | 16 | 28 |
| reading | 0 | 15 | 32 |
| writing | 1 | 22 | 24 |
| talk | 5 | 30 | 12 |

CONCLUSION: Majority of teachers has satisfactory English language competence.

Have you ever attended a course in one of the listed disciplines during your formal education?

| course | Yes | No |
|---|---|---|
| Pedagogy | 30 | 15 |
| Psychology | 31 | 15 |
| Teaching methodology | 24 | 18 |
| Application of new technologies in teaching | 9 | 30 |
| English language | 42 | 4 |
| You have not attended a course of any of these disciplines | | 17 |

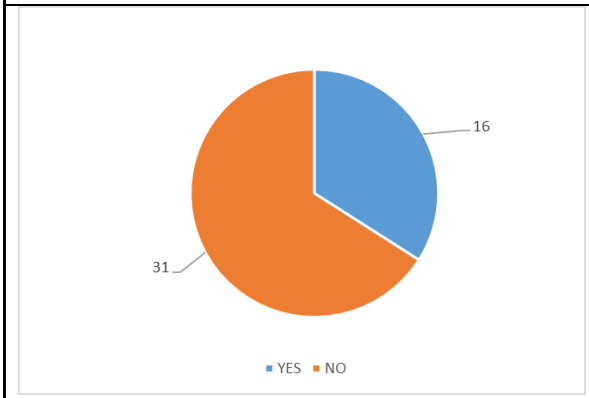
Have you ever held a course or have educated yourself informally (consulting some of the sources: books, articles, online resources, professional organizations, experienced colleagues, mentors, etc.) from one of the above disciplines during your career.

| course | Yes | No |
|---|---|---|
| Pedagogy | 7 | 32 |
| Psychology | 9 | 31 |
| Teaching methodology | 17 | 26 |
| Application of new technologies in teaching | 18 | 22 |
| English | 25 | 17 |
| You have not taught or learned a course of any of these disciplines | 3 | 23 |

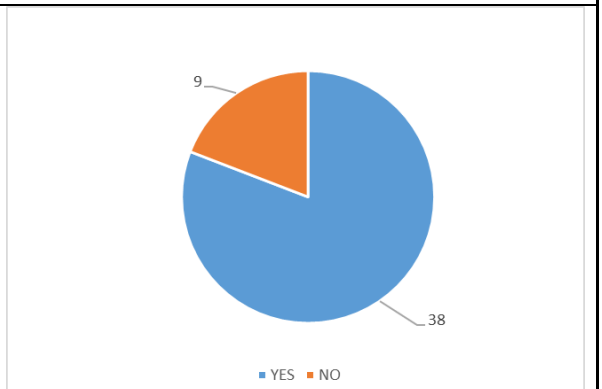
Do you consider that the teaching skills of university professors are very important for the quality of their classes?

| | |
|---|---|
| I totally agree | 41 |
| I partially agree | 6 |
| I do not agree | 0 |

Did you participate in a professional conference whose emphasis was on education?




Have you tried to provide feedback from students as part of the institutional evaluation




What would motivate you to engage in improving your teaching competencies?

| | | |
|---|---|---|
| Get more respect from colleagues or students | 11 | 23.40% |
| Possibility of easier preparation of classes | 14 | 29.79% |
| Achieve better quality of teaching | 37 | 78.72% |
| Attracting more students to elective courses | 18 | 38.30% |
| Getting some financial or material compensation | 14 | 29.79% |
| You are not interested | 2 | 4.26% |

CONCLUSION: Most of the teachers (about two thirds) attended courses Pedagogy, Psychology and Subject Methodology during their initial education, while only a quarter of them had a dedicated ICT course. Most of the teachers (87.23%) consider the teaching skills very important for the quality of the teaching process, and also (78.72%) consider the increase in the quality of teaching as the most important motivation for working on the improvement of teaching skills. Only 4.26% of teachers are not interested in improving their skills. All this indicates that there is a strong motivation for teachers to improve teaching, which is good base for believe that well-designed training and/or prepared materials will give the desired result.

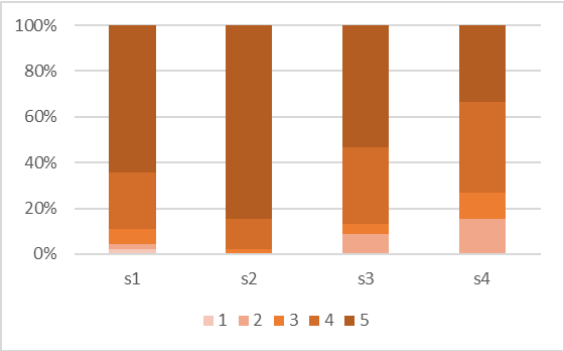
***Application of educational strategies, English language and technology in teaching***

On the five-level Lihter scale (1- It's not true at all; 2 - It's not true at all; 3- Equally true and not true; 4 - Generally true. 5. Totally true) responded how much the following claims are true for them

## Teaching strategies involving students

| Notation | Statement |
|---|---|
| s1 | You provide feedback to students about test solutions, tasks, and ongoing work. |
| s2 | You provide clear information to students on how to evaluate the course they attend. |
| s3 | You give students clear instructions on how to prepare for the next hour. |
| s4 | You give students homework, short-term assignments, an obligation to read something or some other form of preparation for the coming time. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| s1 | 1 | 1 | 3 | 11 | 29 |
| s2 | 0 | 0 | 1 | 6 | 39 |
| s3 | 0 | 4 | 2 | 15 | 24 |
| s4 | 0 | 7 | 5 | 18 | 15 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statement | mean | median | mod | mean | median | mod | mean | median | mod |
| s1 | 4.467 | 5 | 5 | 4.333 | 5 | 5 | 4.583 | 5 | 5 |
| s2 | 4.826 | 5 | 5 | 4.81 | 5 | 5 | 4.84 | 5 | 5 |
| s3 | 4.311 | 5 | 5 | 4.476 | 5 | 5 | 4.167 | 4.5 | 5 |
| s4 | 3.911 | 4 | 4 | 3.952 | 4 | 4 | 3.875 | 4 | 4 |

Mean response values of the respondents

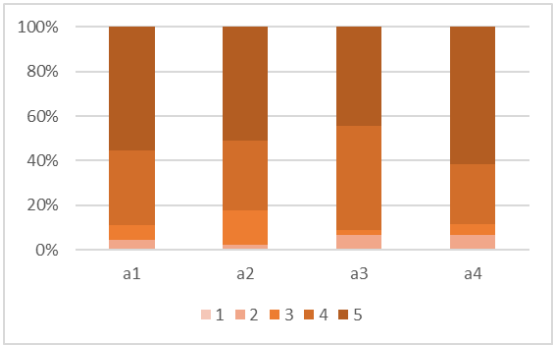
CONCLUSION: Teachers rated with high-grade their teaching strategies (communication with students in order to achieve optimum results in teaching and learning). As for the first three statements (S1, S2 and S3), the students agree with those answers.

## Intellectual engagement and impact on learning

| Notation | Statement |
|---|---|
| a1 | You motivate and encourage students to develop new ideas and find creative solutions to problems during learning. |

| | |
|---|---|
| a2 | You motivate students to seek more solutions to the same problem and compare them. |
| a3 | Usually, you initiate a discussion on classes, about solving complex problems. |
| a4 | You ask students to explain their ideas. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| a1 | 0 | 2 | 3 | 15 | 25 |
| a2 | 0 | 1 | 7 | 14 | 23 |
| a3 | 0 | 3 | 1 | 21 | 20 |
| a4 | 0 | 3 | 2 | 12 | 27 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| a1 | 4.4 | 5 | 5 | 4.381 | 5 | 5 | 4.417 | 5 | 5 |
| a2 | 4.311 | 5 | 5 | 4.333 | 5 | 5 | 4.292 | 4 | 5 |
| a3 | 4.289 | 4 | 4 | 4.286 | 4 | | 4.292 | 4 | 4 |
| a4 | 4.432 | 5 | 5 | 4.476 | 5 | 5 | 4.391 | 5 | 5 |

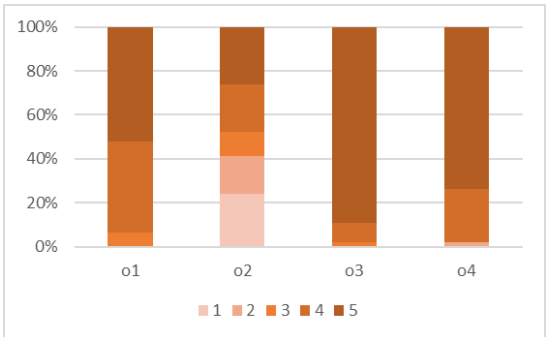
Mean response values of the respondents

CONCLUSION: Teachers have relatively highly estimated their engagement in actively engaging students during lectures, which is not fully supported by student responses. It would be desirable to inspect the reasons for this disagreement.

**Relationship: teacher-student**

| oznaka | tvrdnja |
|---|---|
| o1 | Students with you communicate openly and freely. |
| o2 | You are open to various forms of electronic communication through social networks (Facebook, Twitter, etc.). |
| o3 | Relate to the students with respect. |
| o4 | You are communicating with students with a smile and a warm and friendly tone. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| o1 | 0 | 0 | 3 | 19 | 24 |
| o2 | 11 | 8 | 5 | 10 | 12 |
| o3 | 0 | 0 | 1 | 4 | 41 |
| o4 | 0 | 1 | 0 | 11 | 34 |



Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| o1 | 4.457 | 5 | 5 | 4.476 | 4 | 4 | 4.44 | 5 | 5 |
| o2 | 3.087 | 3 | | 3 | 3 | 1 | 3.16 | 3 | 5 |
| o3 | 4.87 | 5 | 5 | 4.952 | 5 | 5 | 4.8 | 5 | 5 |
| o4 | 4.696 | 5 | 5 | 4.714 | 5 | 5 | 4.68 | 5 | 5 |

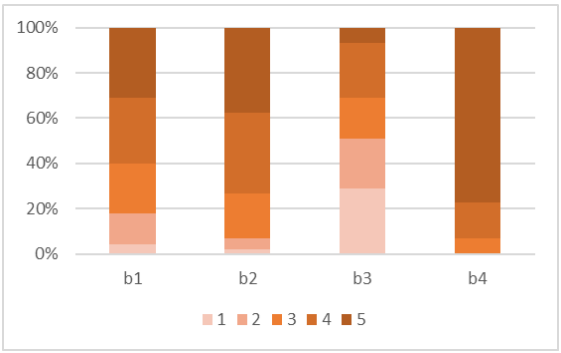
Mean response values of the respondents

CONCLUSION: The teacher-student relationship was generally characterized by teachers as being very good, which agrees with the assessment given by students. This is very important, because good communication with mutual respect is a prerequisite for a good working atmosphere.

## Cooperation

| notations | statement |
|---|---|
| b1 | You give students group assignments that they need to finish at class or at home. |
| b2 | You motivate students to share their knowledge and help other students during classes or during the preparation of the exam. |
| b3 | Use collaborative software in communicating with students (Google Docs, Wikis, etc.). |
| b4 | You expect students to engage in discussion and express their opinion. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| b1 | 2 | 6 | 10 | 13 | 14 |
| b2 | 1 | 2 | 9 | 16 | 17 |
| b3 | 13 | 10 | 8 | 11 | 3 |
| b4 | 0 | 0 | 3 | 7 | 34 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| b1 | 3.689 | 4 | | 3.667 | 4 | | 3.708 | 4 | 5 |
| b2 | 4.022 | 4 | | 3.952 | 4 | | 4.083 | 4 | 4 |
| b3 | 2.578 | 2 | 1 | 2.524 | 2 | 1 | 2.625 | 2.5 | 1 |
| b4 | 4.705 | 5 | 5 | 4.7 | 5 | 5 | 4.708 | 5 | 5 |

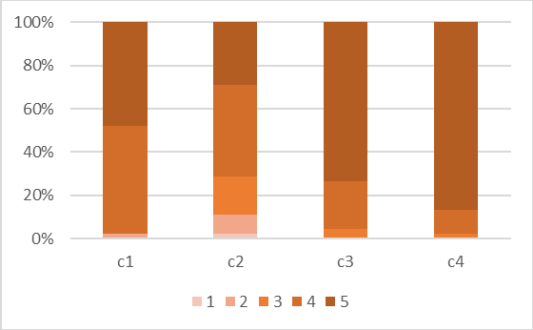
Mean response values of the respondents

CONCLUSION: According to teachers, they generally consider that in a good way (the average for b1, b2 and b4 is greater than 3.5) stimulate student collaboration during classes and learning, except in case of using collaborative software and communicating with students (the average for b3 is 2.578) . Students are slightly less likely to evaluate these teacher activities as good, but they agree that using collaborative software in communication with students is the least represented.

## Student-centered teaching and learning

| notation | Statement |
|---|---|
| c1 | You are ready to make certain changes to the contents of your course, to accommodate it to the needs of students. |
| c2 | You respect the priorities and wishes of the students by giving them individual tasks. |
| c3 | Link the contents of your courses with previous knowledge and experience of students. |
| c4 | You are interested in the opinions of students. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| c1 | 0 | 1 | 0 | 23 | 22 |
| c2 | 1 | 4 | 8 | 19 | 13 |
| c3 | 0 | 0 | 2 | 10 | 33 |
| c4 | 0 | 0 | 1 | 5 | 39 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| c1 | 4.435 | 4 | 4 | 4.571 | 5 | 5 | 4.32 | 4 | 4 |
| c2 | 3.867 | 4 | 4 | 3.857 | 4 | 4 | 3.875 | 4 | 4 |
| c3 | 4.689 | 5 | 5 | 4.714 | 5 | 5 | 4.667 | 5 | 5 |
| c4 | 4.844 | 5 | 5 | 4.905 | 5 | 5 | 4.792 | 5 | 5 |

Mean response values of the respondents

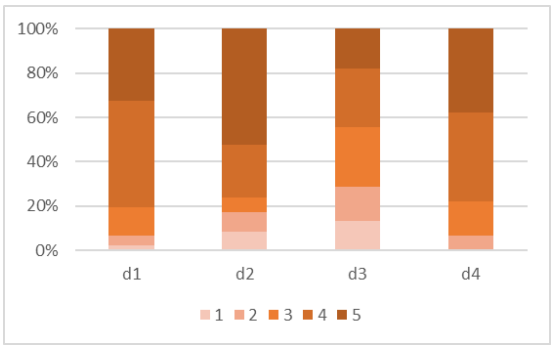
CONCLUSION: Teachers estimate that they, taking into account the knowledge, interests and abilities of the students, shaped in an enviable manner (the average for c1, c2, c3 and c4 is greater than 3.5) teaching process. In this case again students evaluate these teacher activities as less adequate. It would be important and useful to examine deeper the reasons for this disagreement.

## Enthusiasm and way of teaching

| Notation | Statement |
|---|---|
| d1 | You change teaching methods to maintain students' interest. |

| | |
|---|---|
| d2 | You use electronic books, presentations, video clips, movies, and more. at their classes. |
| d3 | You use work in pairs, group work, workshops and other techniques to improve interaction during classes. |
| d4 | You motivate students to search for new learning resources beyond required materials and critically assess their reliability. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| d1 | 1 | 2 | 6 | 22 | 15 |
| d2 | 4 | 4 | 3 | 11 | 24 |
| d3 | 6 | 7 | 12 | 12 | 8 |
| d4 | 0 | 3 | 7 | 18 | 17 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| d1 | 4.043 | 4 | 4 | 4.143 | 4 | 4 | 3.96 | 4 | 4 |
| d2 | 4.022 | 5 | 5 | 4.095 | 4 | 5 | 3.96 | 5 | 5 |
| d3 | 3.2 | 3 | | 3.238 | 3 | 3 | 3.167 | 3 | 4 |
| d4 | 4.089 | 4 | 4 | 4 | 4 | 4 | 4.167 | 4 | |

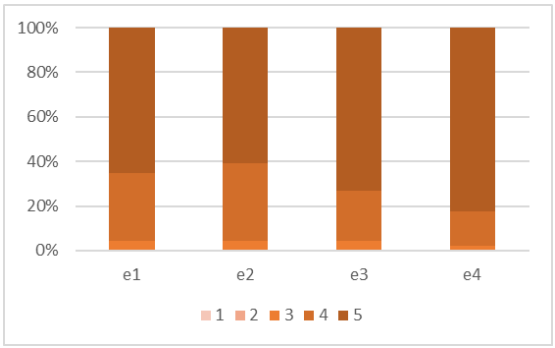
Mean response values of the respondents

CONCLUSION: Majority of teachers estimate that they adapt methods and type of work to students to a great extent. On the contrary, the students consider that only a few professors do it properly. Again, it would be great and helpful to inspect the reasons for this disagreement.

## Structure

| Notation | Statement |
|---|---|
| e1 | During the lessons you summarize the material and highlight the most important parts. |
| e2 | During the lessons you adjust the time of instruction and manage the time of the organization of the classes well. |
| e3 | Organize and structure teaching materials |
| e4 | You make sure that your classes are well organized. |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| e1 | 0 | 0 | 2 | 14 | 30 |
| e2 | 0 | 0 | 2 | 16 | 28 |
| e3 | 0 | 0 | 2 | 10 | 33 |
| e4 | 0 | 0 | 1 | 7 | 38 |




Distribution of the answers to the observed claims

| | TOTAL | | | YOUNGER | | | OLDER | | |
|---|---|---|---|---|---|---|---|---|---|
| statements | mean | median | mod | mean | median | mod | mean | median | mod |
| e1 | 4.609 | 5 | 5 | 4.571 | 5 | 5 | 4.64 | 5 | 5 |
| e2 | 4.565 | 5 | 5 | 4.524 | 5 | 5 | 4.6 | 5 | 5 |
| e3 | 4.689 | 5 | 5 | 4.667 | 5 | 5 | 4.708 | 5 | 5 |
| e4 | 4.804 | 5 | 5 | 4.81 | 5 | 5 | 4.8 | 5 | 5 |

Mean response values of the respondents

CONCLUSION: Teachers estimate the structure of their classes and lectures as excellent, which stays in line with student assessments.

# University of Niš

## The TeComp Consortium

www.tecomp.ni.ac.rs
e-mail:
tecomp@ni.ac.rs
tecomp.p2018@gmail.com



Co-funded by the
Erasmus+ Programme
of the European Union

This project has been co-funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein

# Report on the PPM knowledge at the Matej Bel University (MBU)

Matej Bel University in Banska Bystrica (Slovak Republic) is one on the leading national universities. It was established in 1992 and currently it consists of the following faculties:

- Faculty of Natural Sciences
- Faculty of Philosophy
- Faculty of Economy
- Faculty of Law
- Faculty of Education
- Faculty of Political sciences and International relations

Due to the contents of the project we concentrate ourselves to the area of mathematics, computer science and natural sciences, therefore in the following we will describe the current situation in the PPM knowledge at the Faculty of Natural Sciences.

## Structure and basic data of the Faculty of Natural Sciences

The faculty was established in 1995 as a result of division the former Faculty of Humanities and Nature science into faculties of humanities and nature science. It consists of the following departments:

- Department of Mathematics
- Department of Computer Science
- Department of Physics
- Department of Biology
- Department of Chemistry
- Department of Environmental Sciences
- Department of Geography and Geology
- Department of Technical Sciences

It offers bachelor, master and PhD studies in the above topics as well as teacher training in combination of two subjects. It has 94 academic employees and over 600 students in internal study and about 50 students in external studies. The study programs accredited and offered by the faculty are the following:

Bachelor degree:

- Forensic and Criminalistic Chemistry
- Applied Geology
- Geography
- Environmental Safety
- Ecology and Protection of Ecosystems
- Mathematics
- Applied Computer Science
- Teaching (combination of 2 subjects)

Master degree:

- Applied Chemistry and Forensic Practice
- Applied Geology
- Geography and Regional Development
- Environmental Management

- Ecology and Protection of Ecosystems
- Mathematics of Data Analysis and Finance
- Teaching (combination of 2 subjects)

Doctoral degree:

- Geochemistry
- Evolution of Ecosystems and their Protection
- Remediation of Environmental Burdens
- Mathematical Analysis
- Theory of Physics Education

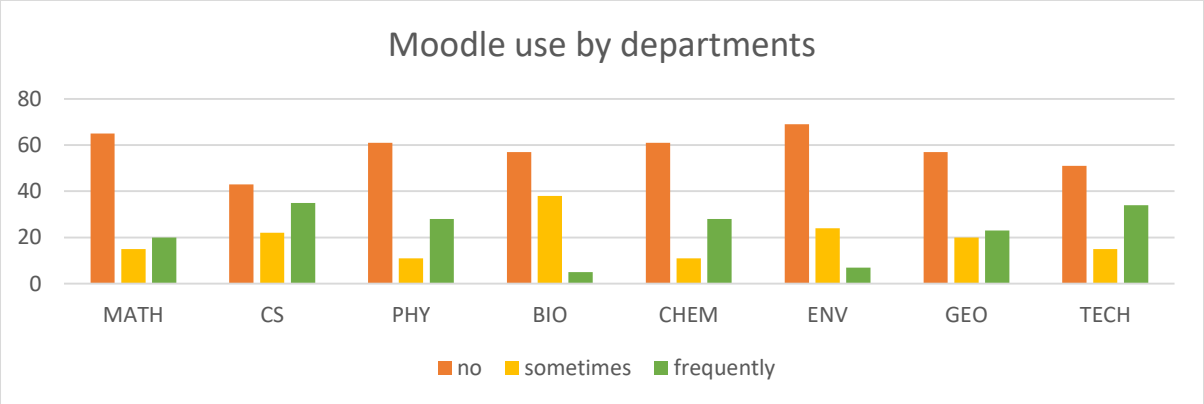
The number of students in particular programs in the academic year 2018/19 is in the following table:

| Degree | Form of study | | Total |
|---|---|---|---|
| | Internal | External | |
| *Bachelor* | 383 | 47 | 430 |
| *Master* | 198 | 30 | 228 |
| *Doctoral* | 20 | 5 | 25 |
| **Total** | **601** | **82** | **683** |

## Technical means for education

Thanks to the participation in previous project and institutional support all students and employees have access to computers connected to internet, including access to scientific databases, like ScienceDirect or WoS. All the departments possess computer laboratories available also to students' individual work.

The major tool for the online support of education is the Moodle software, as the university standard. In the internal study programs, there are no subjects taught exclusively by Moodle, but it serves to different levels as a complementary method of teaching.




The table above shows the percentage of subjects delivered by particular department in which Moodle is used in educational process.

## Human sources

Currently the number of teaching staff at Faculty of Natural Sciences is 99. The following table shows numbers of staff members who graduated in particular scientific disciplines, i.e. not in educational programs (group A), and those who graduated in education (group B).

| Department | MATH | CS | PHY | BIO | CHEM | ENV | GEO | TECH |
|---|---|---|---|---|---|---|---|---|
| A | 7 | 3 | 3 | 4 | 5 | 8 | 2 | 9 |
| B | 5 | 12 | 5 | 9 | 10 | 1 | 13 | 3 |

As the table shows, the number of staff members graduated in education (58) is slightly higher than the number of graduates in particular subjects (41). Experience shows that this ratio is suitable for education in teacher training as well as e.g. advanced postdoctoral studies in mathematics, biology, chemistry, etc. Therefore, the long-term aim of the personal management is to maintain approximately equal share of the both groups.

## Quality feedback

At the end of each academic year the students are asked to fill an online form about subjects they attended. Here they can evaluate the quality of teaching in 14 question, each aspect of the study can be evaluated by marks from one (the best) to five (the worst). The results of the evaluation are available to the particular lecturer and also to the head of the respective department. The outputs of the opinion poll are available to management of the faculty and heads of the departments. In case of need the didactic courses organized by the Faculty of Education are offered to particular staff members. In urgent cases passing such course can be required as a part of work duties.