Blending academic and entrepreneurial knowledge in technology enhanced learning

eLearning
7th Conference on e-Learning 2016

ADVANTAGES AND CHALLENGES IN PRESENTING MATHEMATICAL CONTENT USING EDX PLATFORM

September 29-30,

Belgrade Metropolitan University

e-Learning Conference

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BAEKTEL

Presentation outline

- Open educational resources
- Tempus project BAEKTEL
- edX platform
- Course “Preparation for entry exam”
- Didactical criteria for developing OER content
- Termi application –connecting with course “Preparation for entry exam”
- Conclusion

Open Educational Resources - OER

Open Educational Resources (OER), definition :

OER materials are educational materials that can be freely accessed, changed, reused and shared. They include courses, textbooks, videos, tests, software …

Massive Open Online Courses (MOOCs) providers

*edX – MIT, Harvard (*As of March 24, 2016, edX has more than 7 million students taking more than 700 courses online*)*

*Coursera - Stanford (*As of January 11, 2016, Coursera offers 1 563 courses from 140 partners across 28 countries*)*

*Udacity - (*As of April 28, 2014, Udacity has 1.6 million users*)*

Tempus project - Blending Academic and Entrepreneurial Knowledge in Technology Enhanced Learning (BAEKTEL)

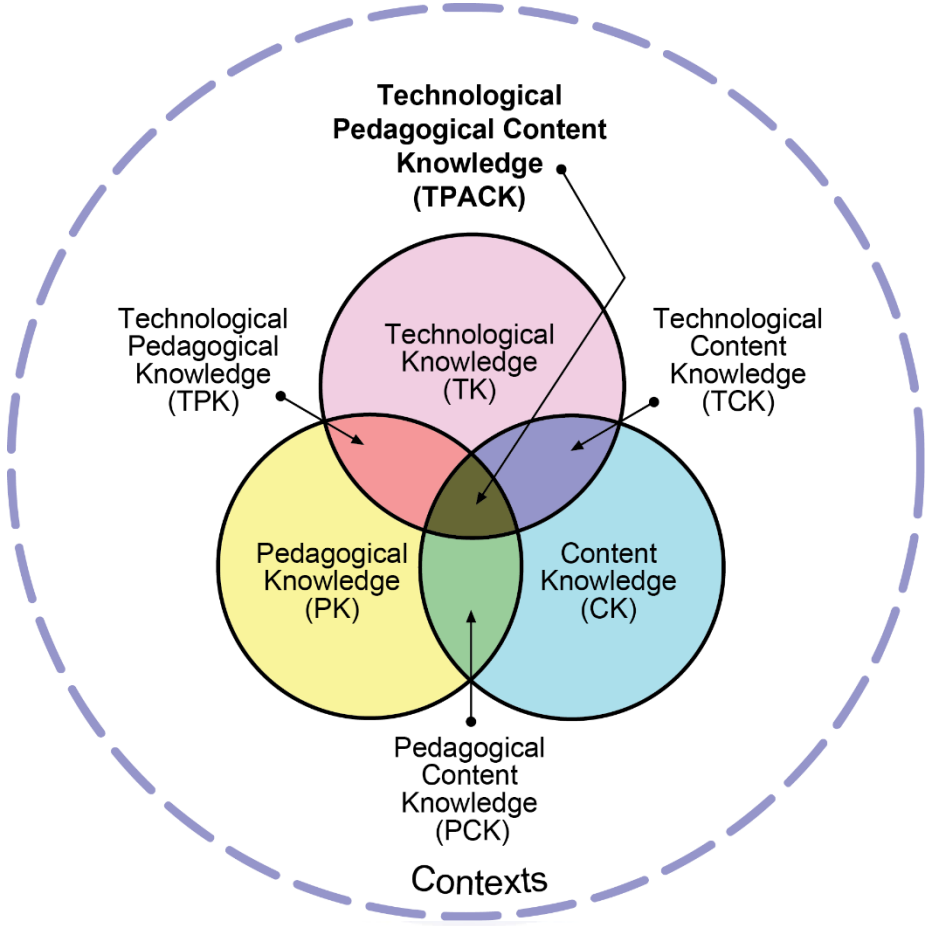
Main purposes of the project :

- Establish an OER framework for fostering technology enhanced learning
- Establishing cooperation between academic institutions and enterprises in the purpose of sharing knowledge

EdX platform

TPACK-Technological Pedagogical Content Knowledge

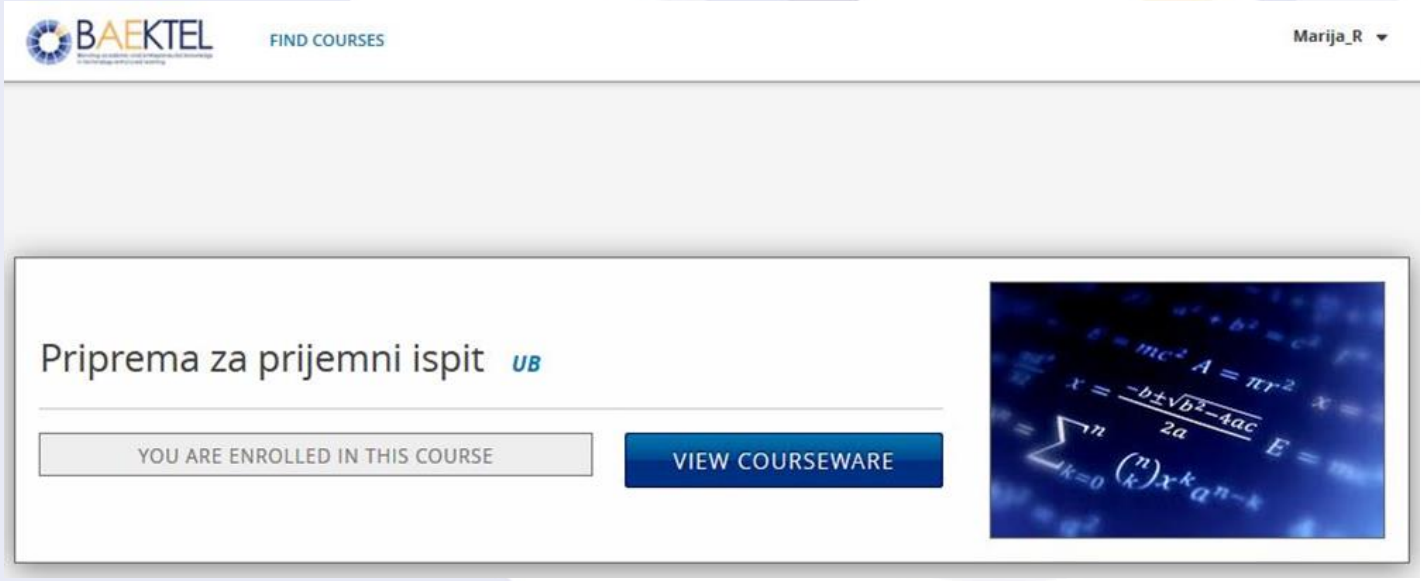
TPACK has been presented as a system which interconnects and intersects technology, pedagogy, and content knowledge



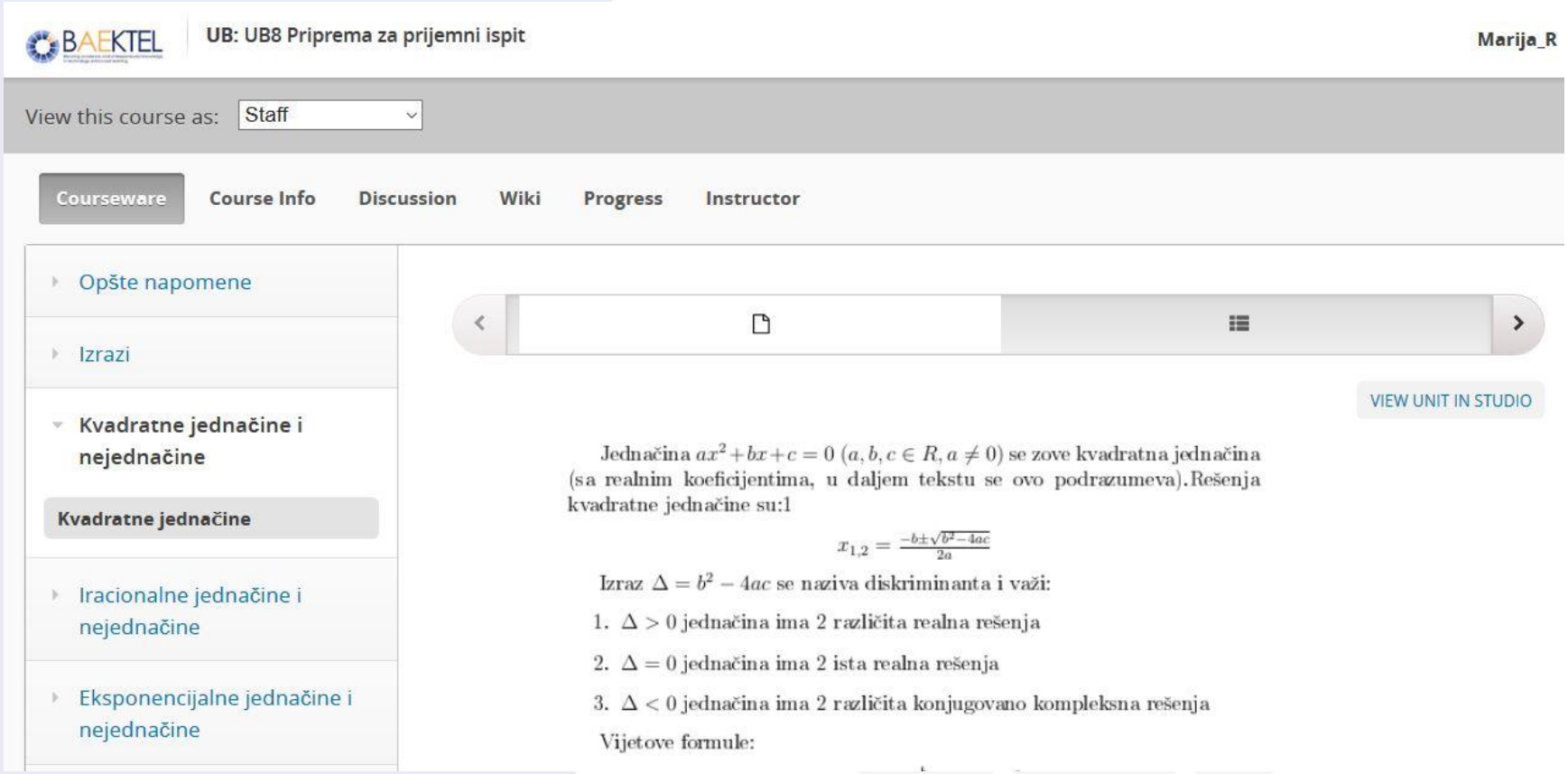
TPACK framework (http://tpack.org)

Course "Preparation for entry exam"

- 13 sections
- Theoretical part -The theoretical part contains basic axioms, theorems and formulae related to a specific mathematical topic
- Exercise part - contains tasks that represent relevant and purposeful examples
- Instructions for the exam process



View of courseware



View of a task

ZADATAK 3 (1 point possible)

Rešenje jednačine

$log_3(log_2(log_5(x))) = 0$

pripada intervalu:

- ○ $(0, 8)$
- ○ $(8, 16)$
- ○ $(16, 24)$
- ○ $(24, 32)$

?

CHECK SHOW ANSWER

Rešenje

$log_3(log_2(log_5(x))) = 0$

$log_2(log_5(x)) = 1$

$log_5(x) = 2$

$x = 25$

Dakle, rešenje pripada intervalu (24,32).

CHECK HIDE ANSWER

Under the hood

- Python programming language
- LaTex notation for mathematical formulae
- Tags

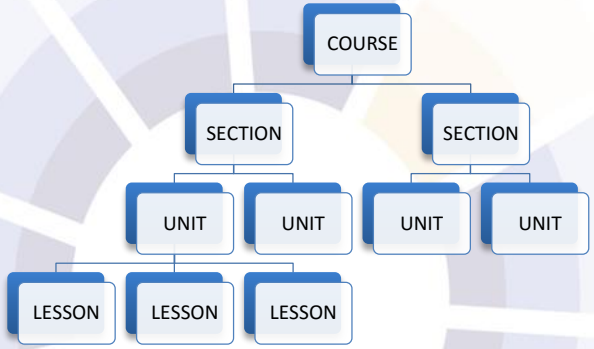
Editing: ZADATAK 4

```
<problem>
  <p> </p>
  <p>Za sve vrednosti \alpha za koje je definisan, izraz [mathjax]\frac
{1+\cos2\alpha+\sin2\alpha}[/mathjax] identički je jednak izrazu: </p>
  <multiplechoiceresponse>
    <choicegroup type="MultipleChoice">
      <choice correct="true">[mathjax] tg\alpha[/mathjax]</choice>
      <choice correct="false">[mathjax] tg2\alpha[/mathjax]</choice>
      <choice correct="false">[mathjax] \sin4\alpha[/mathjax]</choice>
      <choice correct="false">[mathjax] ctg2\alpha[/mathjax]</choice>
    </choicegroup>
  </multiplechoiceresponse>
  <p>     </p>
  <solution>
    <p>Rešenje:</p>
    <p>[mathjax]\frac{2\sin^2\alpha+2\sin\alpha\cos\alpha}{2\cos^2\alph
[/mathjax] [mathjax]=\frac{2\sin\alpha(\sin\alpha+\cos\alpha)}{2\cos\al
[/mathjax]</p>
    <p>[mathjax]=tg\alpha[/mathjax]</p>
    <p> </p>
  </solution>
```

Save Cancel

Some didactic criteria for developing OER content

- Principle of systematization and gradualism in the teaching process



- Principle of active role of end users in learning process
- Didactic principle of science
- Connecting theory and practice

Advantages of edX platform which are in line with didactical criteria

- Allows adding and easy editing videos, tasks, texts…
- Combining different components in the same unit
- Wide specter of tasks in various forms
- Monitoring a user progress
- Detailed description of learning materials
- Easy to use

Task Types

TEXT INPUT (1 point possible)

A text input problem accepts a line of text from the student, and evaluates the input for correctness based on an expected answer. The answer is correct if it matches every character of the expected answer. This can be a problem with international spelling, dates, or anything where the format of the answer is not clear.

Which US state has Lansing as its capital?

Check

NUMERICAL INPUT (3 points possible)

A numerical input problem accepts a line of text input from the student, and evaluates the input for correctness based on its numerical value.

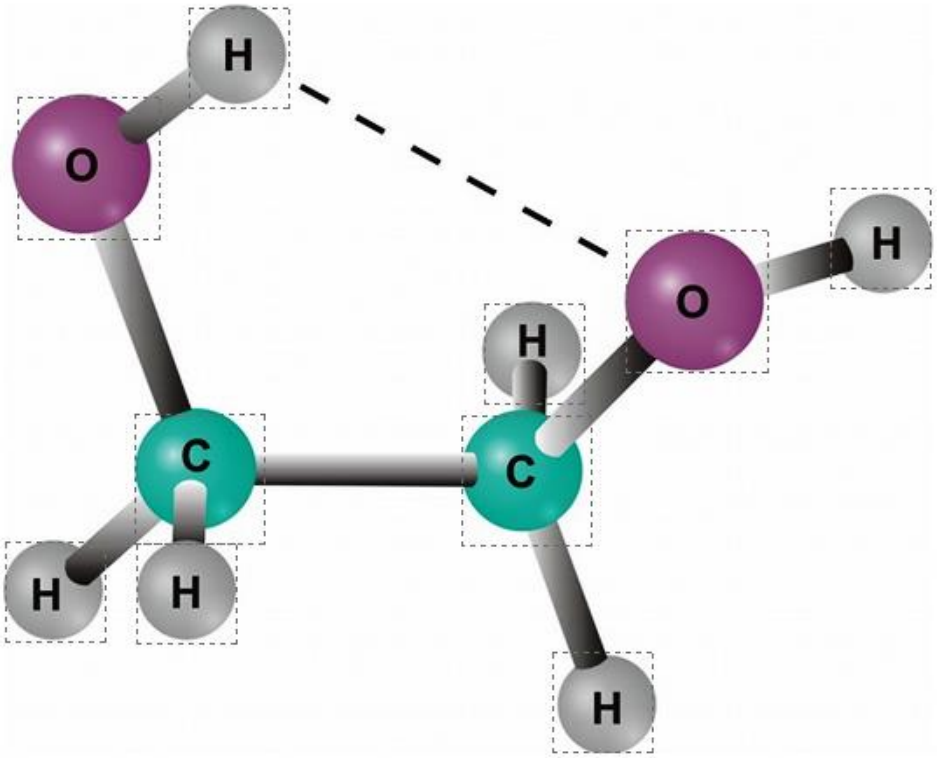
The answer is correct if it is within a specified numerical tolerance of the expected answer.

Enter the numerical value of Pi:

Task Types

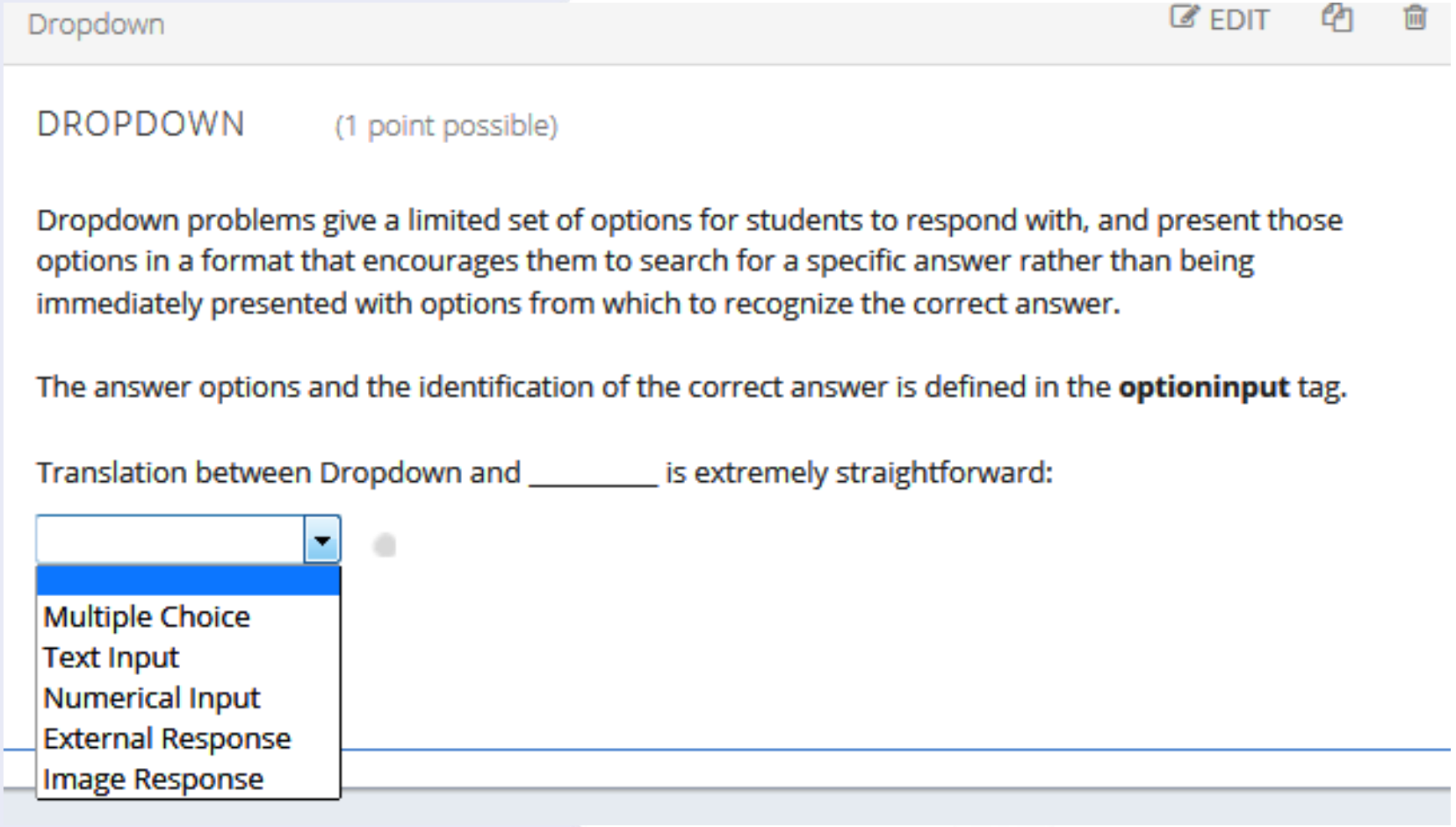
DRAG AND DROP WITH OUTLINE

Please label hydrogen atoms connected with left carbon atom.



Hydrogen | Hydrogen

Task Types


Dropdown
EDIT
DROPDOWN
(1 point possible)
Dropdown problems give a limited set of options for students to respond with, and present those options in a format that encourages them to search for a specific answer rather than being immediately presented with options from which to recognize the correct answer.
The answer options and the identification of the correct answer is defined in the optioninput tag.
Translation between Dropdown and _____ is extremely straightforward:
Multiple Choice
Text Input
Numerical Input
External Response
Image Response

Task Types

MULTIPLE CHOICE (1 point possible)

A multiple choice problem presents radio buttons for student input. Students can only select a single option presented. Multiple Choice questions have been the subject of many areas of research due to the early invention and adoption of bubble sheets.

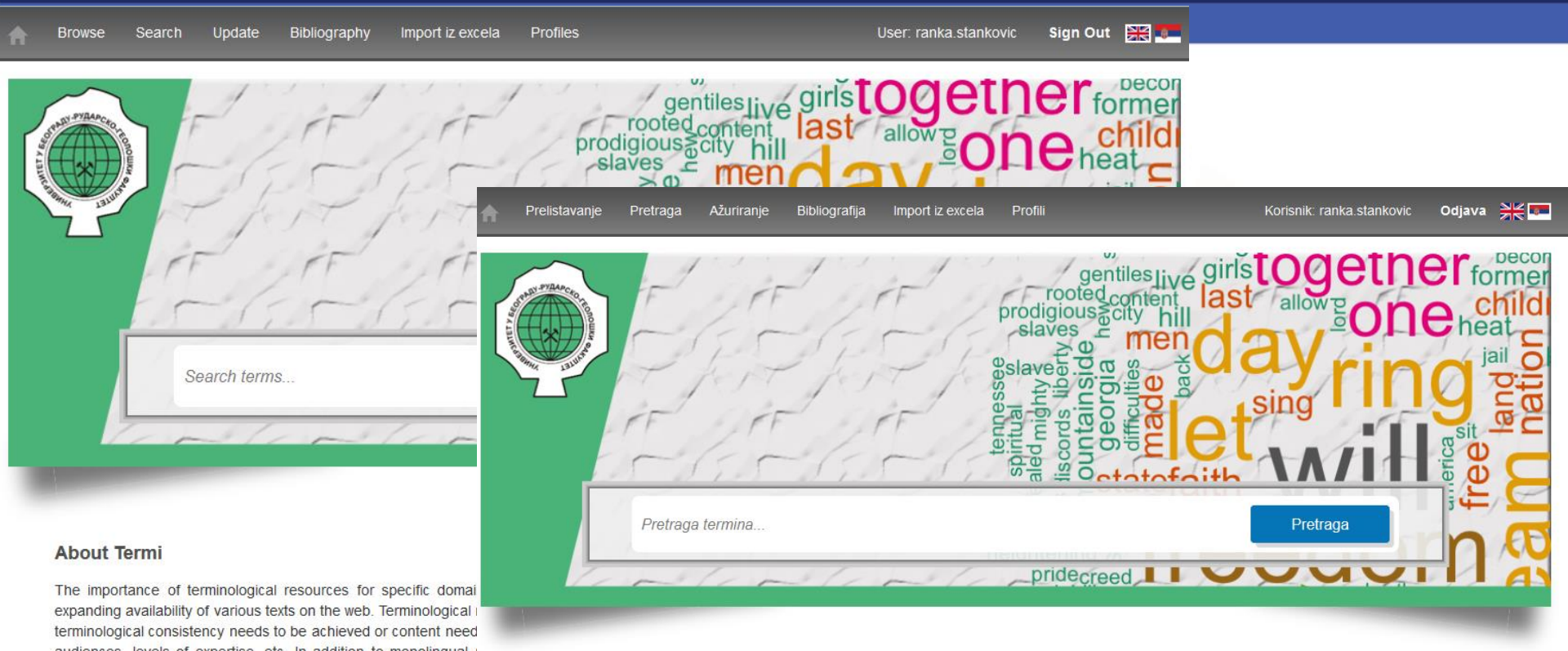
One of the main elements that goes into a good multiple choice question is the existence of good distractors. That is, each of the alternate responses presented to the student should be the result of a plausible mistake that a student might make.

What Apple device competed with the portable CD player?

- **The iPad**
- **Napster**
- **The iPod**
- **The vegetable peeler**

Check

Termi application as a support for the development of terminological dictionaries in various fields



About Termi

The importance of terminological resources for specific domai
expanding availability of various texts on the web. Terminological
terminological consistency needs to be achieved or content need
audiences, levels of expertise, etc. In addition to monolingual
language information retrieval emphasize the need for develo
resources as well. The Termi application supports the develop
(mathematics, computer science, mining, library science, comput
processing and presentation of terms in Serbian and English, but
Browse and Search page all terms verified by editors can be vi
whether they are logged in or not. Export to excel, TBX, csv is sup

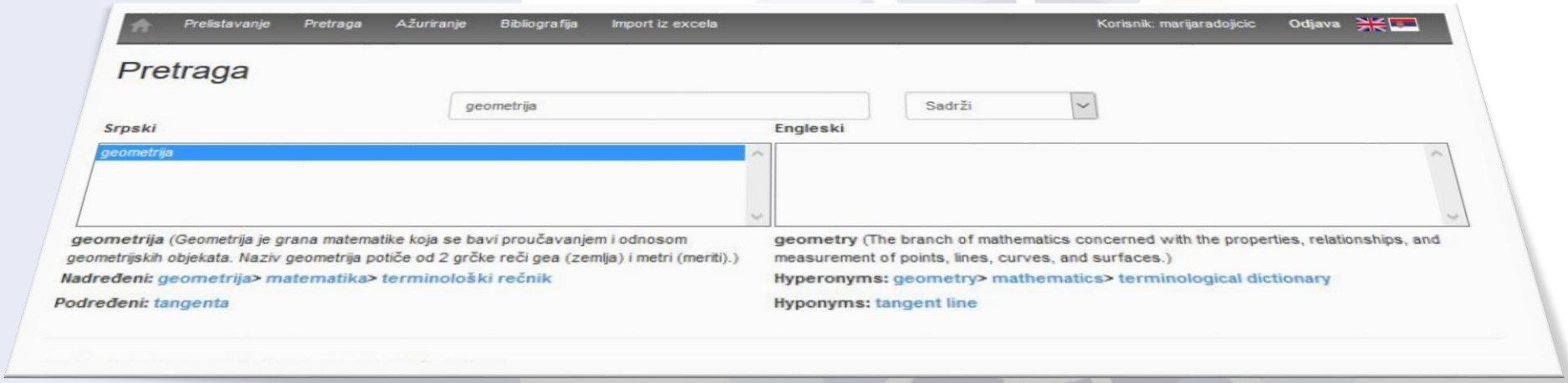
O Termi Aplikaciji

Važnost terminoloških resursa za specifične domene u elektronskom obliku rapidno se širi dostupnošću tekstova na Internetu. Terminološki resursi su važni za mnoge aplikacije kod kojih sadžaj treba da bude opisan na više jezika, treba da bude prilagođen različitim korisnicima ili različitom nivou stručnosti korisnika. U odnosu na jednojezične resurse, sistemi za mašinsko previđenje, kao i sistemi za višejezičnu pretragu informacija imaju potrebu za višejezičnim i dvojezičnim resursima. Termi aplikacija podržava razvoj terminoloških rečnika u raznim naučnim sferama (matematika, računarske nauke, rudarstvo, bibliotekarska nauka, računarska lingvistika...). Termi trenutno podržava obradu i prikaz termina na engleskom i srpskom jeziku, a u planu je razvoj za druge jezike. Na stranicama Prelistavanje i Pretraga dostupni su svi termini verifikovani od strane autora. Ove stranice u vidljive svin korisnicima bili prijavljeni ili ne. Podržan je izvoz u eksel tabelu, TBX i csv fajlove, a u planu je i razvoj izvoza u rdf, owl i slične formate.

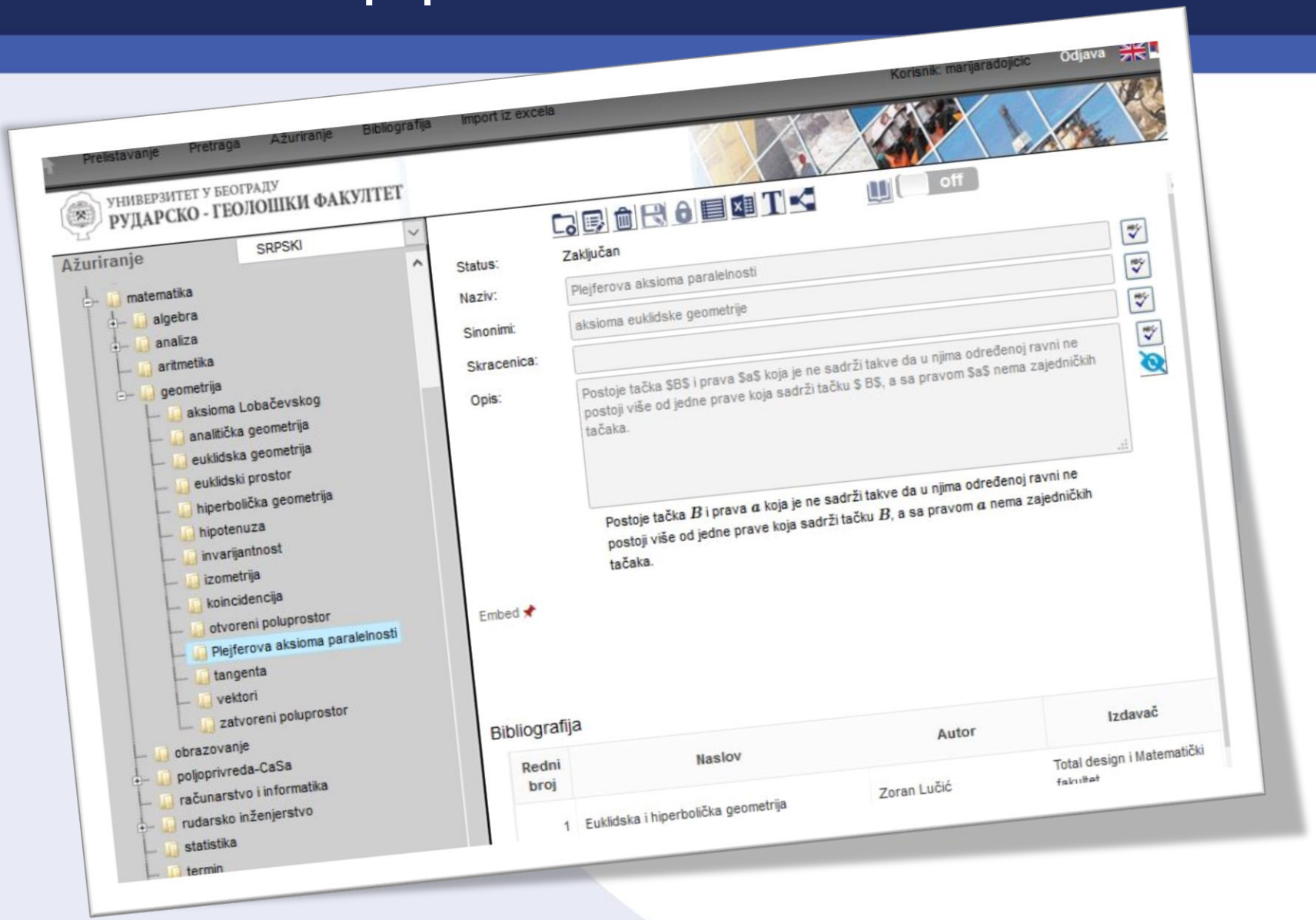
Korisni linkovi

Jerteh.rs
Biblisha
CaSa NaRA
Baektel Meta portal
GeoIISS Term

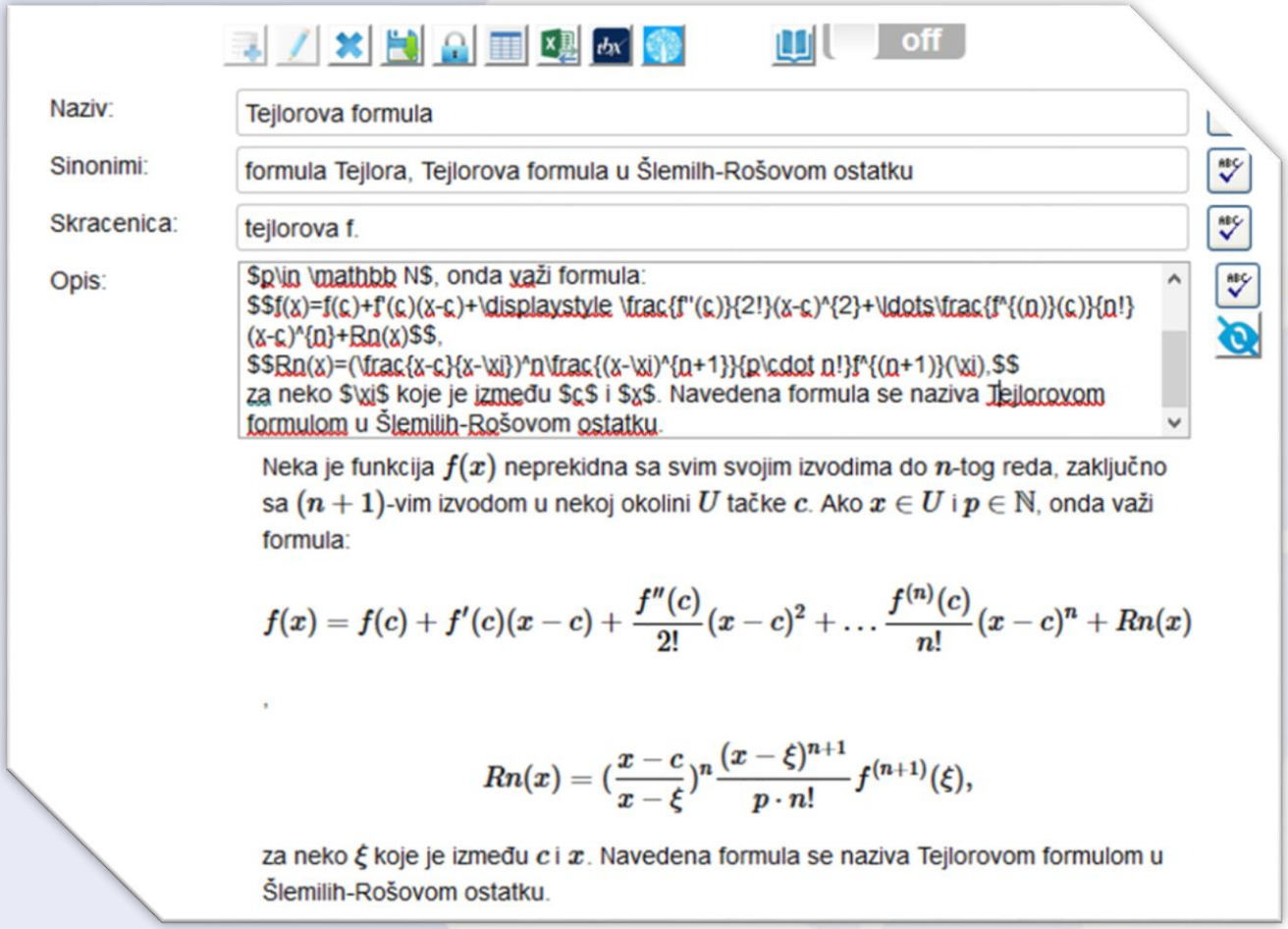
Termi application - search page



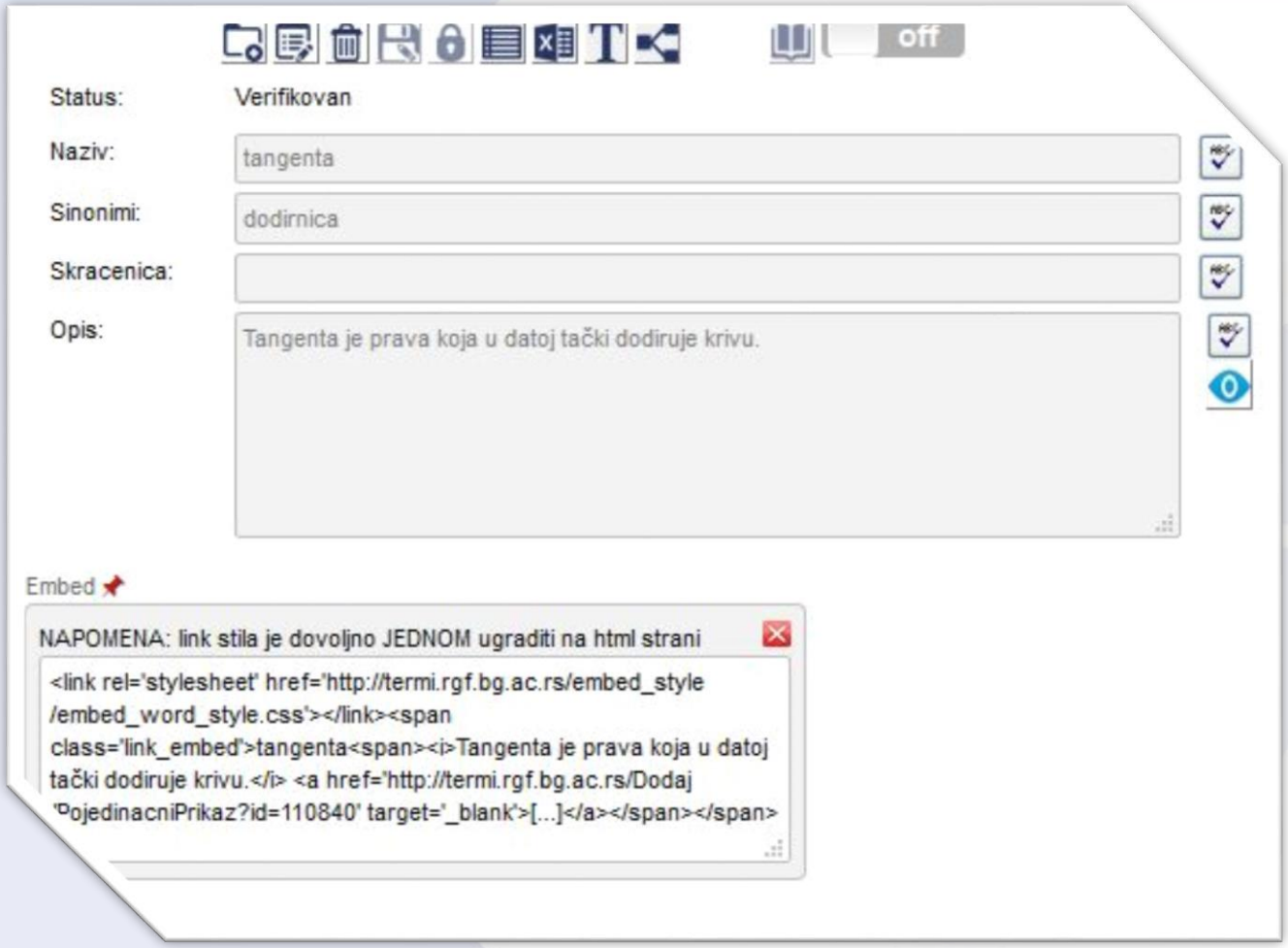
Termi application - math terms



Termi application - math example



Linking terms from courses to Termi



Linking terms from courses to Termi

ZADATAK 1 (1 point possible)

Jednačina tangente kružnice

$k : x^2 + y$

Tangenta je prava koja u datoj tački dodiruje krivu.[...]

koje su paralelne pravoj

$p : 2x - y + 1 = 0$

Tangenta Tangent line

Termin:	tangenta tangent line
Definica:	Tangenta je prava koja u datoj tački dodiruje krivu. Tangent line to a plane curve at a given point is the straight line that touches the curve at that point
Nadređeni koncept: :	geometrija matematika terminološki rečnik
Bibliografija :	The Crooked Made Straight: Roberval and Newton on Tangents, Wolfson, Paul R, 2001

`16 - Univerzitet u Beogradu, Rudarsko-geološki fakultet

Concluding remarks

- "Preparation for entry exam" was offered to more than 300 students, but only 155 students have enrolled
- Possible reasons:
  - unsuccessful promotion of the course and its content
  - lack of students' habit to use OER courses
  - lack of interest of students for additional learning materials
  - students' fear that their work will be evaluated by their future teachers
  - lack of internet access or basic IT skills required
- Introduction of this course did not mean just adding a new tool, but also offering a new learning paradigm
- There are still open questions what can be done to improve and promote OER in Serbia and to explore crucial reasons for scarce use of OER

BAEKTEL

Blending academic and entrepreneurial knowledge in technology enhanced learning

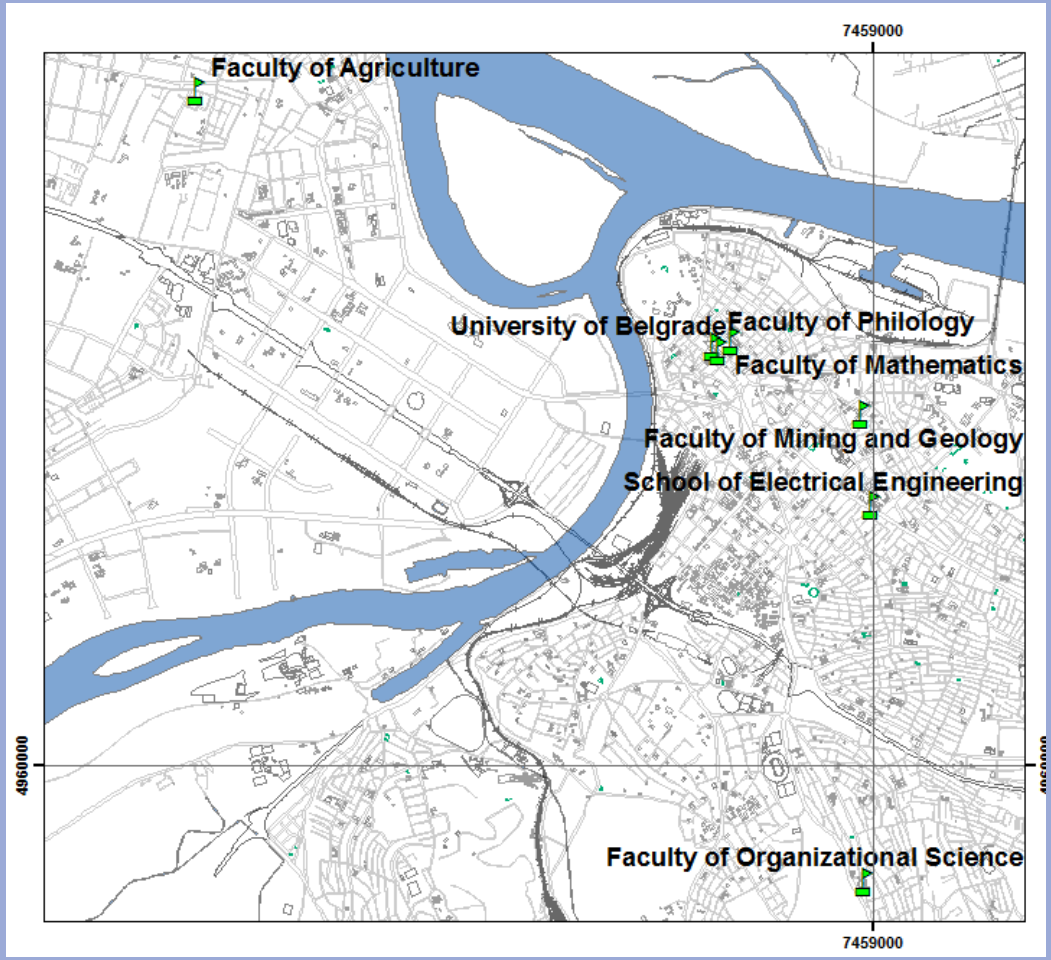
Tempus

Thank you for your attention

Grazie per la vostra attenzione

Vă mulțumesc pentru atenție

Hvala za vašo pozornost

Hvala na pažnji

Хвала на пажњи