

# ANALYSIS OF THE USAGE OF COMPUTERS IN MATHEMATICS TEACHING

## – OVERVIEW OF THE SITUATION IN SERBIA

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# Computer usage and teaching



- ❑ Digital technologies and computers based applications are ubiquitous in the modern society
- ❑ Today's children should not be taught only by “old” techniques
- ❑ Computer should be used for the improvement of the quality of teaching

# Motivation



- ❑ What is the situation in Serbia?
  - ❑ Mathematics students papers
  - ❑ Lessons plans of applicants for State License
  - ❑ Insights in school practice that we have
- ❑ Absence of similar and systematic researches in our country

# Aims



- ❑ Collect the relevant data about experienced teachers of mathematics
- ❑ Get trustworthy conclusions
- ❑ Give some possible suggestions for improvement of the usage

# Hypothesis

- ❑ Computers are used insufficiently and inadequately
  - ❑ lack of knowledge (of appropriate software)
  - ❑ lack of skills related to using computers
  - ❑ lack of a positive attitude towards using contemporary technologies in teaching
  - ❑ the modest technical equipment in schools
  
- ❑ There are no significant differences between school practice in different types of schools

# Methodology



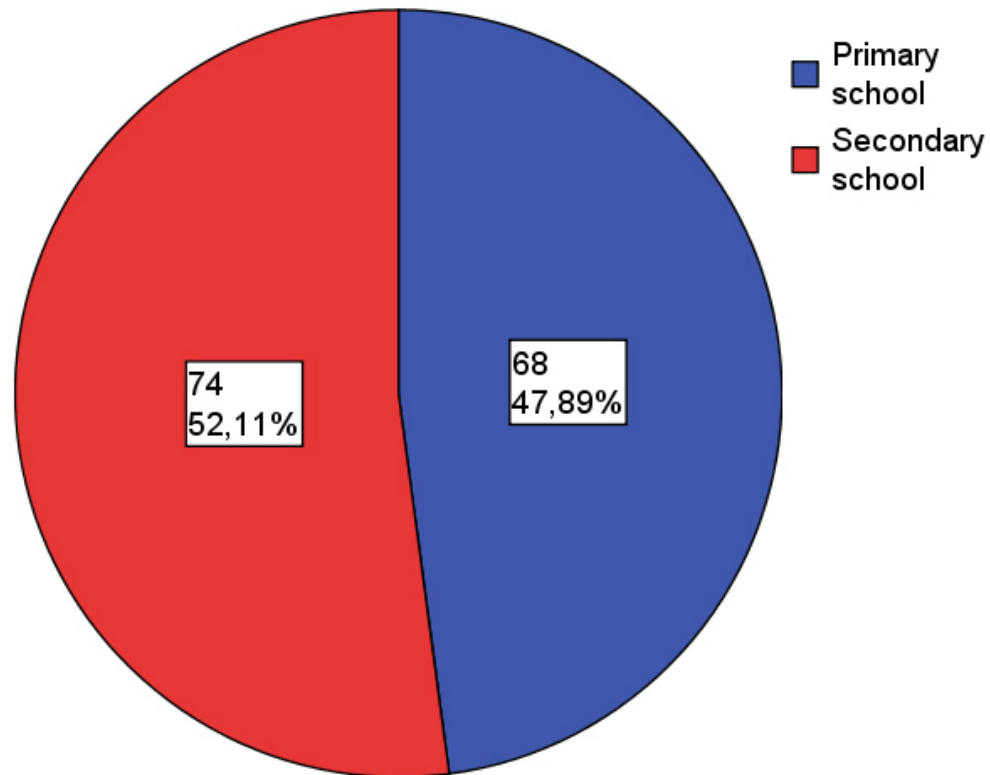
- ❑ We performed an inquiry during the annual seminar for permanent education of mathematics teachers in Serbia (2011), organized by Mathematical Society of Serbia.
- ❑ 142 licensed mathematics teachers from both primary and secondary schools

# Queries

- ❑ Duration of working experience in school
- ❑ Type of school
- ❑ Number of hours spent in permanent education (5 year)
- ❑ Frequency of usage of computers for private purposes
- ❑ Having some basic computer skills
- ❑ Technical equipment at school
- ❑ Frequency and way of computers usage in teaching process
- ❑ Reasons for current level of computers usage in teaching
- ❑ Ways for elevating computers usage in teaching process

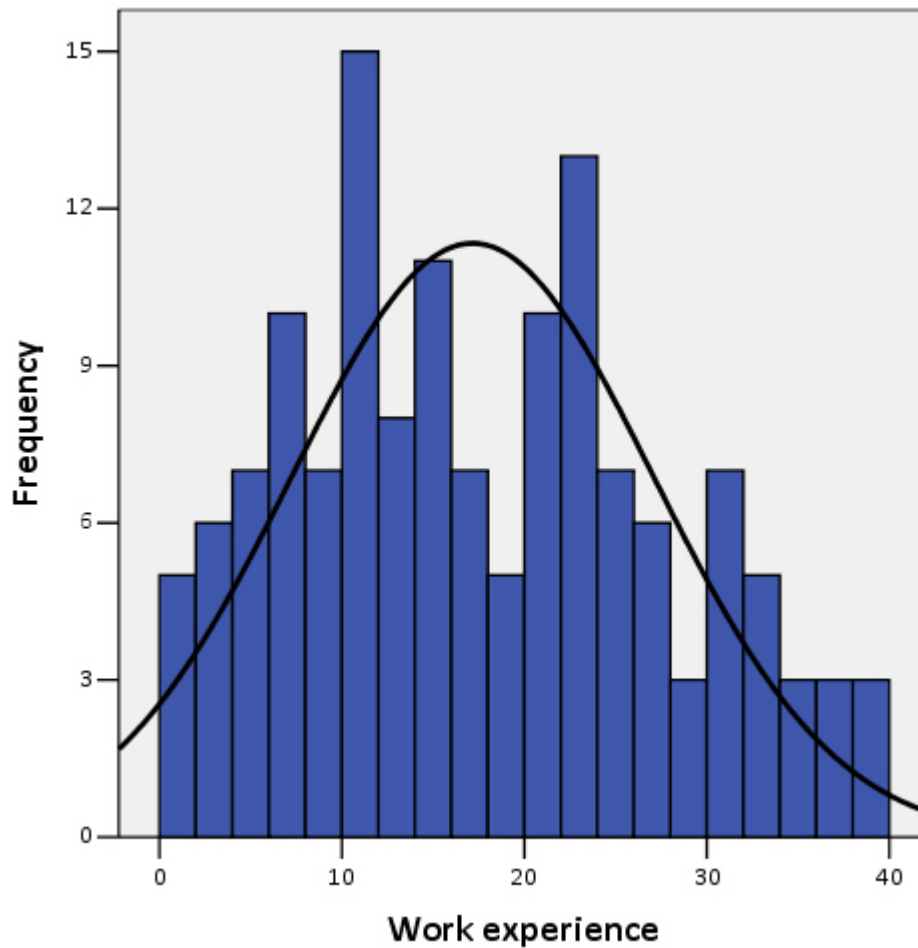
# Sample

- 142 licensed mathematics teachers





# Sample

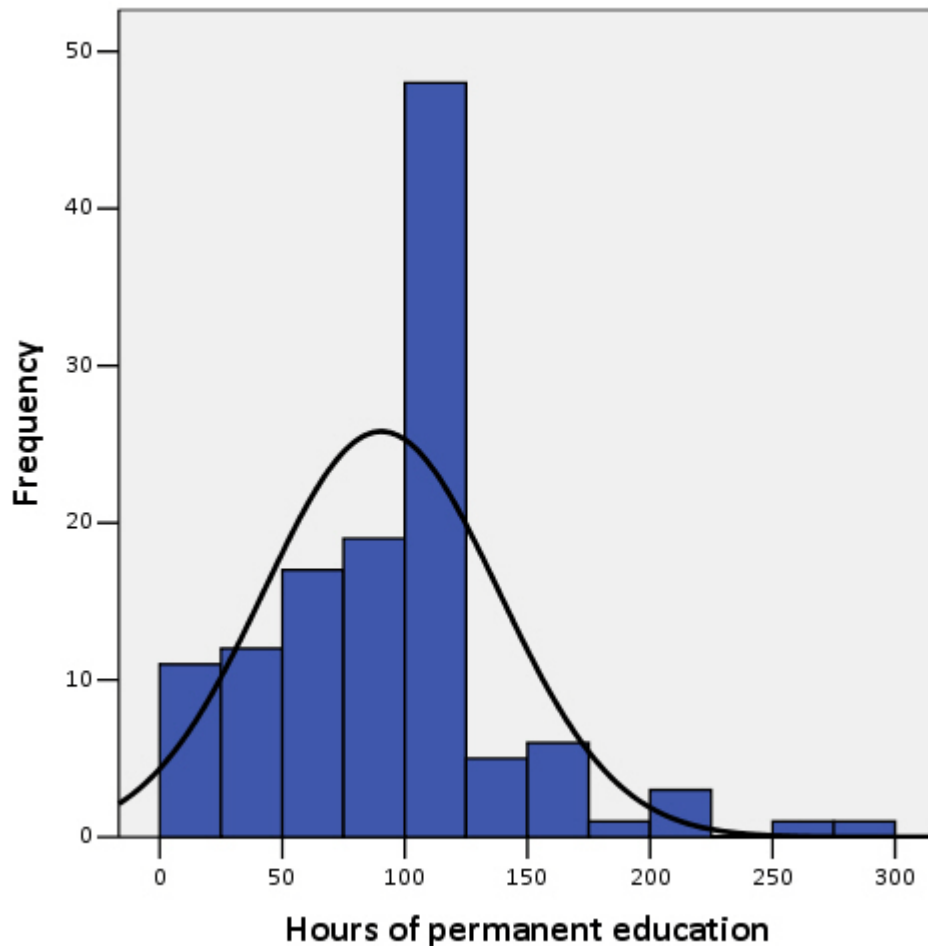


- Work experience ranged from 1 to 39 years

mean 17.16( $\pm 9.92$ )

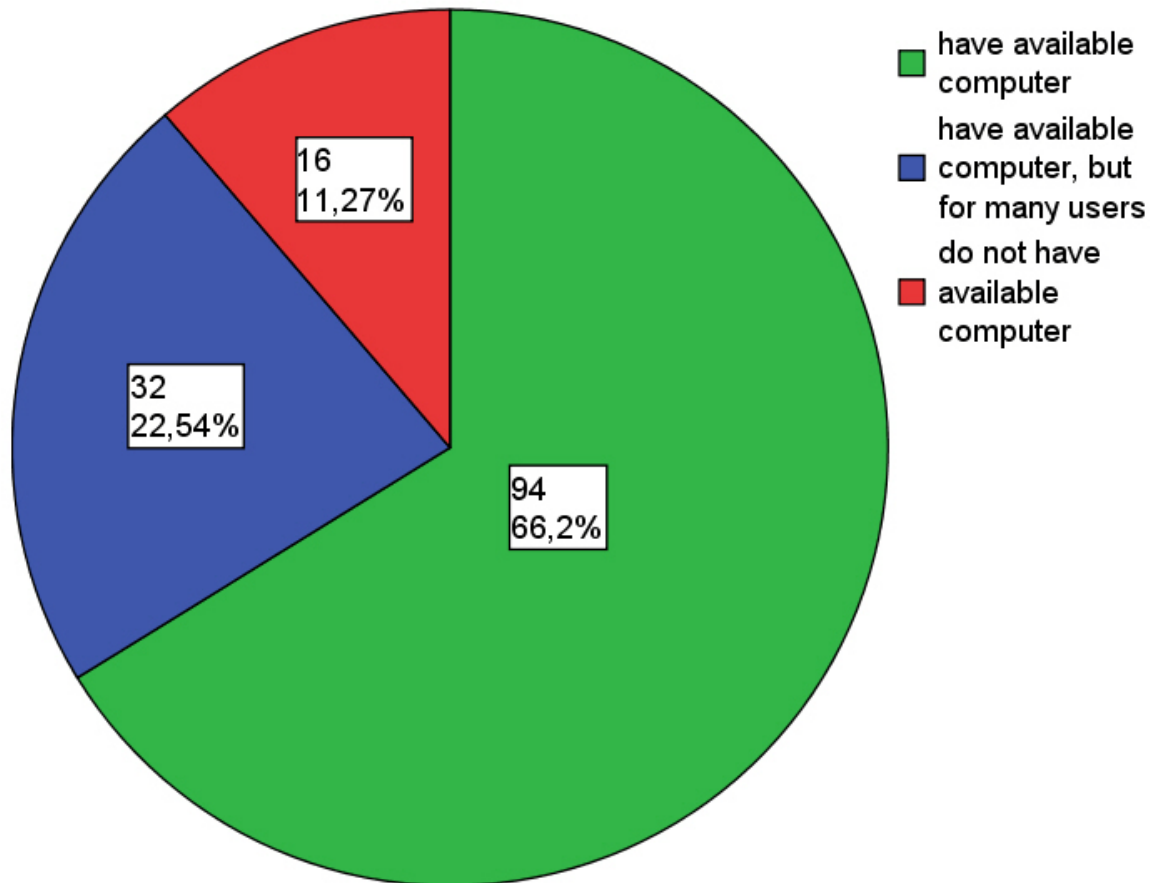
median 16.00

# Sample



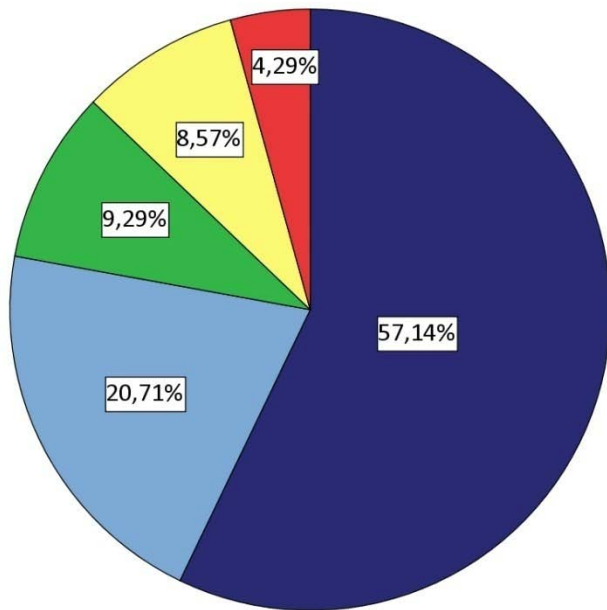
- ❑ 124 of teachers have given data about their permanent education, measured in hours in the last five years
- ❑ The range – 0 to 300, mean 90.40( $\pm$ 47.90) median 100.00

# Availability of computers in schools



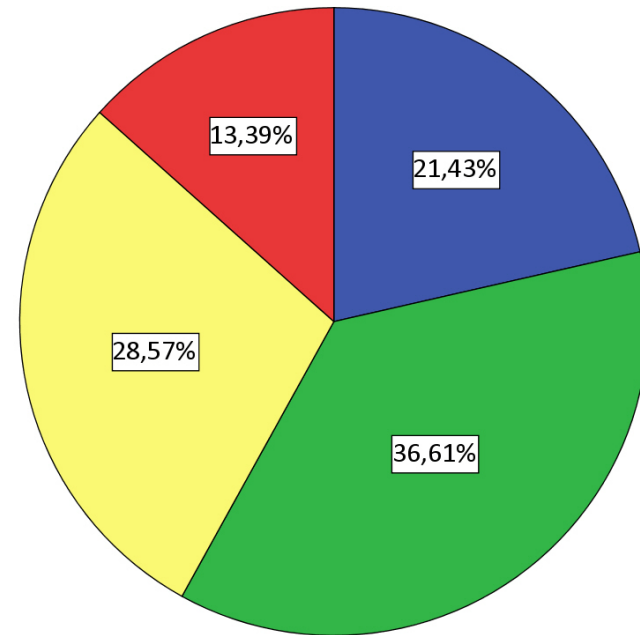
- The current level gives enough support for computers usage in schools

# Personal and school usage of computers



Personal use

- Everyday
- Several times a week
- Several times a month
- Once a month or less
- Do not use at all



School use

- Daily
- Sometimes
- Rarely
- Never

# Ways of computers usage

1. Collections of teaching units in the electronic form (77 examinees)
2. Some kind of educational software (34 examinees)
3. Presentations or video films for some parts of teaching units (56 examinees)
4. Collections of control or final tests (59 examinees)
5. Nothing of the above (10 examinees)

# Ways of computers usage

- ❑ 98 (69.01%) of examinees marked 1 or 4
- ❑ only 34 (23.94%) use computers at an advanced level
- ❑ only 15 (10.56%) use CAS and IG tools
  
- ❑ **Inadequate usage of computers in teaching process**
- ❑ Teachers mainly use computers as “clever notebook”

# Main barriers

- ❑ Absence of adequate equipment in schools  
36 (25.35%) examinees
- ❑ Lack of their knowledge  
17 (11.97%) examinees
- ❑ Negative attitude  
11 (7.75%) examinees

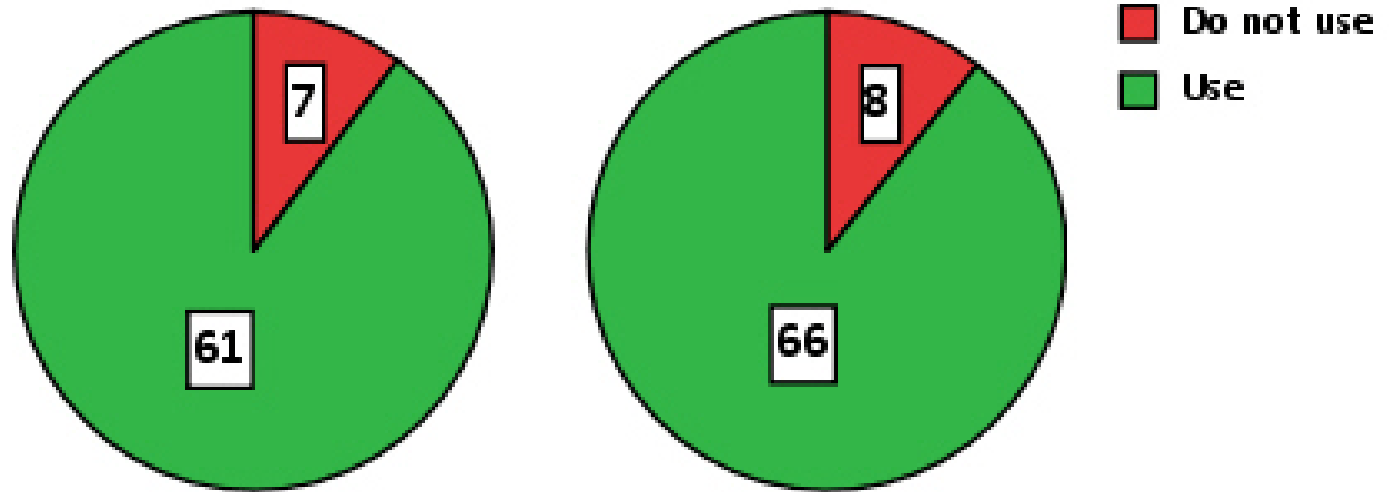
# Ways for elevating computers usage

- ❑ Better technical equipment in schools  
84 (59.15)% examinees
- ❑ Permanent education of teachers  
75 (52.82%) examinees
- ❑ More available software  
50 (35.21%) examinees
- ❑ More help from the State authorities  
34 (23.94%) examinees



# Type of school – is it relevant?

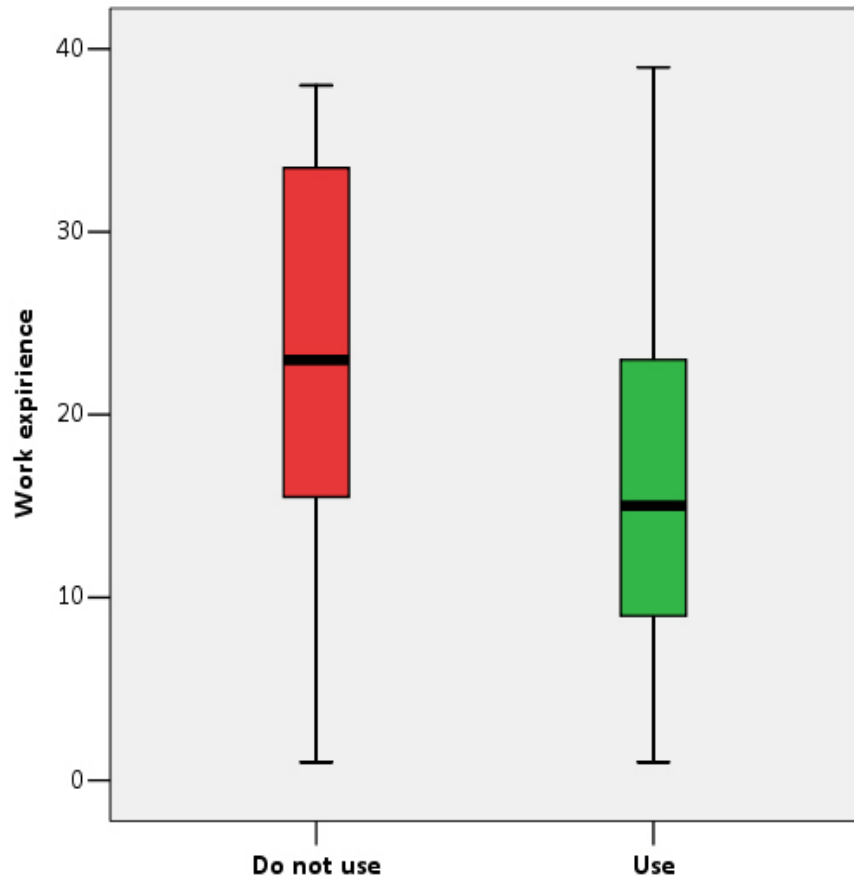
- Chi-Square test does not show significant relationship between usage of computers and the type of school,  $\chi^2(1, n=142)=0.000$ ,  $p=1.000 > 0.05$



Primary school

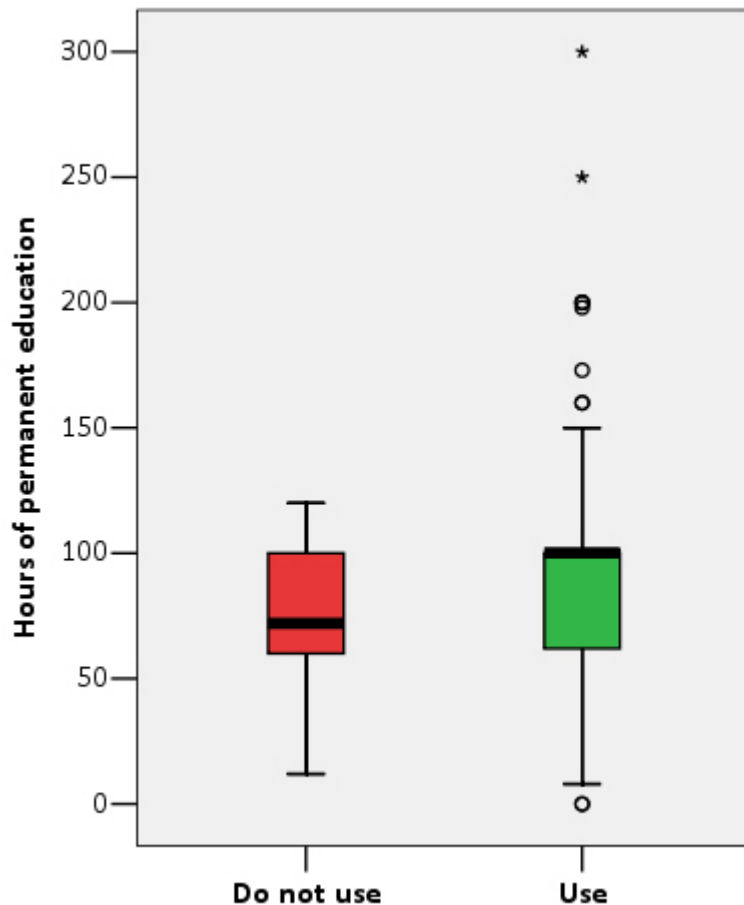
Secondary school

# Work experience (age) – is it relevant?



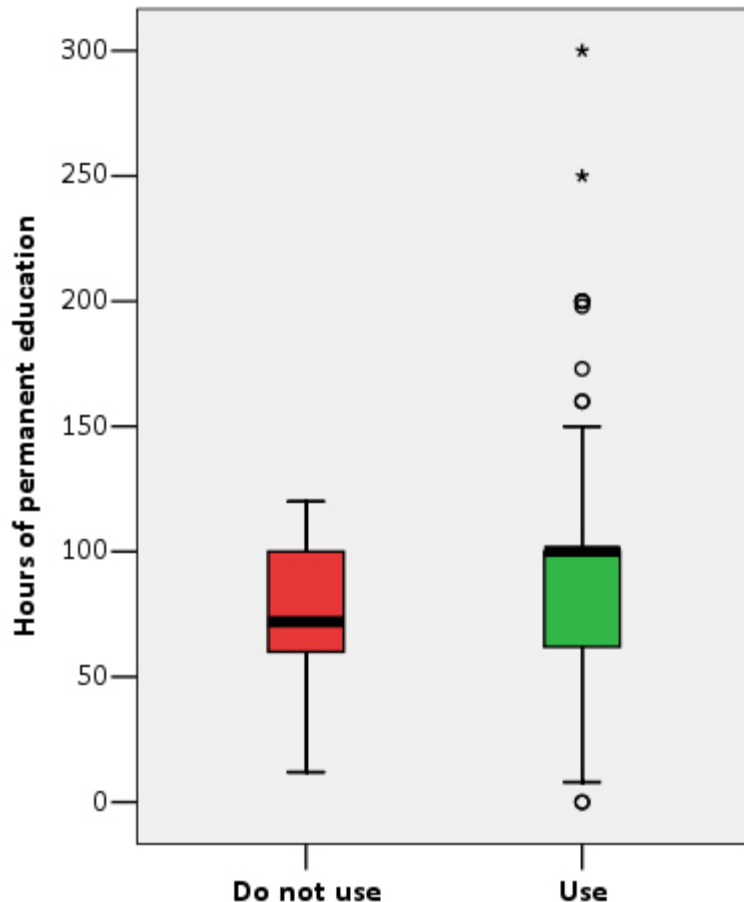
- Mann-Whitney U test – there is a significant difference between average work experience of teachers who use (Md=15, n=126) and who do not use computers in teaching process (Md=23, n=15),  $p=0.023 < 0.05$

# Permanent education – is it relevant?



- Mann-Whitney U test – there is no significant difference between average duration of permanent education in populations of teachers who use (Md=100, n=111) and who do not use computers (Md=72, n=13) in teaching process  $p=0.37 > 0.05$

# Permanent education – is it relevant?



- However, all of the examinees who have more than 120 hours of permanent education use computers in teaching process

# Conclusions and recommendations



- ❑ Situation is unsatisfactory, and must be improved in future!
- ❑ There is too great difference between usage of computers for private and professional purposes
- ❑ The level of usage for private purposes gives the possibility for fast increase of computers usage in teaching process

# Conclusions and recommendations

- ❑ Teachers do not have resistance to digital technologies at all, but they are not sure about ways of implementing them in teaching processes
- ❑ During the education (both basic and permanent) teachers should be encouraged to develop the right attitude and become qualified to use newly developed digital tools
- ❑ *being qualified* = knowledge+ skill

# Conclusions and recommendations



- ❑ Possible solutions
  - ❑ Providing wider range of topics (both in basic and in permanent education) directly related to the school practice that would help the teachers to deal with multiple problems that they may face in their practice
  - ❑ Restructuring of already existing courses in such a way that they encourage the use of digital technologies which can improve the quality of teaching process

THANK YOU  
FOR YOUR ATTENTION!