# ANALYSIS OF HISTORY OF GRANTING CREDITS AND HANDLING TEST EXAMS ON THE ASK SYSTEMS E-EXAM PLATFORM AT WARSAW MEDICAL UNIVERSITY - A PRELIMINARY REPORT

**Joanna Gotlib[1], Mariusz Panczyk[1], Aleksander Zarzeka[1], Filip Dąbrowski[2], Piotr Gębski[3], Grażyna Dykowska[4], Marcin Malczyk[5], Jarosława Belowska[1], Lucyna Iwanow[6]**

*[1] Division of Teaching and Outcomes of Education, Faculty of Health Sciences, Medical University of Warsaw (POLAND)*
*[2] 1st Department of Obstetrics and Gynaecology, First Faculty of Medicine, Medical University of Warsaw (POLAND)*
*[3] Examination Centre of the Faculty of Medicine, Medical University of Lodz (POLAND)*
*[4] Division of Public Health, Faculty of Health Sciences, Medical University of Warsaw (POLAND)*
*[5] University Examinations Office, Medical University of Warsaw (POLAND)*
*[6] Student Research Society of Medical Law, Medical University of Warsaw (POLAND)*

## Abstract

Background: Until now, test exams at Warsaw Medical University were mostly carried out in the paper-and-pen test form. Beginning in the academic year 2014-2015, it is possible to get a credit and pass a test exam on the ASK Systems e-exam platform.

Aim of study: The study aimed to analyse in detail the history of granting credits and handling e-exams that were for the first time carried out in the winter 2014-2015 session at Warsaw Medical University.

Material and Methods: An analysis of granting credit for the *"Medical Law"* course for the first-year full-time Master's students of Nursing (152 students taking the exam) and exams for the following courses: *"Gynaecology and Obstetrics"* for the third-year full-time Bachelor's students of Emergency Medicine (141 students taking the exam) and *"Health Insurance"* for the second-year part-time Master's students of Public Health (30 students taking the exam). An analysis concerned the following: exam results (average of points, descriptive statistics), the course of getting credits and passing exams (time, round of exam), objections to questions (qualitative analysis).

Results: Due to the fact that the ASK System gives a lot of flexibility with reference to the combination of exam parameters, credits granted and test exams handled in the winter 2014-2015 session differed in terms of the following: duration (20, 60, and 30 minutes), number of rounds of exam (12, 6, and 1, respectively), number of questions included in the exam base (200, 60, and 26, respectively), process of selection of questions for the exam test (randomly, total exchange of questions). During the exams students did not report any technical problems regarding the use of the ASK Systems platform and used the opportunity to report objections to test questions while getting credits or taking exams in the electronic form (38 objections in total).

Conclusions

1. Although the ASK Systems e-exam platform gives a lot of flexibility with reference to the combination of exam parameters, due to a small number of computer stations, the exams should take place in a continuous session and their parameters should be similar.
2. The examination module of the ASK Systems e-exam platform has been prepared in a transparent manner so that students do not require any special training.
3. An improvement of the quality of exam tools is the key issue relating to organising exams and granting credits with the use of an e-exam platform. An e-exam will be handled properly only if the base of test questions is prepared earlier and it includes a proper number of questions of appropriate easiness and differentiation power. An opportunity to improve the quality of exam tools is also worth considering.

Keywords: e-assessment, quality of education, health sciences students, educational measurement.

# 1 BACKGROUND

With an increase of interest in using modern information technologies and with a development of e-learning for teaching students of medicine and health science, recent years have also seen an increased interest in using modern computer techniques for assessment of students' knowledge [1-5]. The use of modern information technologies for examination of students may influence both the quality of examination and attractiveness of computer-aided examinations (electronic examinations - EE) [1-5].

Performing examinations with the use of computers (computer-aided exams, electronic examinations - EE) has now been used for several years in order to assess knowledge of students of medical science and health science as well as to monitor the outcomes of postgraduate education of doctors, nurses and other groups of healthcare professionals [1-5]. The world literature presents a number of publications describing both advantages and limitations of this form of examination [1-5]. Many authors draw attention to conditions a university-level school needs to meet before it can start performing electronic examinations as well as suggest a variety of plans of introducing computer-aided examinations [1-5]. Most publications, however, emphasise the fact that computer-aided examinations are supposed to be introduced gradually, starting with formative tests and only later be used to perform end-of-semester tests and examinations [1-5].

So far only three medical universities in Poland have introduced electronic examinations (EE) using various systems: ASK Systems platform in the Medical University of Łódź and Warsaw Medical University (since 2014) and OLAT used in the Medical University of Poznań.

Until now, test exams at Warsaw Medical University were mostly carried out in the paper-and-pen test form. Beginning in the academic year 2014-2015, it is possible to get a credit and pass a test exam on the ASK Systems e-exam platform.

In the winter 2014-2015 session, there were three exams conducted on the ASK Systems e-exam platform in Warsaw Medical University (WMU): the exam for the "Gynaecology and Midwifery" course for third-year Bachelor's degree students of Nursing, end-of-semester test for the "Law in Medicine" course for first-year Master's degree students of Nursing, and end-of-semester test for the "Health Insurance" course for second-year part-time Master's degree students of Public Health [6-9].

# 2 AIM OF STUDY

The study aimed to analyse in detail the history of granting credits and handling e-exams that were for the first time carried out in the winter 2014-2015 session at Warsaw Medical University.

# 3 MATERIAL AND METHODS

An analysis of granting credit for the "Medical Law" course for the first-year full-time Master's students of Nursing (152 students taking the exam) and exams for the following courses: "Gynaecology and Obstetrics" for the third-year full-time Bachelor's students of Emergency Medicine (141 students taking the exam) and "Health Insurance" for the second-year part-time Master's students of Public Health (30 students taking the exam). An analysis concerned the following: exam results (average of points, descriptive statistics), the course of getting credits and passing exams (time, round of exam), objections to questions (qualitative analysis).

# 4 RESULTS

Due to the fact that the ASK System gives a lot of flexibility with reference to the combination of exam parameters, credits granted and test exams handled in the winter 2014-2015 session differed in terms of the following: duration (20, 60, and 30 minutes), number of rounds of exam (12, 6, and 1, respectively), number of questions included in the exam base (200, 120, and 26, respectively), process of selection of questions for the exam test (randomly, total exchange of questions). During the exams students did not report any technical problems regarding the use of the ASK Systems platform and used the opportunity to report objections to test questions while getting credits or taking exams in the electronic form (38 objections in total) (Tab. 1).

Tab. 1. Detailed characteristics of e-exams conducted in winter 2014/2015 semester at Warsaw Medical University.

| **Parameters** | | | |
|---|---|---|---|
| **Subject** | **Law in medicine** | **Gynaecology and Midwifery** | **Health Insurance** |
| **Major** | **Nursing** | **Nursing** | **Public Health** |
| **Number of students** | 152 | 141 | 30 |
| **Year of studies/degree** | **(first year, Master's degree)** | **(third year, Bachelor's degree)** | **(second year, Master's degree, part-time)** |
| **Number of terms** | 12 (Jan 16-30, 2015) | 6 (Feb 6, 2015) | 1 (Feb 7, 2015) |
| **Number of questions** | 200 | 120 | 26 |
| **Number of questions in one exam** | 30 | 60 | 26 |
| **Duration of the exam** | 20 minutes (45 seconds per question) | 60 minutes (1 minute per question) | 30 minutes |
| **Time for searching for mistakes** | 5 minutes | 5 minutes | 5 minutes |
| **Cut-off score** | 60% (18 points) | 60% (36 points) | 57% (15 points) |
| **Maximum score** | 27 points | 51 points | 21 points |
| **Minimum score** | 13 points | 21 points | 8 points |
| **Mean** | 20.90 | 40.79 | 14.31 |
| **Final grade** | no | yes | yes |
| **Objections raised** | 11 (including 2 objections granted) | 26 (including 2 objections granted) | 1 (granted) |

## 4.1 Analysis of “law in medicine” exam

| Lp. | Data i godzina pisania egzaminu | Liczba studentów | Średnia punktów | Minimalna ilość punktów | Maksymalna ilość punktów |
|---|---|---|---|---|---|
| 1. | 16.01.2015; godz. 8.15 | 1 | 26 | 26 | 26 |
| 2. | 20.01.2015; godz. 19.15 | 4 | 24,75 | 22 | 27 |
| 3. | 21.01.2015, godz. 8.15 | 12 | 23 | 19 | 27 |
| 4. | 21.01.2015; godz. 12.00 | 26 | 20,5 | 15 | 24 |
| 5. | 22.01.2015; godz. 19.15 | 12 | 20,83 | 15 | 26 |
| 6. | 23.01.2015; godz. 8.15 | 17 | 20,41 | 16 | 24 |
| 7. | 23.01.2015; godz. 12.00 | 24 | 21,43 | 15 | 25 |
| 8. | 28.01.2015; godz. 8.15 | 18 | 21,22 | 17 | 26 |
| 9. | 28.01.2015, godz. 12.00 | 27 | 20,37 | 15 | 27 |
| 10. | 30.01.2015; godz. 8.15 | 2 | 21 | 20 | 22 |
| 11. | 30.01.2015, godz. 12.00 | 9 | 17,33 | 13 | 22 |

Fig. 1. Exams for “Law in health protection” course divided by rounds: number of students, mean score, minimum and maximum number of points
(DATE AND TIME OF EXAM; NUMBER OF STUDENTS; MEAN SCORE; MINIMUM NUMBER OF POINTS; MAXIMUM NUMBER OF POINTS)

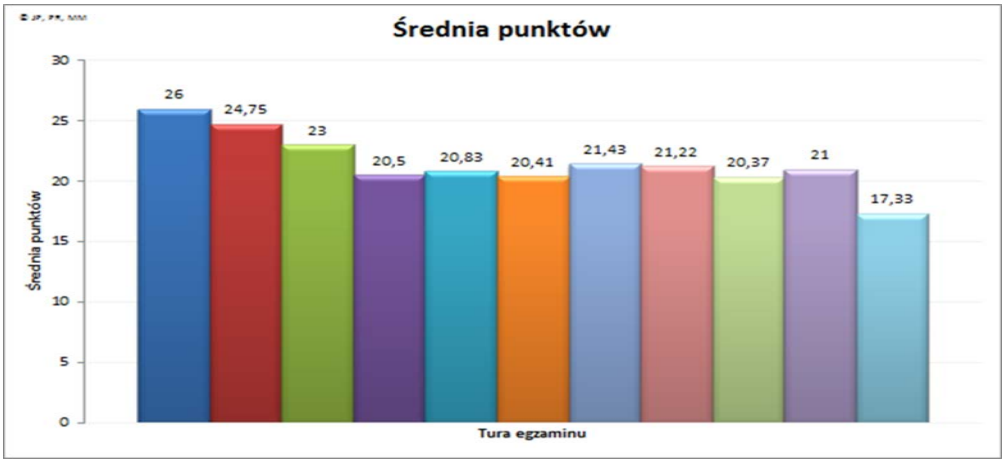


Fig. 2. Mean score obtained by students during particular rounds of exam
(MEAN SCORE; ROUND OF EXAM)

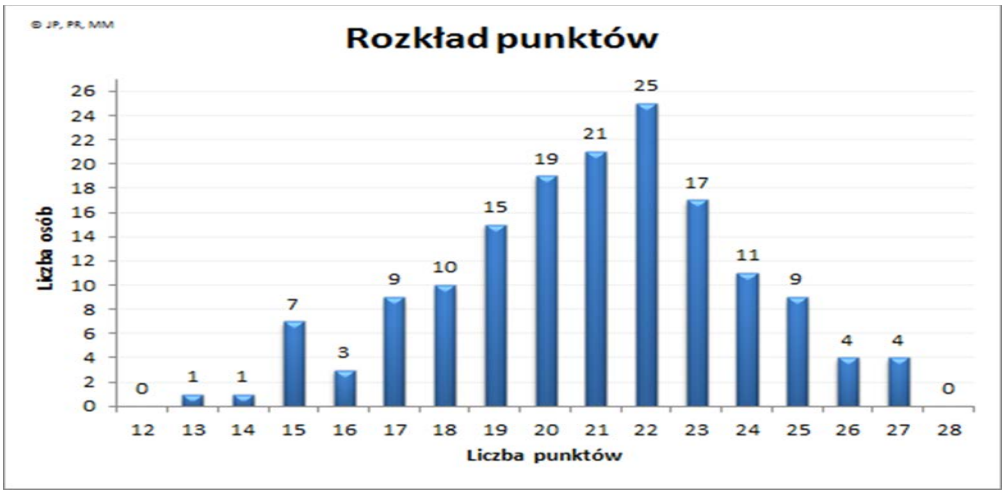


Fig. 3. Detailed distribution of points obtained by students during exam
(NUMBER OF PERSONS; DISTRIBUTION OF POINTS; NUMBER OF POINTS)

## 4.2 Analysis of "gynaecology and midwifery" exam

| Lp. | Data i godzina pisania egzaminu | Liczba studentów | Średnia punktów | Minimalna ilość punktów | Maksymalna ilość punktów |
|---|---|---|---|---|---|
| 1. | 2015-02-06 08:00 | 11 | 37,36 | 21 | 46 |
| 2. | 2015-02-06 09:30 | 26 | 39,96 | 28 | 51 |
| 3. | 2015-02-06 11:00 | 26 | 41,58 | 35 | 51 |
| 4. | 2015-02-06 12:30 | 26 | 42,04 | 33 | 51 |
| 5. | 2015-02-06 14:00 | 26 | 41,85 | 33 | 49 |
| 6. | 2015-02-06 15:30 | 26 | 40 | 28 | 50 |

Fig. 4. Exams for “Gynaecology and Midwifery” course divided by rounds: number of students, mean score, minimum and maximum number of points


Fig. 5. Mean score obtained by students during particular rounds of exam

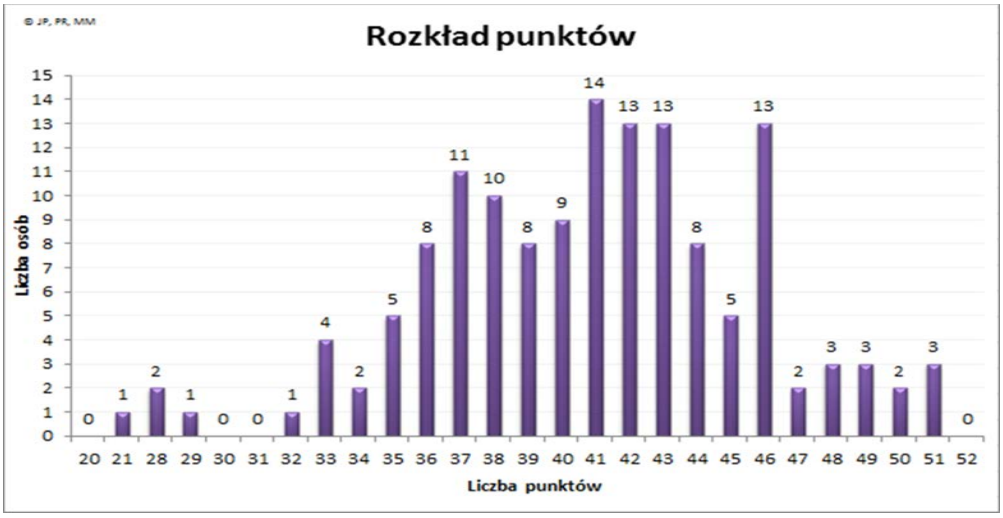


Fig. 6. Detailed distribution of points obtained by students during exam

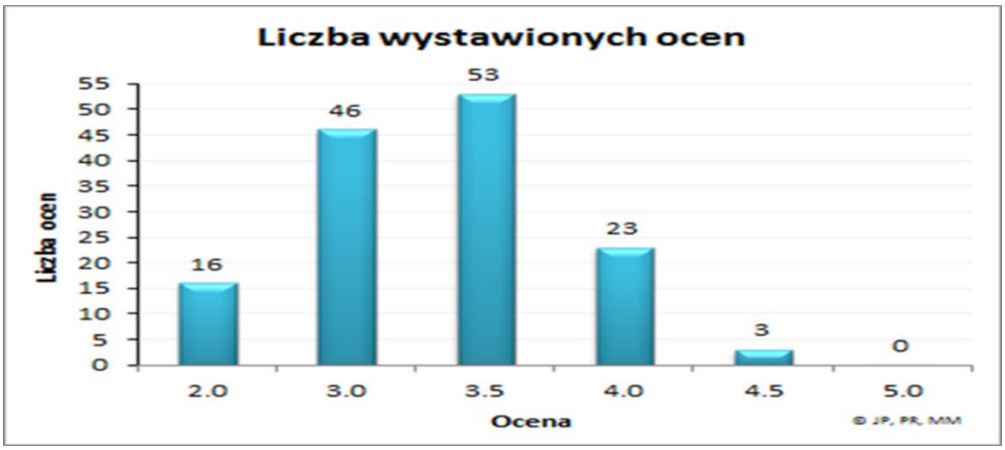


Fig. 7. Detailed number of grades given in the exam
(NUMBER OF GRADES; NUMBER OF GRADES; GRADE)

## 4.3 Analysis of "health insurance" exam

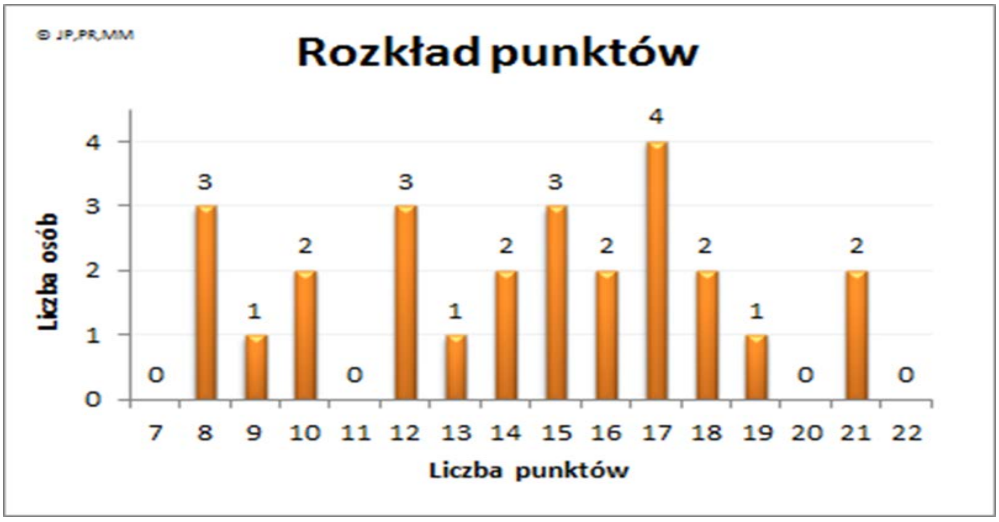


Fig. 8. Detailed distribution of points obtained by students during exam

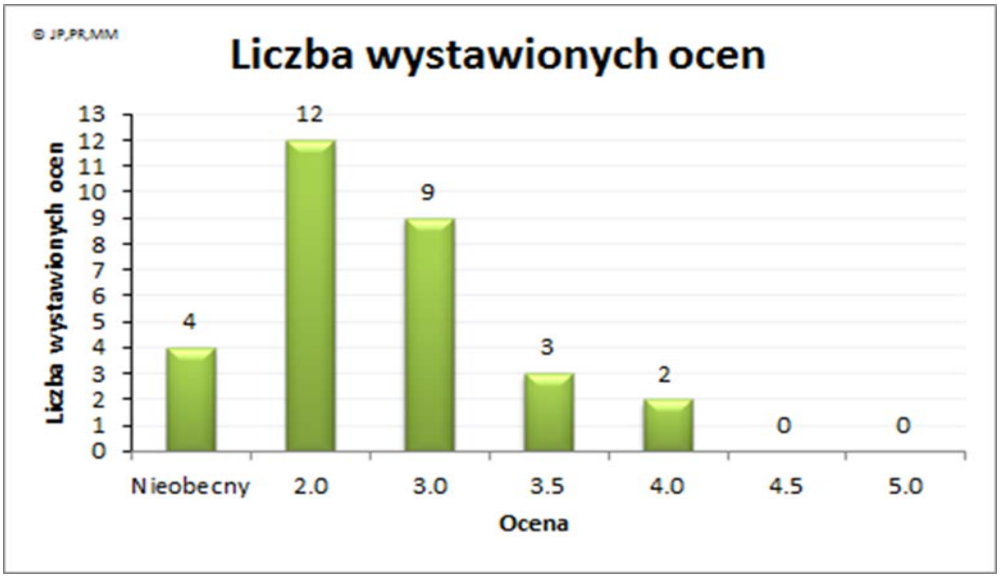


Fig. 9. Detailed number of grades given in the exam

## 5 DISCUSSION

Due to the fact that e-exams have been introduced in medical university-level schools only recently, the available Polish scientific literature does not present any publications offering a detailed analysis of their course. The issue of computer-aided examinations is innovative in the Polish scientific literature and so far it has been discussed only by the staff of the Division of Teaching and Outcomes of Education, Faculty of Health Science, Warsaw Medical University.

Computer-aided examinations conducted as a pilot in Warsaw Medical University in the winter 2014/205 semester proceeded satisfactorily.

The present data on organisation of the end-of-semester tests and examinations for the "Law in Medicine", "Gynaecology and Midwifery" and "Health Insurance" courses conducted for the first time in the history of Warsaw Medical University on the ASK Systems e-exam platform allows for presenting several preliminary observations concerning the use of this innovative form of testing and examination in the future.

The management of the ASK Systems e-exam platform in the aforementioned end-of-semester tests did not constitute a barrier for students since it is intuitive. Thus there is no need to organise a special training on management of the platform for students and materials developed by the University Examinations Office seem to be sufficient to learn operating principles of the platform.

As far as dates of exams are concerned, due to organisational reasons, it seems justified to adjust the number of dates and timings to the number of students, particularly in the context of a growing interest in electronic testing and expected problems with availability of the computer room.

However, the key issue in organising end-of-semester tests and exams on the e-exam platform is the improvement of the quality of examination tools. Thus it seems necessary to create a proper number of test questions of appropriate differentiating power and difficulty that would ensure an equivalent set of questions for each student/group of students. Therefore, it seems necessary to conduct a series of trainings/workshops for teachers covering broad issues concerning phrasing test questions and evaluating test exams, particularly in relation to the ability to monitor the outcomes of education specified in the new curricula for students of medical majors and health sciences.

## 6 CONCLUSIONS

1. Although the ASK Systems e-exam platform gives a lot of flexibility with reference to the combination of exam parameters, due to a small number of computer stations, the exams should take place in a continuous session and their parameters should be similar.

2. The examination module of the ASK Systems e-exam platform has been prepared in a transparent manner so that students do not require any special training.

3. An improvement of the quality of exam tools is the key issue relating to organising exams and granting credits with the use of an e-exam platform. Therefore, an e-exam will be handled properly only if the base of test questions is prepared earlier and it includes a proper number of questions of appropriate easiness and differentiation power. An opportunity to improve the quality of exam tools (by using different types of tasks, which is possible due to the electronic form of the exam) is also worth considering.

## REFERENCES


[1] Cantillon P, Irish B, Sales D. Using computers for assessment in medicine. BMJ 2004; 329: 606-609.

[2] Conole G, Warburton B. A review of computer-assisted assessment ALT-J. Research in Learning Technology 2005; 13(1): 17-31.

[3] Dennick R, Wilkinson S, Purcell N. Online e-Assessment: AMEE Guide No. 39 Medical Teacher 2009; 31: 192-206.

[4] Hewson C. Can online course-based assessment methods be fair and equitable? Relationships between students' preferences and performance within online and offline assessments. Journal of Computer Assisted Learning 2012; 28: 488-498.

[5] Mooney GA, Bligh JG, Leinster SJ. Some techniques for computer-based assessment in medical education Medical Teacher 1998; 20(6): 560-566.

[6] Gotlib J, Zarzeka A, Panczyk M, Malczyk M. Zaliczenie testowe z przedmiotu *„Prawo w medycynie”* dla studentów Wydziału Nauki o Zdrowiu na platformie egzaminów elektronicznych ASK Systems – doświadczenia własne. Medycyna Dydaktyka Wychowanie 2015; 1: 28-31.

[7] Gotlib J, Panczyk M, Gębski P, Zarzeka A, Iwanow I, Dąbrowski F, Dykowska G, Malczyk M. Analiza porównawcza opinii studentów Warszawskiego Uniwersytetu Medycznego na temat egzaminów i zaliczeń elektronicznych zależności od ich udziału w takiej formie sprawdzania wiedzy – doniesienie wstępne. Pielęgniarstwa XXI wieku 2015; 2: w druku.

[8] Gotlib J, Panczyk M, Gębski P, Zarzeka A, Iwanow L, Dąbrowski F, Dykowska G, Malczyk M. Analiza opinii studentów Warszawskiego Uniwersytetu Medycznego na temat udziału w zaliczeniach
i egzaminach wspomaganych komputerowo – doniesienie wstępne. Polish Journal of Public Health 2015; 2: in print.

[9] Gotlib J, Panczyk M, Gębski P, Zarzeka A, Iwanow L, Dąbrowski L, Dykowska G, Malczyk M. Porównanie opinii studentów i nauczycieli Warszawskiego Uniwersytetu Medycznego na temat egzaminów i zaliczeń wspomaganych komputerowo – doniesienie wstępne. Medycyna Dydaktyka Wychowanie 2015; w druku,