

Delavnica: Laboratorijske vaje v gimnaziji –primeri dobre prakse

Jože Pernar

Peter Šlajpah

Gorazd Planinšič

NAMEN

Korak k bolj učinkovitim laboratorijskim vajam (zadovoljni učenci, zadovoljni učitelji)

KAKO?

Premik k bolj odprtemu tipu laboratorijskih vaj

Uporaba tabel za samoevalvacijo

ZAKAJ?

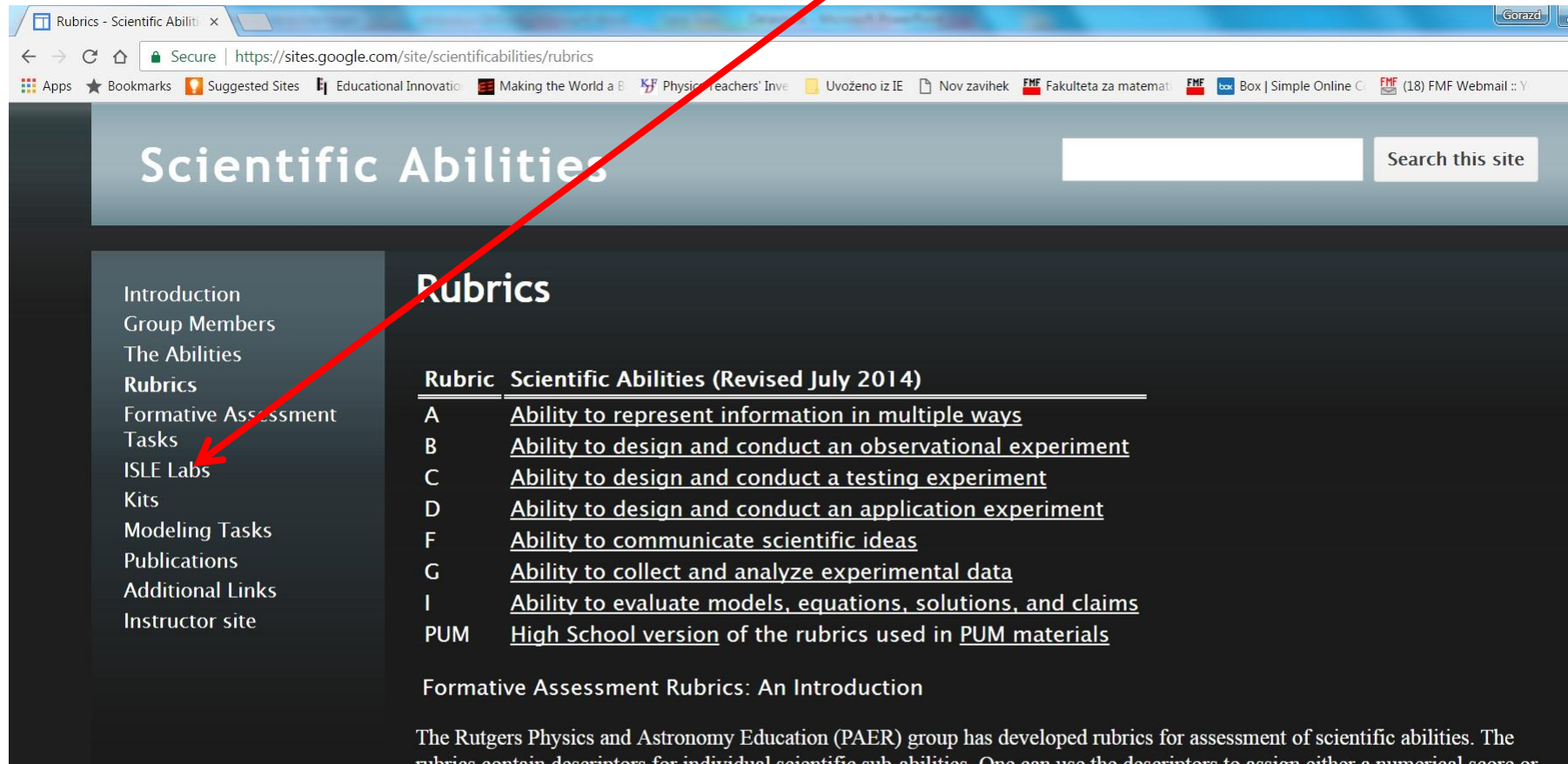
NGSS	MATURA IZ FIZIKE (katalog)
Asking questions (for science) and defining problems (for engineering)	
Developing and using models	
Planning and carrying out investigations	<ul style="list-style-type: none">• načrtovati in izvesti preproste poskuse• uporabljati osnovne merske naprave
Analyzing and interpreting data	<ul style="list-style-type: none">• urejeno zapisovati merske podatke• risati skice poskusov in pri tem uporabljati dogovorjene shematske simbole• grafično pokazati zveze med fizikalnimi količinami +• na podlagi grafov ugotoviti in zapisati zveze med njimi• analizirati in interpretirati opazovanja in dobljene podatke
Using mathematics and computational thinking	<ul style="list-style-type: none">• analizirati in interpretirati opazovanja in dobljene podatke
Constructing explanations (for science) and designing solutions (for engineering)	
Engaging in argument from evidence	
Obtaining, evaluating, and communicating information	<ul style="list-style-type: none">• analizirati in interpretirati opazovanja in dobljene podatke +• predstaviti izide poskusov

VIR

Rutgers University Scientific Ability Rubrics

Google: SCIENTIFIC ABILITIES

Tudi bogat vir odprtih
eksperimentalnih vaj



The screenshot shows a web browser window with the URL <https://sites.google.com/site/scientificabilities/rubrics>. The page title is "Scientific Abilities" and the main heading is "Rubrics". A left-hand navigation menu lists various sections, with "Tasks" highlighted by a red arrow. The main content area displays a table of rubrics for "Scientific Abilities (Revised July 2014)".

Rubric	Scientific Abilities (Revised July 2014)
A	<u>Ability to represent information in multiple ways</u>
B	<u>Ability to design and conduct an observational experiment</u>
C	<u>Ability to design and conduct a testing experiment</u>
D	<u>Ability to design and conduct an application experiment</u>
F	<u>Ability to communicate scientific ideas</u>
G	<u>Ability to collect and analyze experimental data</u>
I	<u>Ability to evaluate models, equations, solutions, and claims</u>
PUM	<u>High School version of the rubrics used in PUM materials</u>

Formative Assessment Rubrics: An Introduction

The Rutgers Physics and Astronomy Education (PAER) group has developed rubrics for assessment of scientific abilities. The rubrics contain descriptors for individual scientific sub-abilities. One can use the descriptors to assign either a numerical score or

DOBRE IZKUŠNJE PRI PREDMETU „PROJEKTNO DELO“ NA FMF UL (primeri vaj s tabelami v slovenskem jeziku so na <http://projlab.fmf.uni-lj.si/>)

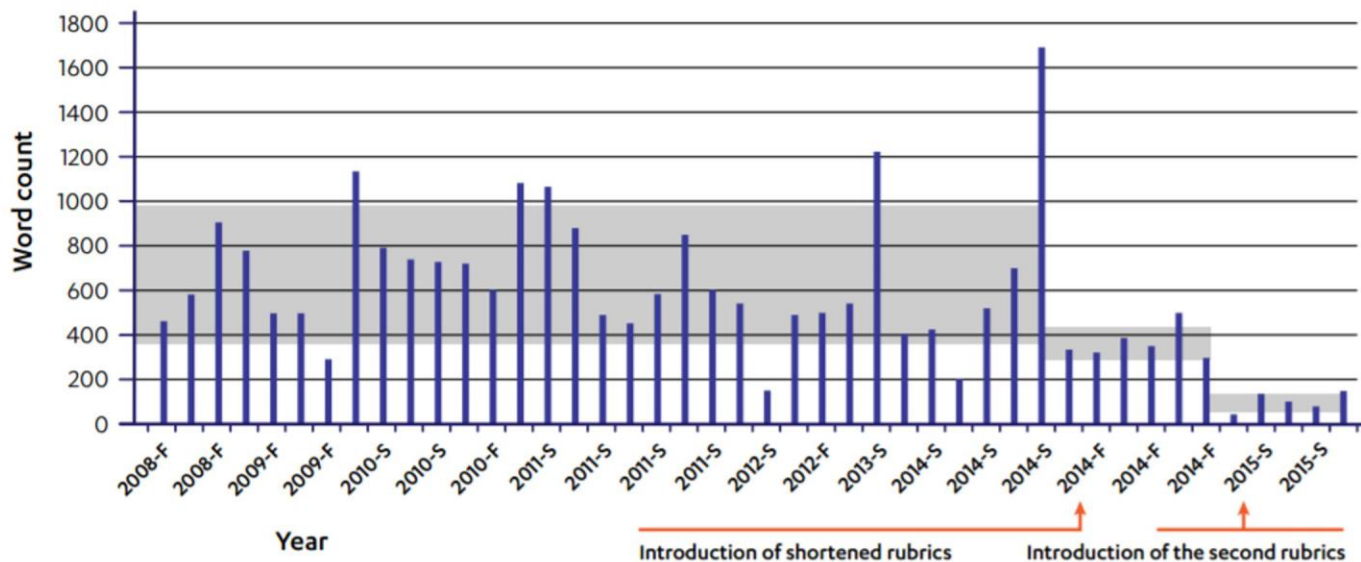


Chart 2: Comparison of the word count on the first feedback before the introduction of rubrics, during the first rubrics and during the second rubrics. The bars are actual word counts on the feedback while the wide line represents the average and the standard deviation for each period.

The quality of the reports

To evaluate the quality of the reports we first verified that the new rubrics included all the sub-abilities that we were already assessing before. In Table 1 the last row lists the main sub-abilities that we assessed before we started using the rubrics. The other rows in the table show the 'adequate' column of four of the sub-abilities in the current rubrics. All of the 'old' sub-abilities from the last row, except the correct physics sub-ability, are now listed in these four 'new' sub-abilities under 'adequate'. Therefore, these are obviously included in the rubrics. The correct

SELF-ASSESSMENT RUBRICS AS A TOOL TO HELP STUDENTS AND TEACHING ASSISTANTS

TABELE ZA SAMOOCENJEVANJE KOT ORODJE V POMOČ ŠTUDENTOM IN ASISTENTOM

SERGEJ FALETIČ¹, EUGENIA ETKINA² and GORAZD PLANINŠIČ³

Abstract

Rubrics are an assessment and self-assessment tool. They consist of a table representing a broad ability, and the listing of sub-abilities and the criteria to assess to which degree the sub-ability has been developed. We introduced such rubrics to assess student work in the "Project laboratory", a project-based course, where groups of students solve open-ended experimental physics problems. They submit a report which is evaluated and returned to the students with feedback on what needs to be improved. These iterations are repeated until the report is deemed acceptable. We present our experience with the rubrics and show that their introduction decreased the workload of teaching assistants down to one third, while increasing the quality of the reports. Based on these results we conclude that using rubrics is a very efficient way of assessing project-based work.

Keywords: assessment, physics, project based work, rubrics, self-assessment, teaching

Povzetek

Tabele za ocenjevanje in samoocenjevanje so pripomoček za vrednotenje napredka študentov. Vsaka tabela predstavlja neko sposobnost. V tabeli so navedene podspodobnosti, ki sestavljajo dano sposobnost in kriteriji za določanje, v kakšnem obsegu je bila podspodobnost razvita. Te tabele smo uvedli v ocenjevanje študentskega dela pri predmetu Projektno delo. To je predmet, pri katerem skupine študentov rešujejo odprte eksperimentalne fizikalne probleme, nato pa o tem oddajo poročilo. Poročilo pregleda asistent in poda povratno informacijo, na podlagi katere študentje izboljšajo poročilo. Te iteracije potekajo dokler poročilo ni sprejemljivo. Predstavljamo svoje izkušnje z uvedbo tabel za samoocenjevanje. Pokazali bomo, da se je z njihovo uvedbo zmanjšala obremenitev asistenta približno na tretjino, medtem ko se je kakovost poročil povečala. Na podlagi tega ocenjujemo, da so rubrike zelo učinkovito orodje za vrednotenje projektne dela študentov.