



BestEDU – Lessons Learned during COVID
Transferability of Best Practice in European Education
ZAGREB, 6.2.2023.

**Field and practical work with students
during Covid 19 pandemia**



Učenje biologije u epidemiološki
prilagođenom istraživačkom okruženju

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Introduction

COVID-19 pandemic developed the **challenge** for teachers:

- to appropriately teach in online environment
- to appropriately evaluate knowledge and understanding of science concepts in online environment.
- how to improve students' competencies required for solving tasks at higher procedural and metacognitive levels.



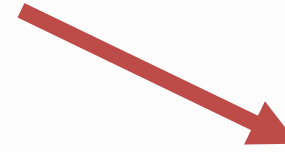
Introduction

Metacognitive and procedural knowledge



Contextual knowledge

**Awareness about level
of personal knowledge**



Developing research

Source analysis

Focusing

Comparing

Classifying



Aim

Improving student's competencies required for solving tasks at higher procedural and metacognitive levels by experimental learning in virtual classroom

Development of virtual BUBO classroom

ASIO model 2.- virtual field work

Topic : Adaptation onto extreme environment

OBJECTIVES

BIO SŠ A.3.1. Connecting appearance of new characteristics through cell development explaining cell specialization in advanced organ systems.

BIO SŠ D.3.1. Application of basic knowledge and methodology of science investigation and developing critical judgement of results ...



Method (virtual classroom)

1.

VIRTUAL FIELD
WORK

2.

STUDENT'S
INVESTIGATION

3.

WRITTEN
REPORT

3. razred gimnazije: Ekstremna staništa



Radni listić (E)



Otok Palagruža-krš i sol

Na portalu Priroda Hrvatske putem sljedeće poveznice:

<https://priodahrvatske.com/2018/07/27/palagruza-najudaljeniji-pucinski-otok/>
ili skeniranjem QR koda upoznajte Palagružu te uz praćenje videozapisa, odgovorite na sljedeća pitanja.

1. Po čemu je stanište (kopneni dio otoka) poseban otok Palagruže?

2. Objasnite zbog čega na otoku Palagruži ima velik broj endemskih vrsta .

3. Navedite najvažnije biljne i životinjske vrste na otoku Palagruži.

Biljne vrste	Životinjske vrste

4. Zabilježite u tablicu kakvi ekološki uvjeti dominiraju na kopnu otoka Palagruža?

Abiotički uvjeti	Biotički uvjeti

Biolška izložba istraživanja ekstremnih staništa

Samostalno osmislite malo istraživanje kojim ćete upoznati kako ekstremni uvjeti utječu na biljne organizme.

Da biste izradili ovaj eksperimentalni rad potrebno je prvo napraviti mala **samoodrživa staništa**, tj. **mezokozmose** ili **otvorena staništa** koji će **imati slične uvjete kao ekstremna staništa** iz virtualne terenske nastave. Slika 1. prikazuje dizajn različitih mezokozmosa napravljenih iz priručnog materijala.



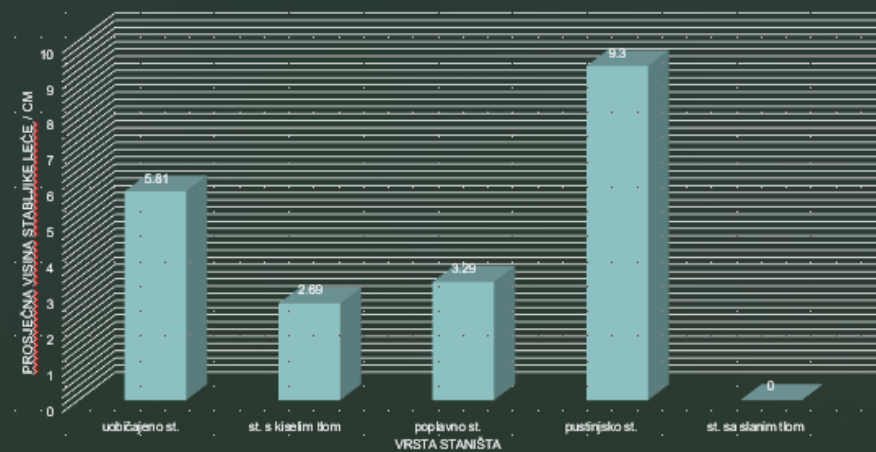
Slika 1 primjer dizajna mezokozmosa na zemlji za cvijeće

Bitno je izraditi **četiri ekstremna staništa** i **stanište koje ima optimalne uvjete** za razvoj ispitivane biljne vrste.

Poštujući formu istraživačkog rada, prezentirajte svoje rezultate kao odgovor na raspravu naslovljenu vašom školom i razredom, u obliku **plakata ili prezentacije ili pisanog rada** po dogovoru s nastavnicom/nastavnikom o formatu, poštujući kriterije i pravila pisanja istraživačkog rada i prema zadacima u prilogu uputa kao **individualni** ili **grupni** zadatak. Kriteriji vrednovanja za svaki oblik prezentacije navedeni su tablicama 1. i 2. uputa.



Obrađeni podatci



Graf 1: prikaz prosječne visine stabljike leće u pojedinom staništu



METHOD (Effectiveness)

1.

Testing
control group

2.

Testing
experimental
group

3.

Analysis of
success

Task example

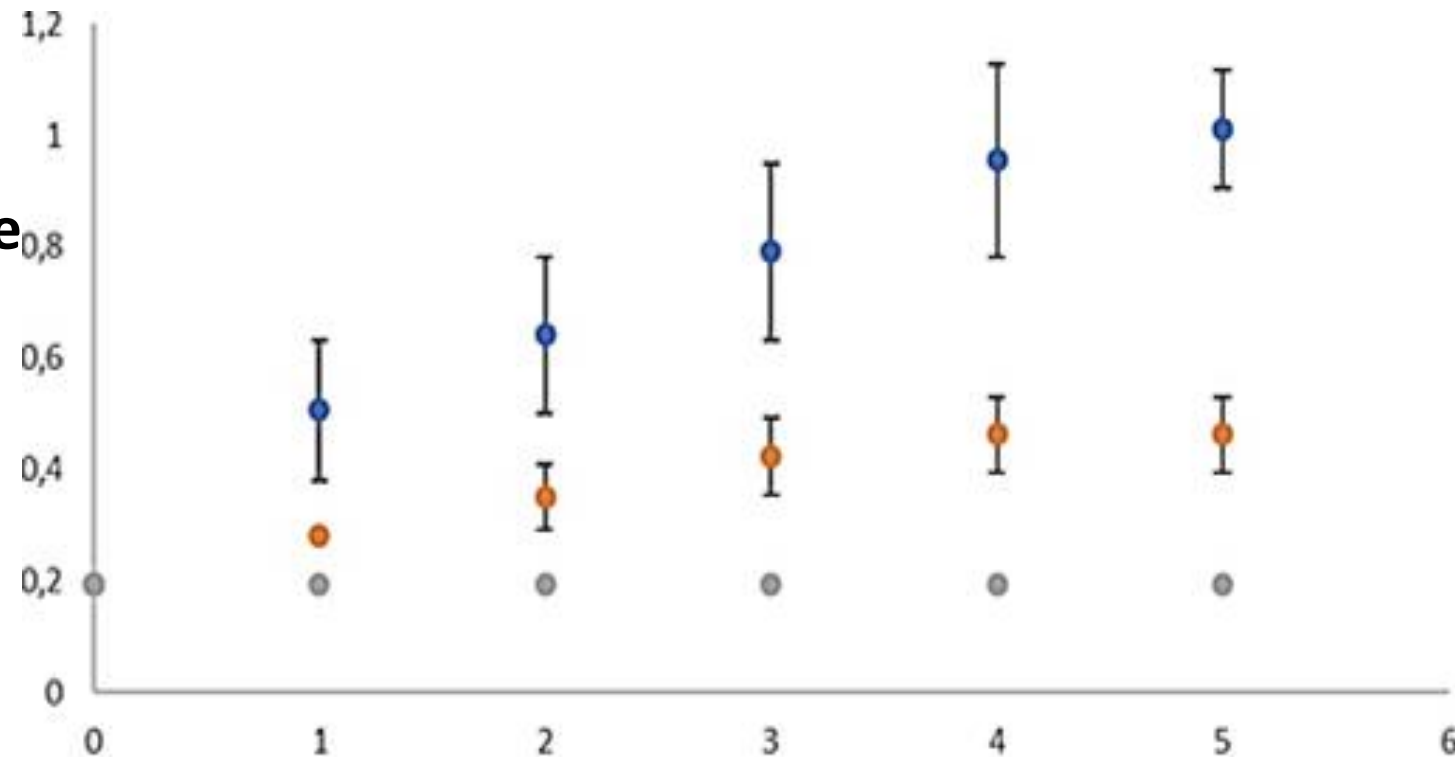
Biology student has been testing effect of natural substances onto bacterial growth. Bacteria colonies used in experiment were same genus. The aim was to test how different concentration of curcuma and zingiber extracts affect bacterial growth by measuring inhibition zone. Result are presented below

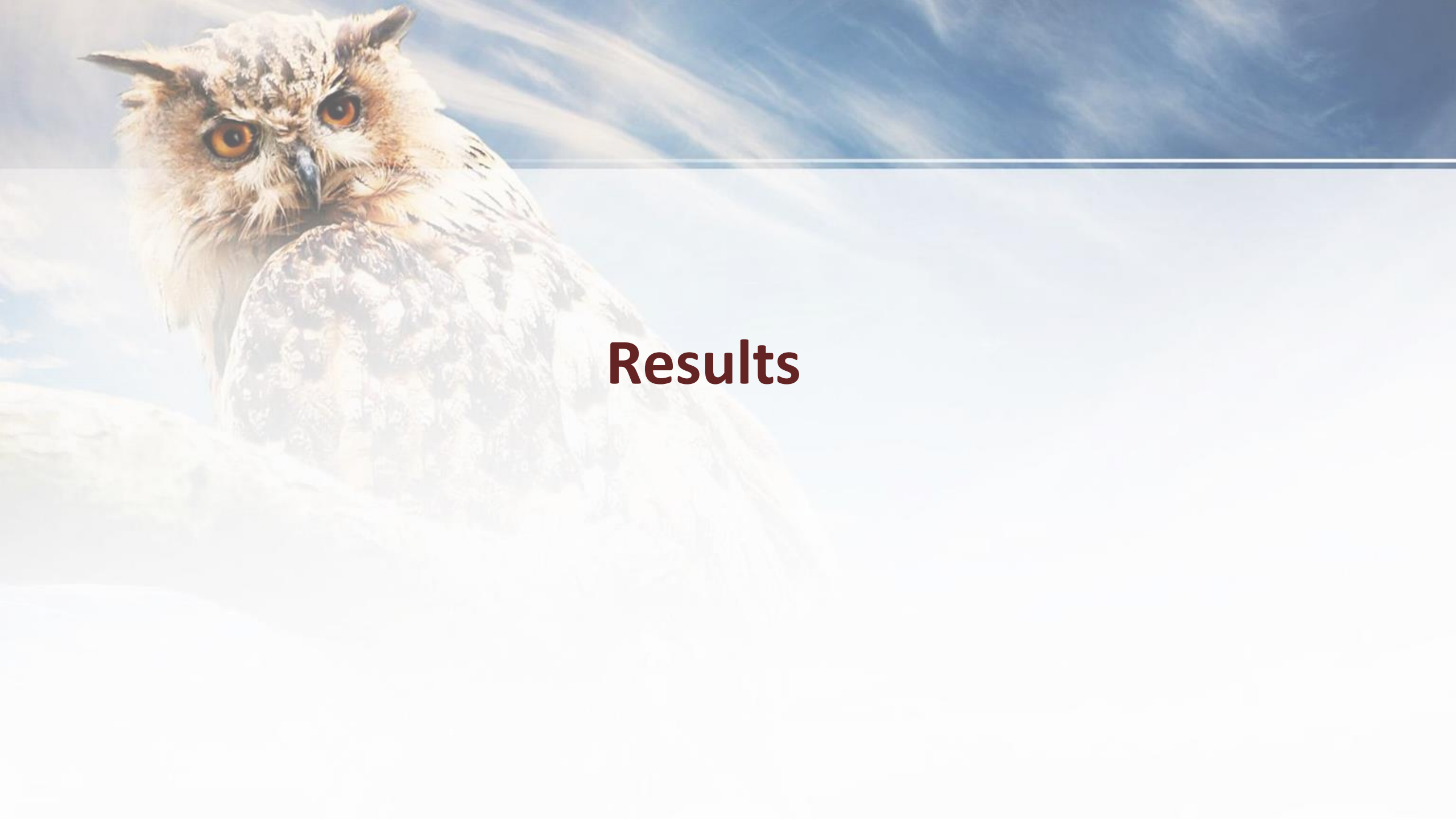
1. Explain what is presented on y-axis.

2. Explain why in this experiment inhibition zone is dependent variable

3. Student has upgrade experiment by using mixed bacterial colony. After reading results he has been noticed that extract do affect some of the colonies.

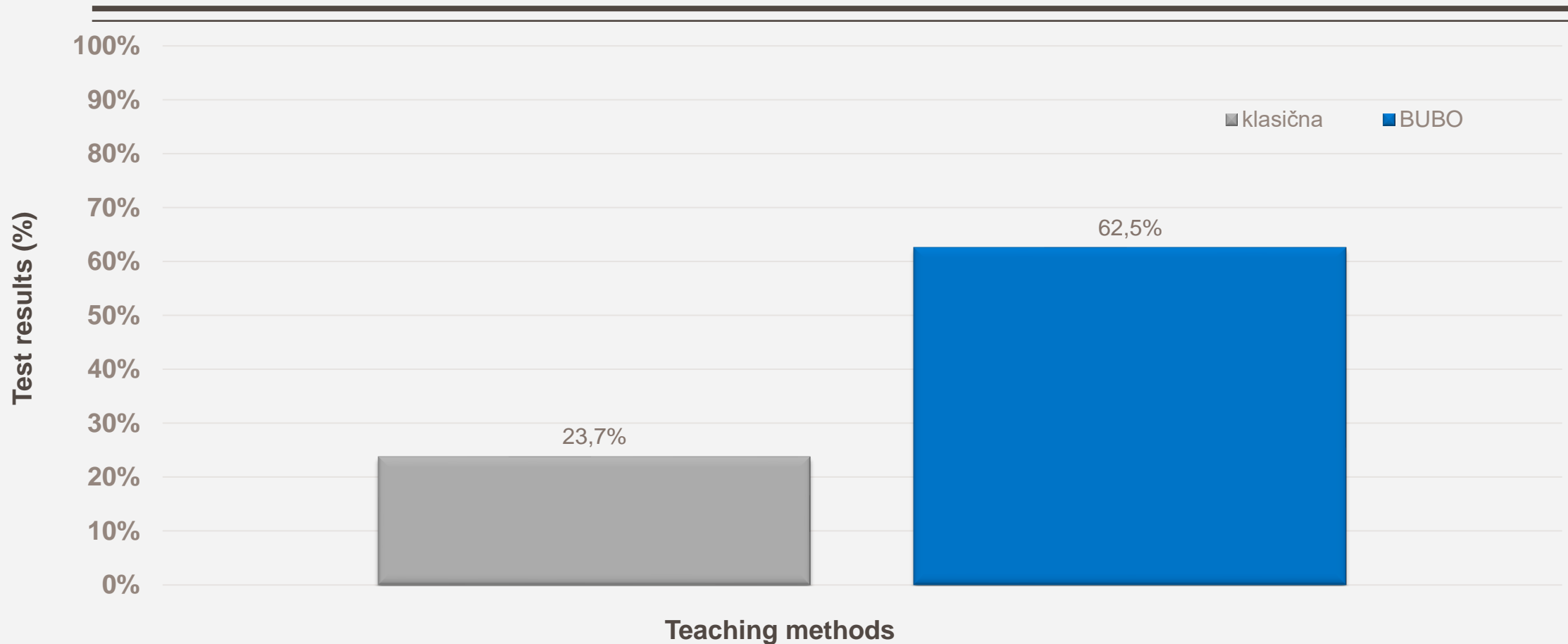
Explain reason for that appearance.





Results

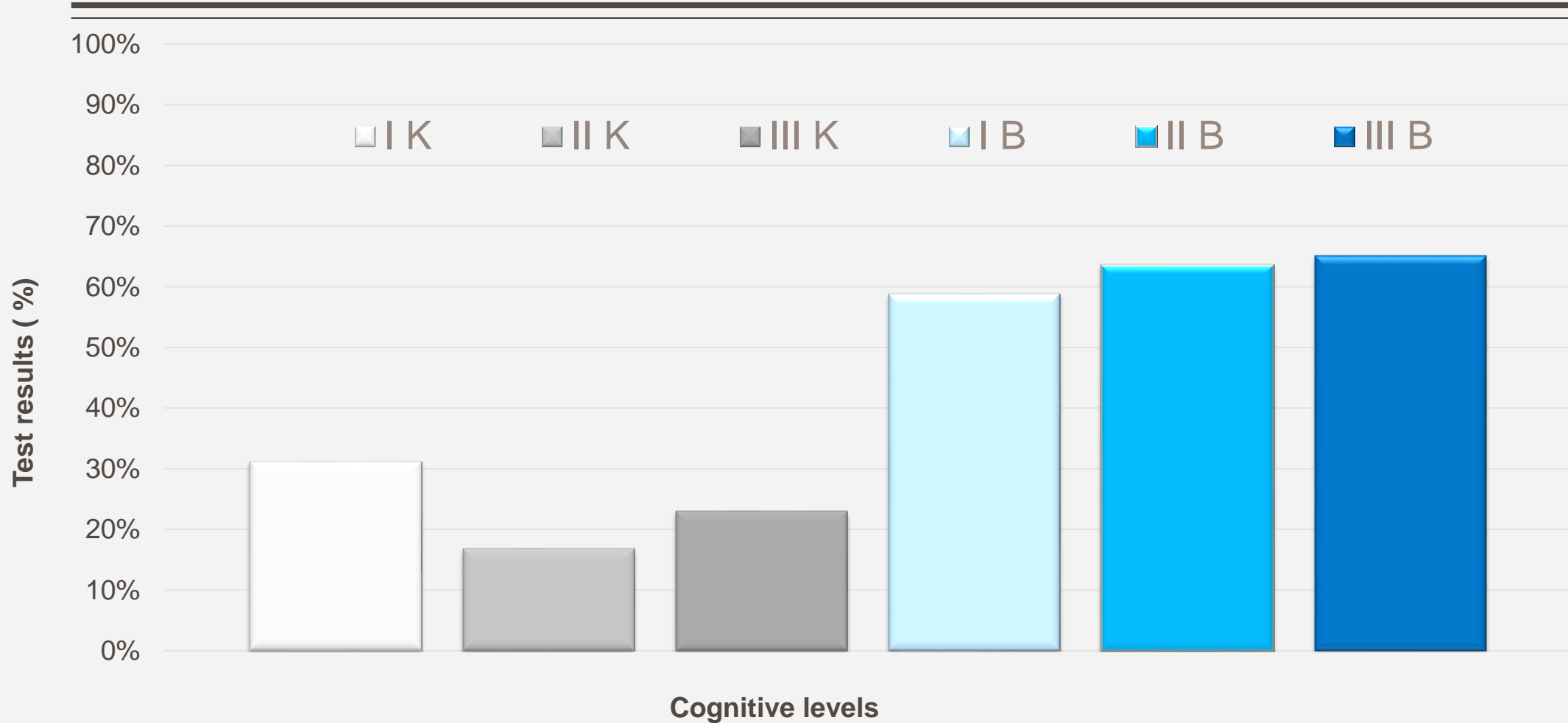
Total results



Graph 1. Total results in group taught by classical methods and group taught by ASIO model in BUBO

The t -value is 6.66264. The p -value is $< .00001$. The result is significant at $p < .05$. (<https://www.socscistatistics.com>, 2022)

Results per cognitive levels



Graph 2. Results per cognitive levels in group taught by classical methods and group taught by BUBO

Conclusion

- students' competencies required for solving has been overall improved by using ASIO models on BUBO
- further improve need to be done on materials that lead to development of competencies required for solving tasks at higher procedural and metacognitive levels





BUBO, VIRTUAL CLASSROOM FOR 11TH GRAMMAR SCHOOL STUDENT AS A SUPPORT IN DEVELOPING OF METACOGNITIVE KNOWLEDGE AND SKILLS

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Učenje biologije u epidemiološki
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Thank

You