TELSON

Workshop on scenario-based learning with low-fidelity simulations

--- the TELSON project

MEFANET --- 27th November 2019

Funded by the Erasmus+ Programme of the European Union

Introductions: TEAM

Trupti

Luke

Georgiana

Adrian

Daniel

Introductions: PROJECT

Problem-based and **TE**am-based **L**earning **S**trategies in the educati**ON** of biomedical and life sciences

Duration:		24 months, September 2018 – August 2020
Partners:		MU (Brno) SGUL (London) UMFIASI (Iasi)
Budget:		198k EUR
Intellectual Outputs:		Methodology & Training Interactive Virtual Scenarios Evidence-Based Guidelines for Educators

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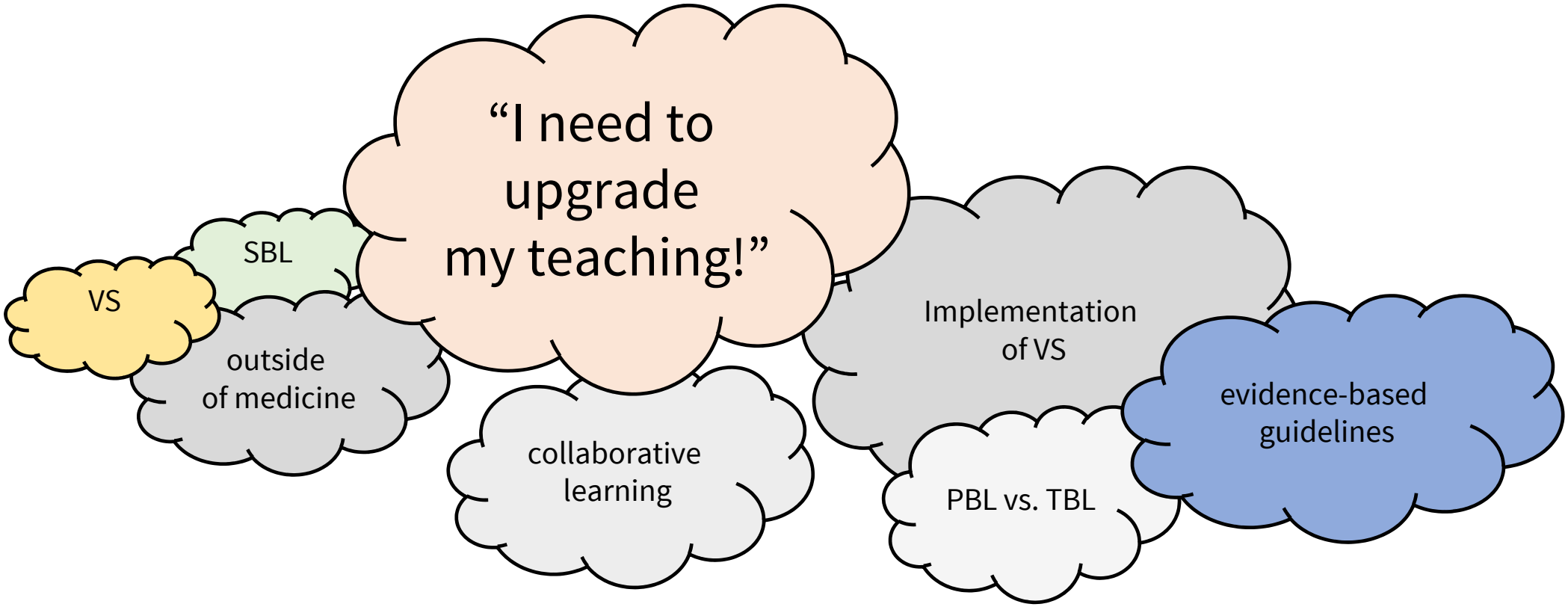
Ideas behind the TELSON project



Workshop Outline

30’

60’

90’

Backgrounds

- Virtual Scenarios
- Collaborative learning methods

Experience & Data

- Study design and evaluation items
- Data resulting from the Summer school on Mathematical Biology

Single-best answer test questions

- Methodology behind SBA
- Several examples

Hands-on activity – group work

- Develop your own SBA items
- Feedback

Collaborative (& scenario-based) learning

- Collaborative learning = contact learning
- Methods: PBL, TBL (& Flipping classroom)
- Each method has its own specifics – spaces, roles, time frames
- Student-centric

PBL: problem-based learning

roles → tutorial part 1 → learning objectives: self-study → tutorial part 2 → reflections

learning objectives

TBL: team-based learning

Pre-class reading

learning objectives

iRAT

tRAT

discussion

Application excercise

Discussion & reflections

Virtual scenarios (patients)
..:: a Czech invention?

A virtual patient is an interactive computer simulation of a real clinical situation or a case that is designed for medical education. It is a learning modality that facilitates development of specific skills such as clinical reasoning, decision making and critical thinking.

Kinoautomat - interactive cinema:

- Expo67 in Montreal – Czechoslovak Pavilion
- world's first interactive movie

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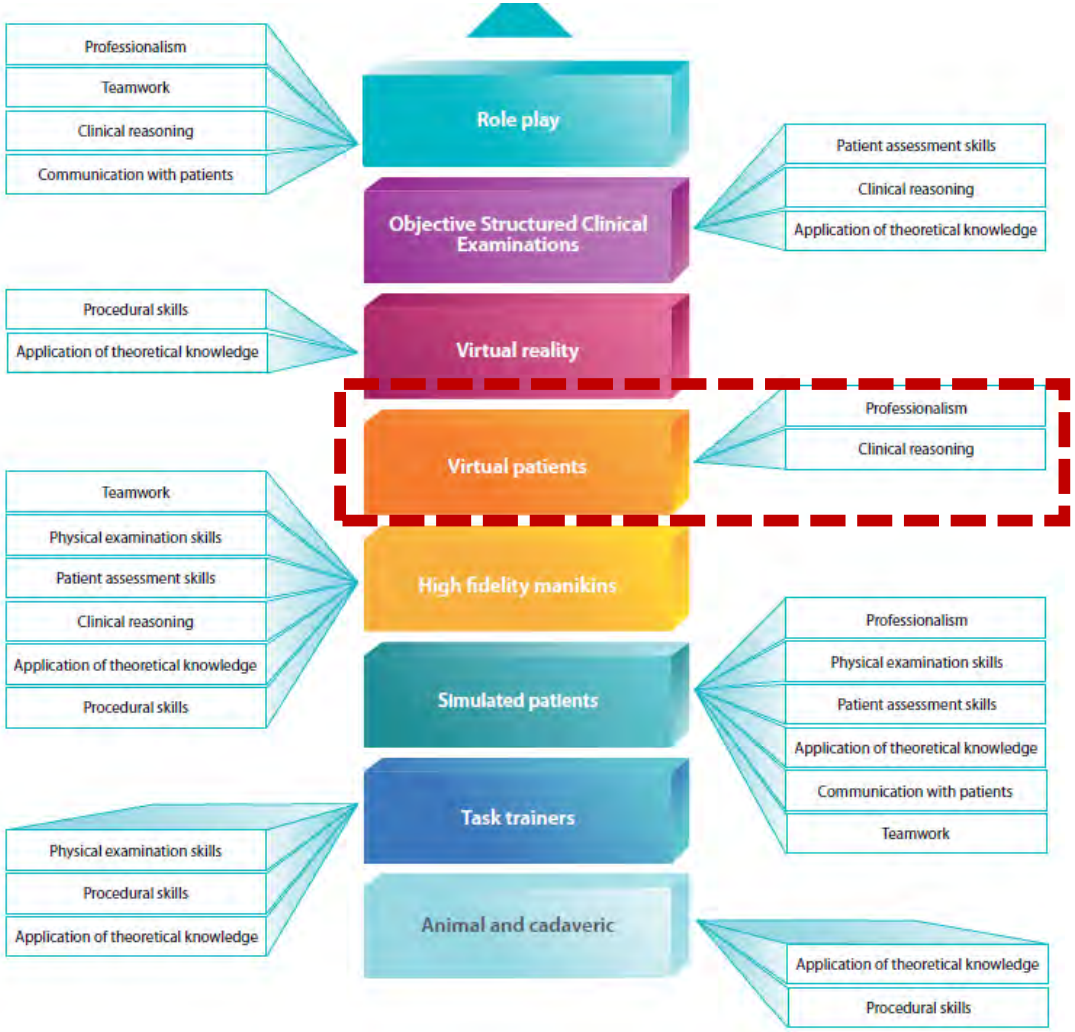
"The Kinoautomat in the Czechoslovak Pavilion is a guaranteed hit of the World Exposition, and the Czechs should build a monument to the man who conceived the idea.

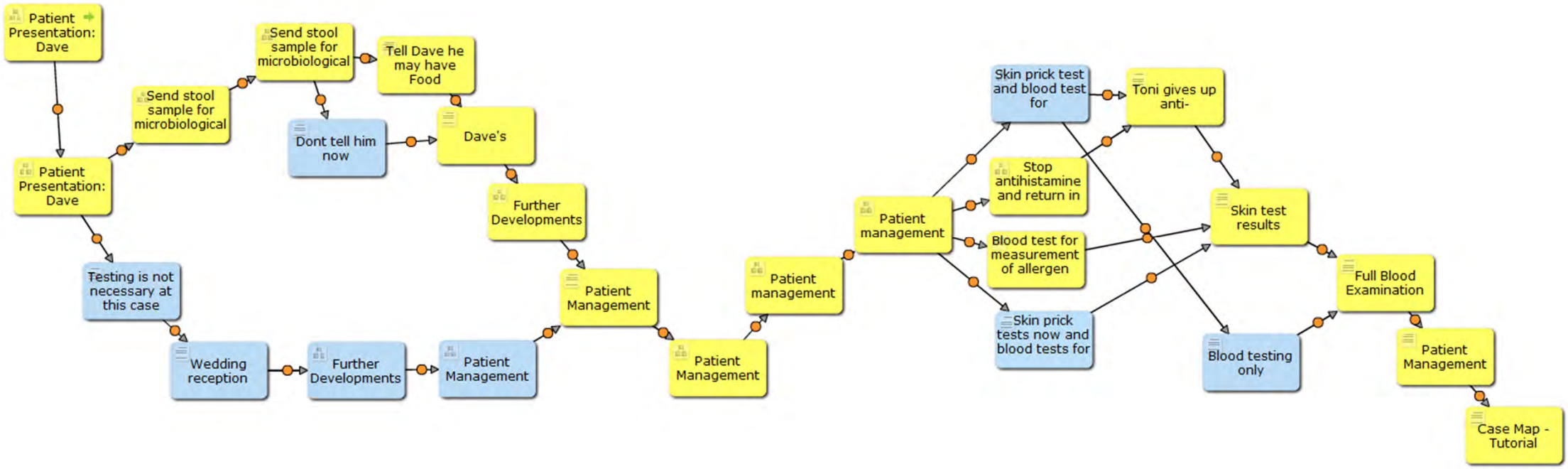
VS as one of many simulation modalities

- low-fidelity simulations aimed at:
  - clinical reasoning
  - critical thinking
  - decision making



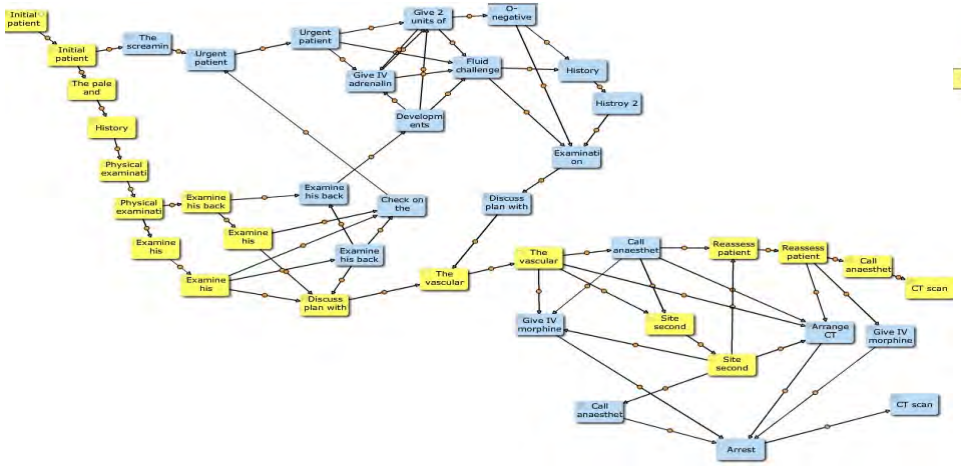
Health Education Training Institute (2014): Simulation based education: professional entry student education and training. p15.

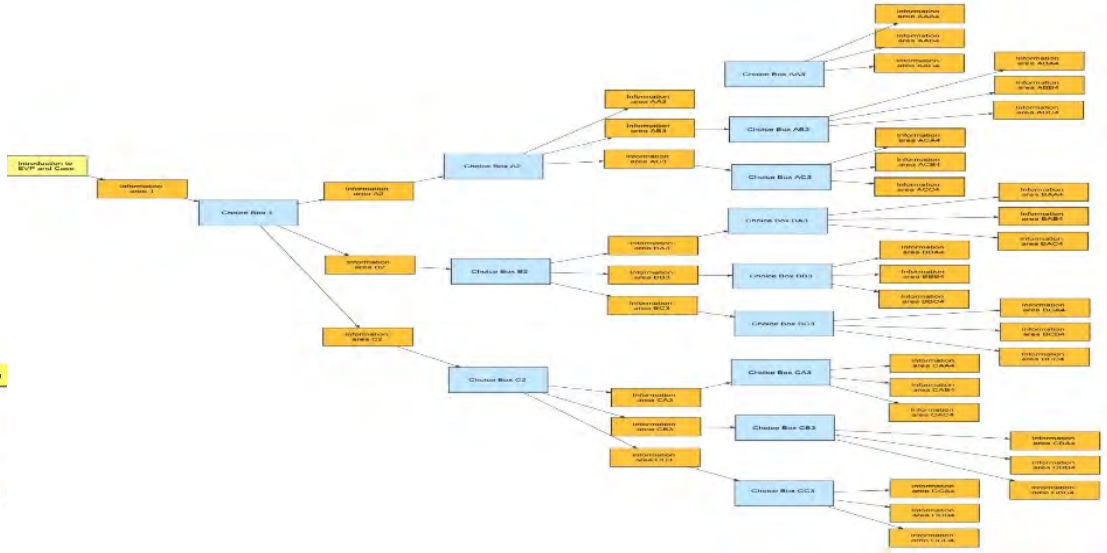
Virtual scenarios



Virtual scenarios

..:: PBL vs. TBL graphs





Discussion

Discussion

1.
What else casuistry methods - apart from PBL, TBL - would you apply in undergraduate students?

2.
In which aspects may VS cases be more advantageous in terms of learning than real patient cases or standardized patient cases?

Discussion

1.

What else casuistry methods - apart from PBL, TBL - would you apply in undergraduate students?

- CBL (what is the main difference between CBL and PBL?)
- Bedside teaching
- Standardized patients
- Small group discussion around EHR records

2.

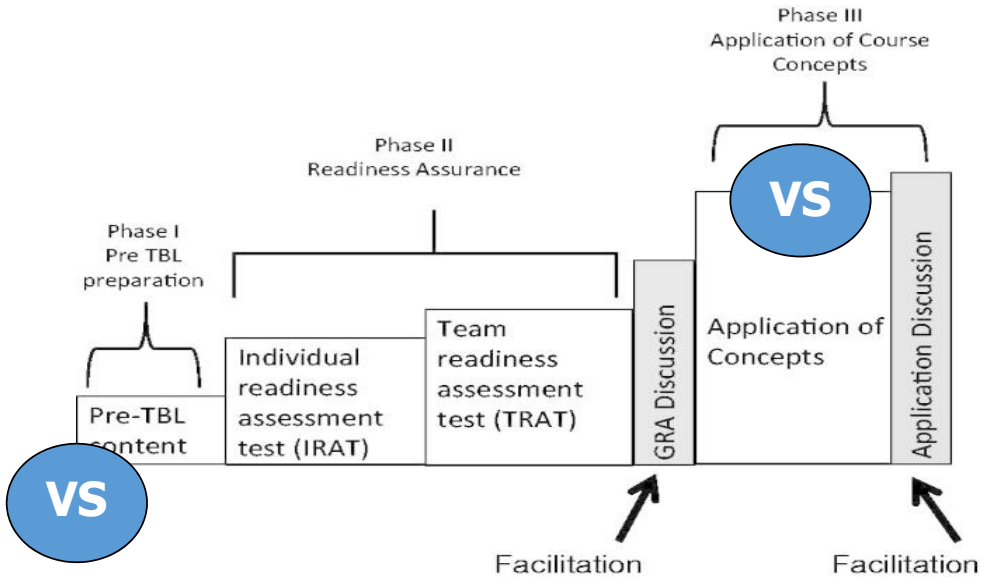
In which aspects can a VS case be more advantageous in terms of learning than real patient cases or standardized patients?

- Learning from errors in a safe environment
- Repeatable conditions - same scenarios for all
- You can inject some medical errors into the scenario and let the students learn from it
- It is obvious that VP cannot be better in terms of patient-doctor communication skills development

TBL structure

..:: with(out) using a virtual scenario

- Preparation:
  - VS tutorial 1
  - Pre-class reading material
- Application Exercise:
  - VS tutorial 2
  - and/or Matlab/R/Python coding exercise
- iRAT/tRAT
  - using SBA items, optionally derived from the content of VS



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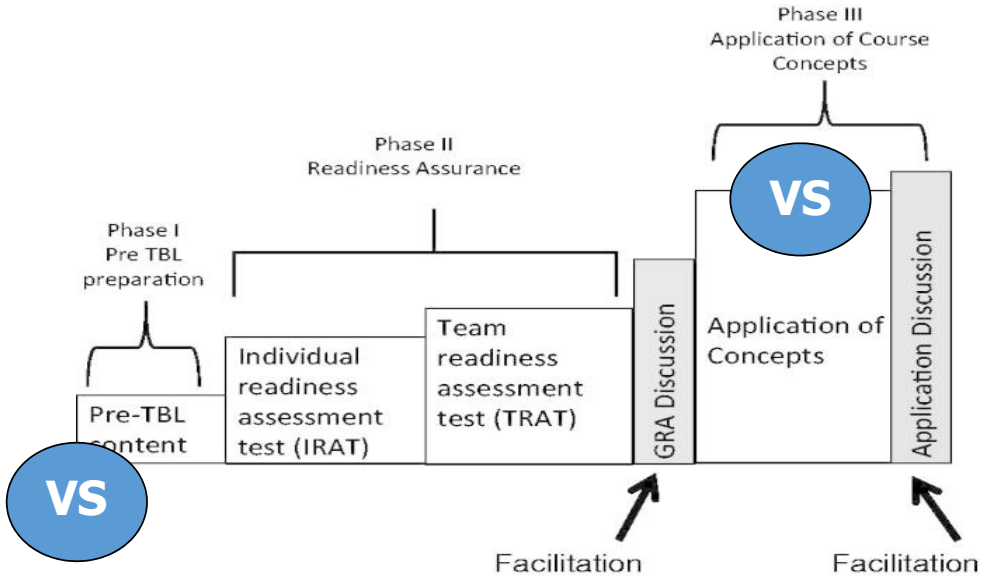

Study Design

Telson Project

Trupti Jivram & Luke Woodham

27th November 2019

Funded by the Erasmus+ Programme of the European Union

Study Aims

Comparison between pedagogic approaches of Problem-based Learning (PBL) and Team-based Learning (TBL) through the use of Virtual Scenarios (VS)

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Planning

Using a defined approach (Hood et al. The 2002 User-Friendly Handbook for Project Evaluation) builds upon evaluation plans created for previous projects

- Training Against Medical Error (TAME)
- ePBLNet

Process:

- Create conceptual model of project to identify key outcomes and processes
- Identify stakeholders and their interests
- Refine into research questions
- Design appropriate methods for these questions

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Key Stakeholders

Stakeholders	Persons at each institution	Audience's key values, interests, expectations
Learners	Students at each of the institutions	Learner experience, engagement in PBL and TBL.
Tutors/Facilitators	Staff at each of the institutions	Impact of TBL and PBL upon experience of delivering session, training requirements, workload and learner performance.
Case and resource writers	Case writers at each of the institutions	Creation and adaptation of resources for PBL and TBL

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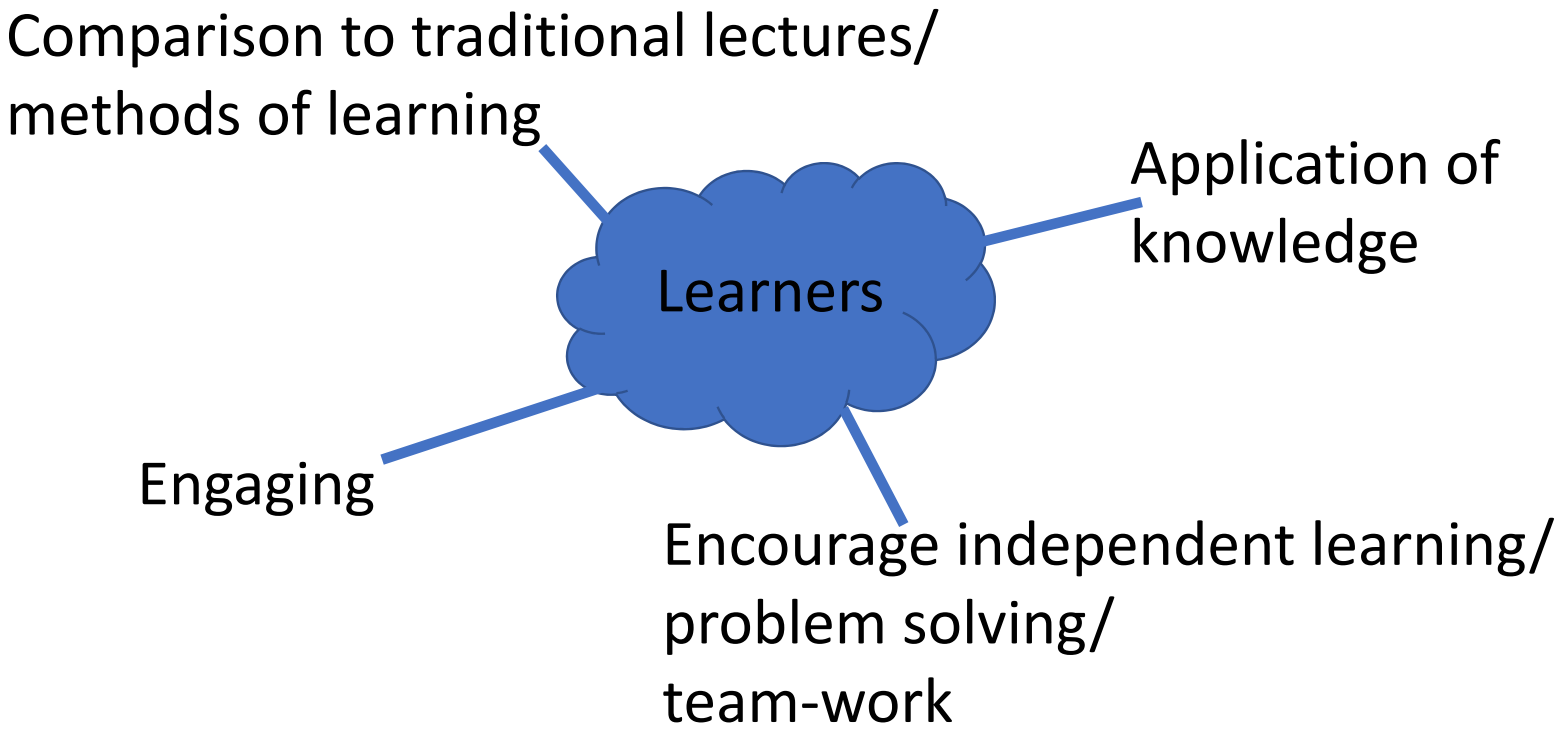
Key research questions- PBL/TBL



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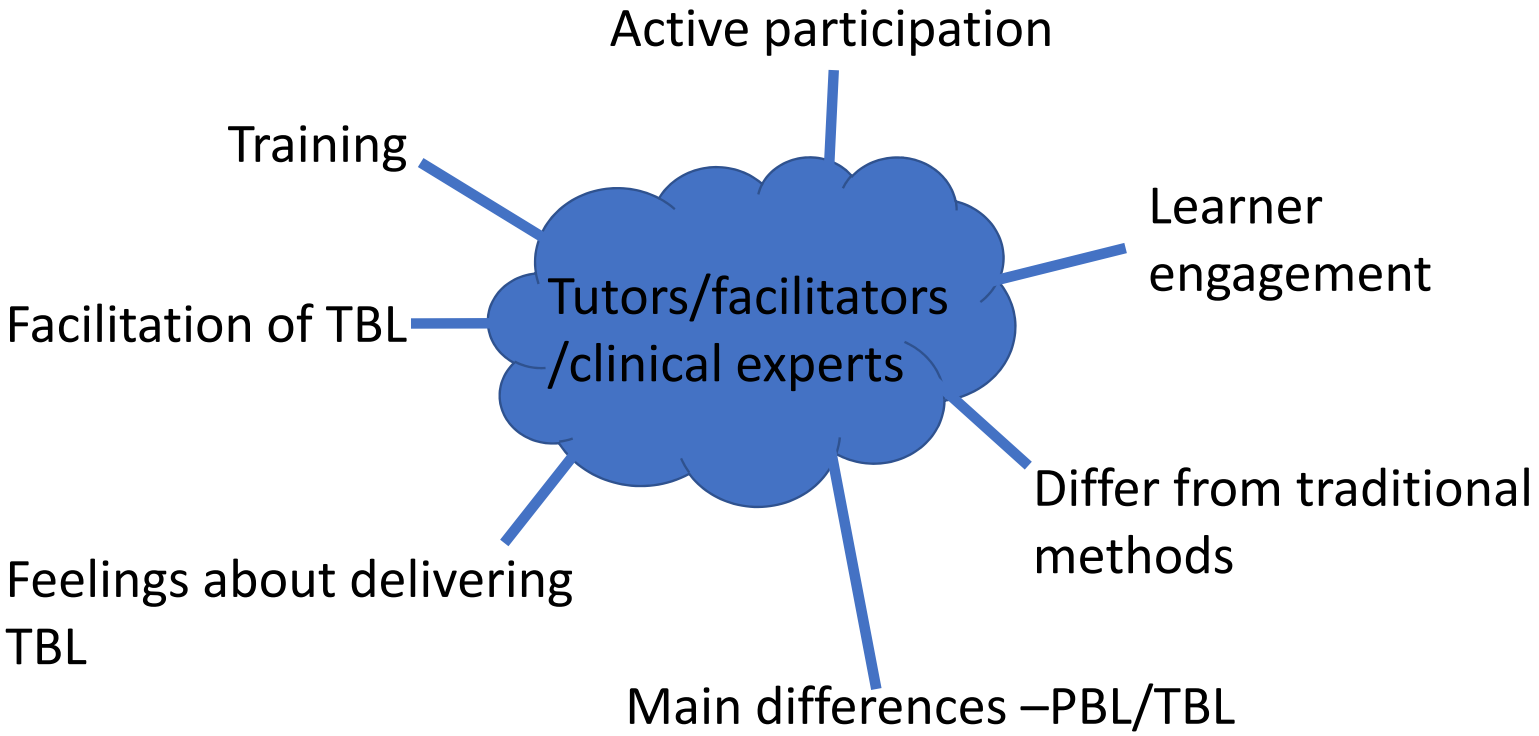

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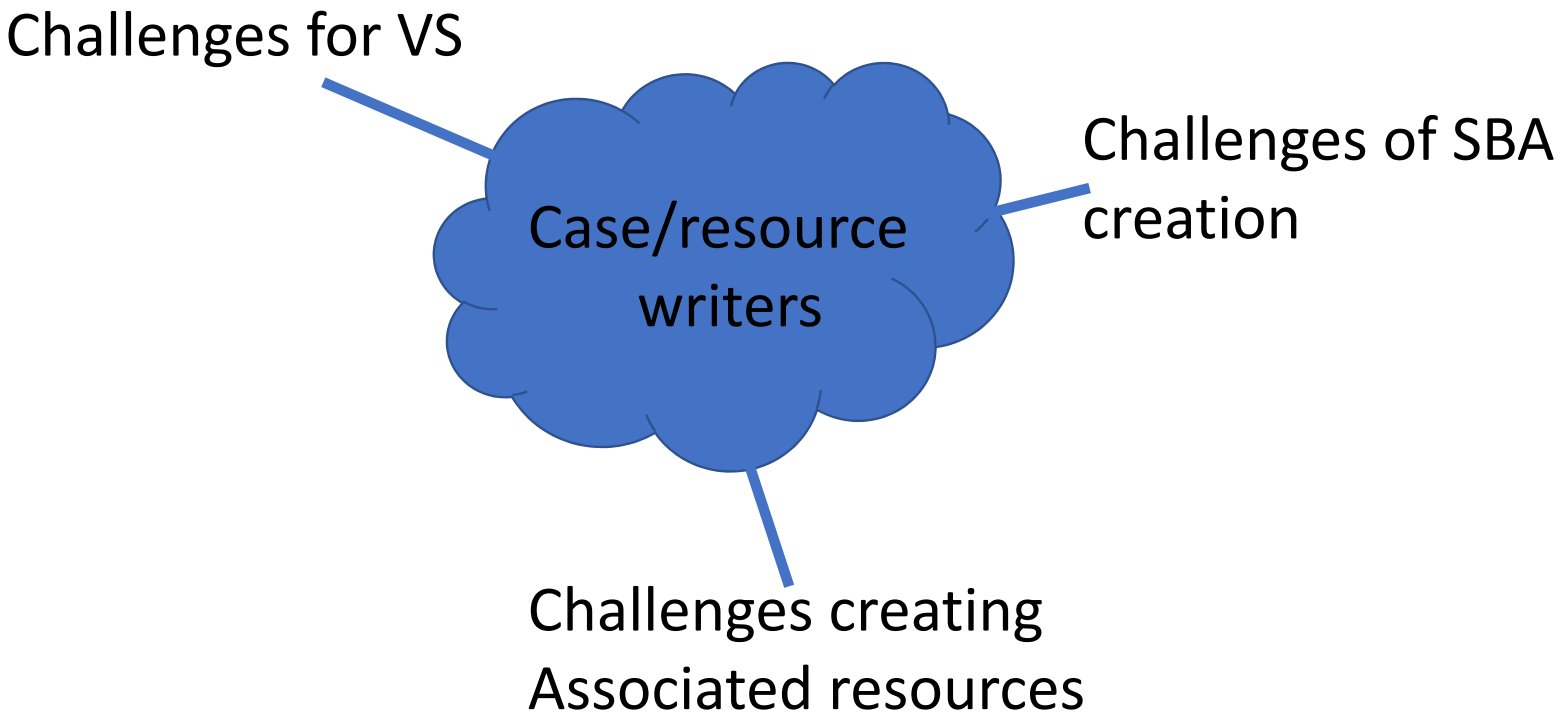
Key research questions- PBL/TBL



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Methods

PBL/TBL

Mixed methods data collection -
Qualitative and Quantitative

Standardised evaluation instruments

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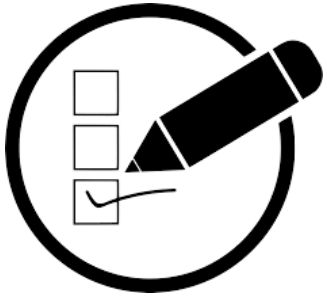
Data collection



After PBL/TBL sessions

After both PBL/TBL session

After case writing & facilitation complete

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Survey instruments & analysis

- Quantitative data
  - Created survey instruments based upon the evaluation/research questions
  - Where appropriate re-use or adapt existing instruments
  - Statistical analysis

- Qualitative data
  - Developed a semi-structured question stem, with follow up questions, based upon the evaluation/research questions
  - Coding and thematic/content analysis

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BiMat Summer School

..:: the source of our experience and data

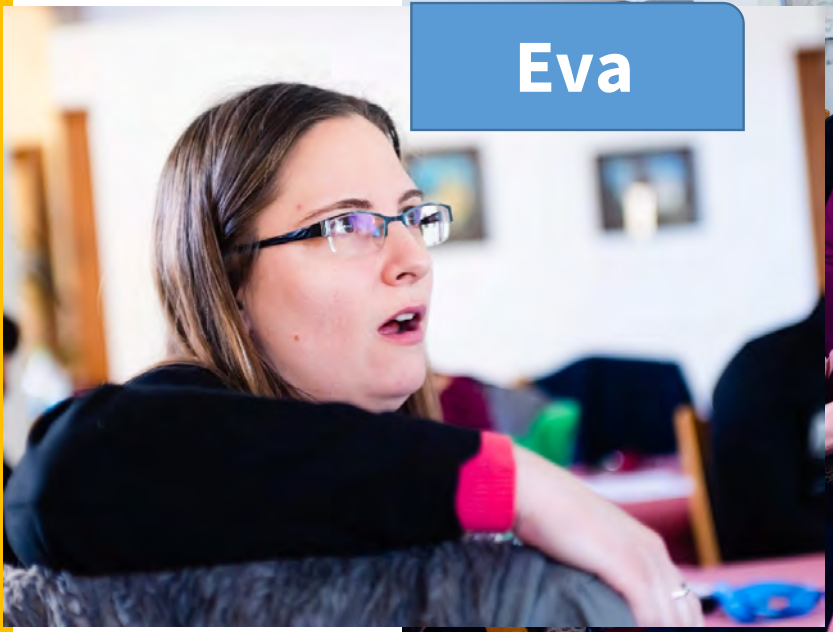
- September 10–12, 2019
- 32 students, 3rd-5th year
- Life sciences, Mathematical Biology & Biomedical Engineering
- Outside of campus

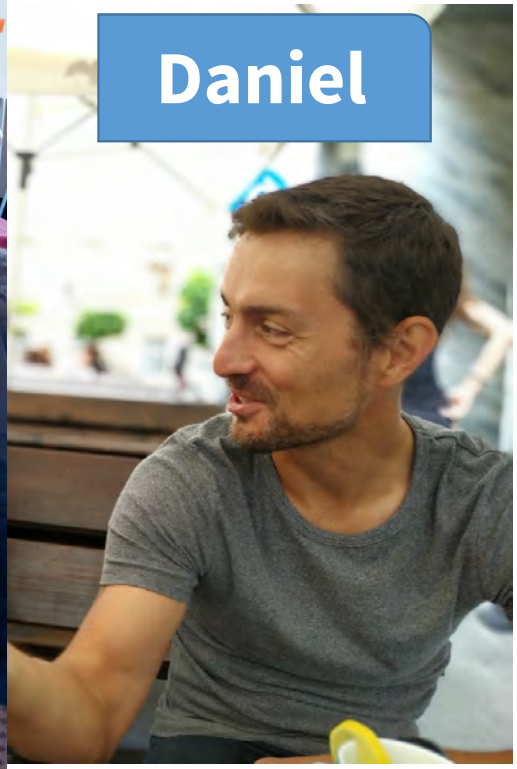
- 4 educators trained within the TELSON project
  - 4x PBL tutors ----- 2x TBL content experts ----- 1x TBL facilitator

1 PBL session – with VS
  - 4 groups with 8 students
  - 1 tutor in each group

2 TBL sessions – with and without VS
  - 8 teams with 4 students
  - 1 content expert, 1 facilitator

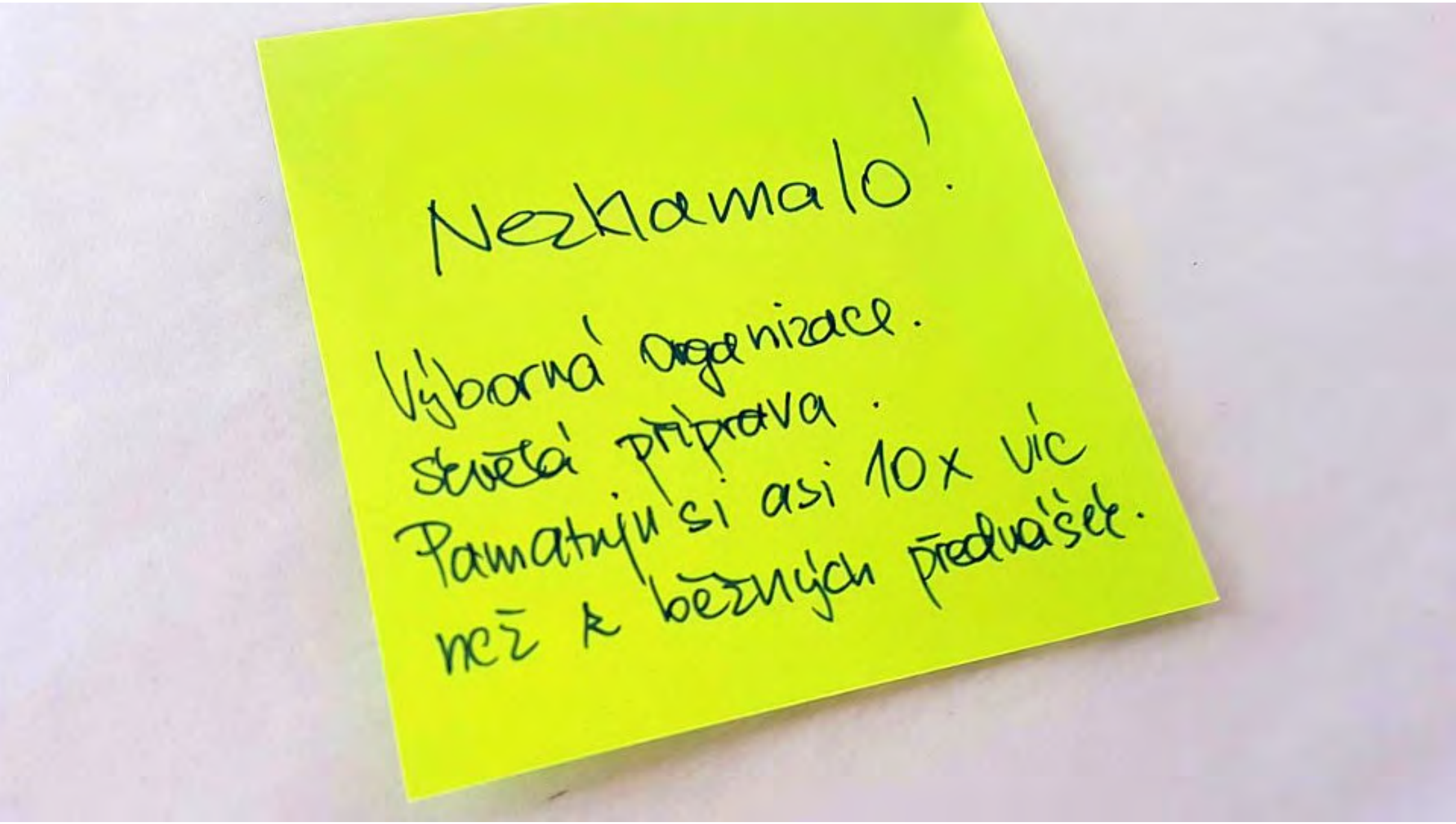
Team





Unstructured evaluation and data

..::Expectations vs. Outcomes


Nezklamalo!
Výborná organizace.
Skvělá příprava.
Pamatuji si asi 10x víc
než z běžných předvášek.

Structured evaluation and data

..::Learner Experience Survey

While working on this virtual scenario, I felt I had to make the same decisions a professional would make in real life. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

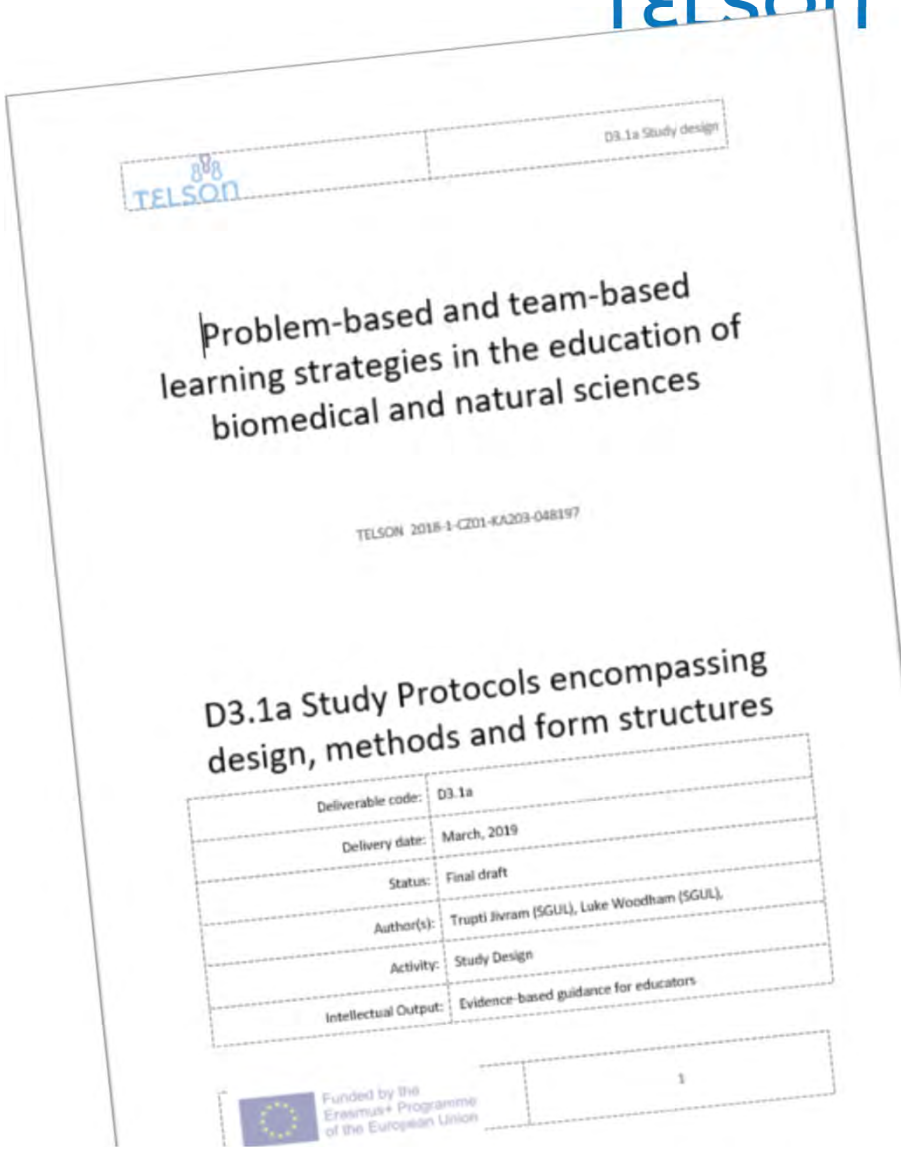
While working through this virtual scenario, I was actively engaged in thinking about which findings supported or refuted each hypothesis in my list of potential solutions. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

The questions I was asked while working through this virtual scenario were helpful in enhancing my problem solving and decision making skills in this type of task. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

The feedback I received was helpful in enhancing my problem solving and decision making skills *



VC3
VC6
VC7

Number of student respondents

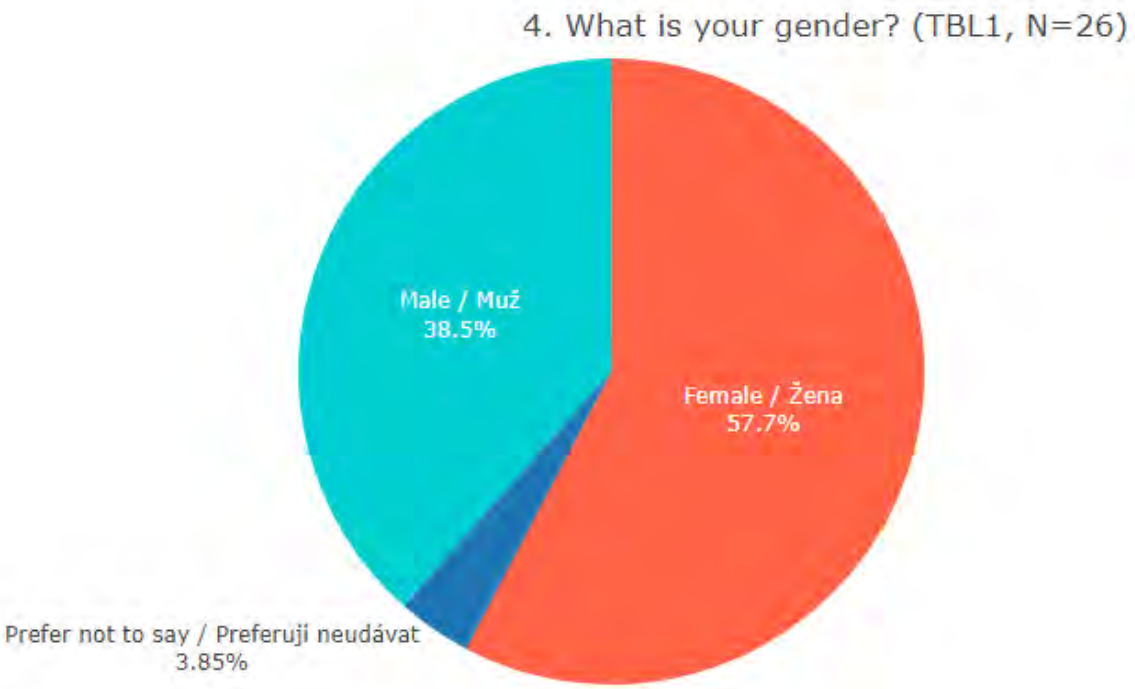
Snímek 37

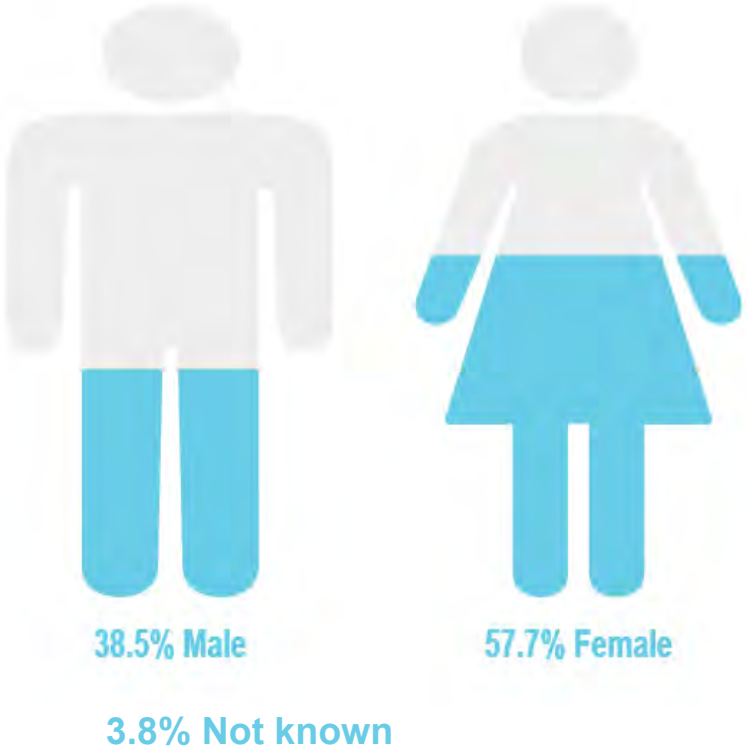
VC3 Po dočasném smazání sporných formulářů (na základě odpovědí).
Vendula Churová; 24.11.2019

VC6 Smazáno: ... ideálně do grafu zahrout PBL 6
TBL1 1
TBL2 1
Vendula Churová; 24.11.2019

VC7 Overall závěrečý dotazník N=26, není v tomto grafu, ale asi to doplním, jestli bude čas.
Vendula Churová; 25.11.2019

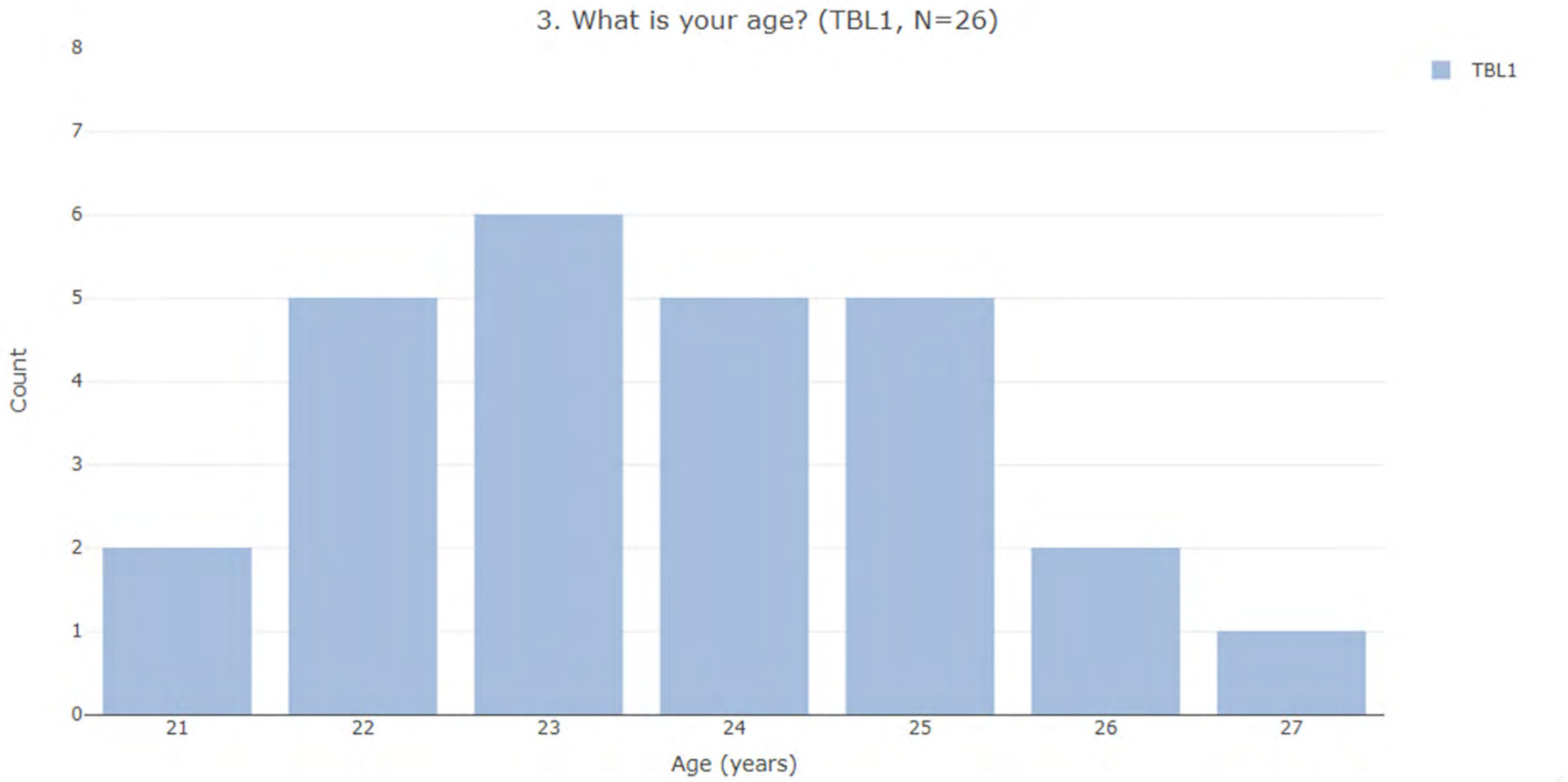
Gender


4. What is your gender? (TBL1, N=26)
Male / Muž
38.5%
Female / Žena
57.7%
Prefer not to say / Preferuji neudávat
3.85%


38.5% Male
57.7% Female
3.8% Not known

(N=26)

Age

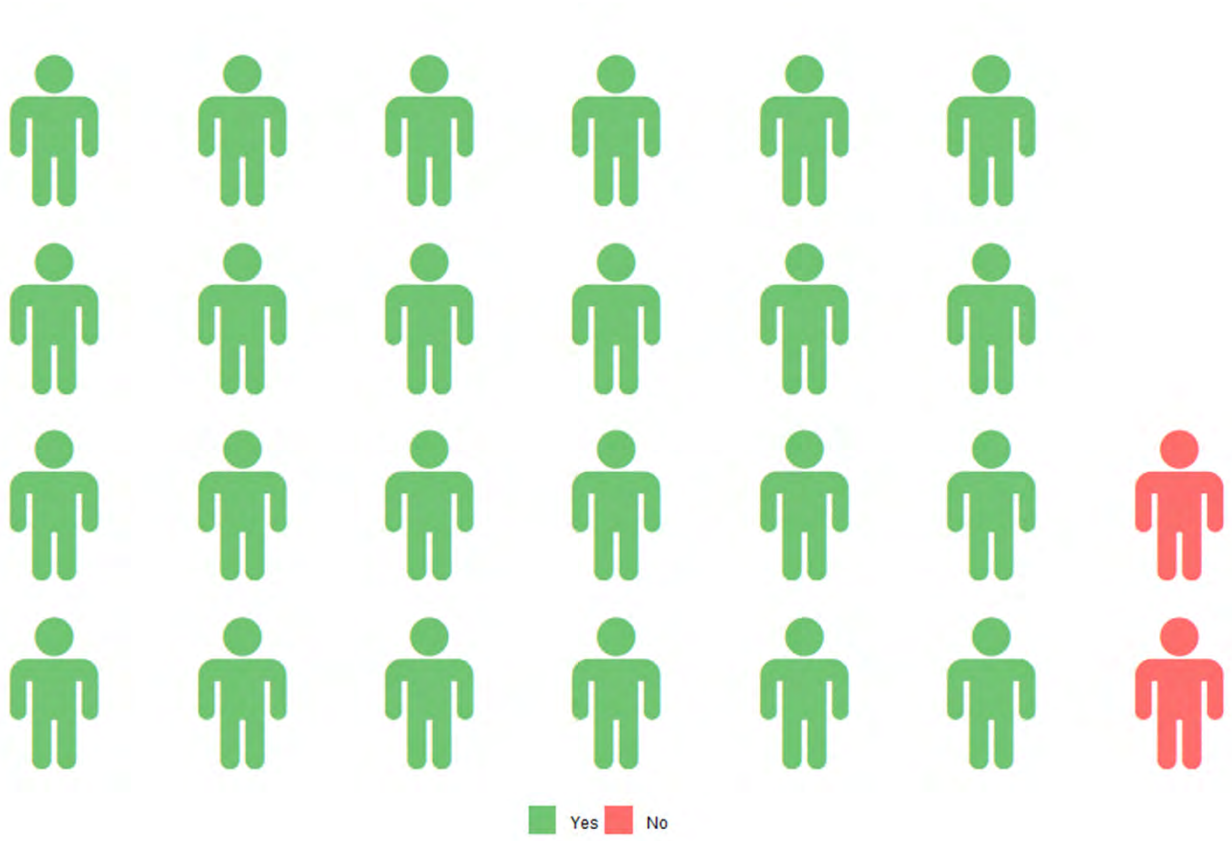

3. What is your age? (TBL1, N=26)
TBL1
Count
0
1
2
3
4
5
6
7
8
21
22
23
24
25
26
27
Age (years)

Collaborative learning

Would you like to see collaborative learning methods (PBL / TBL) introduced in common teaching?

(N=26)

92.31% vs. **7.69%**

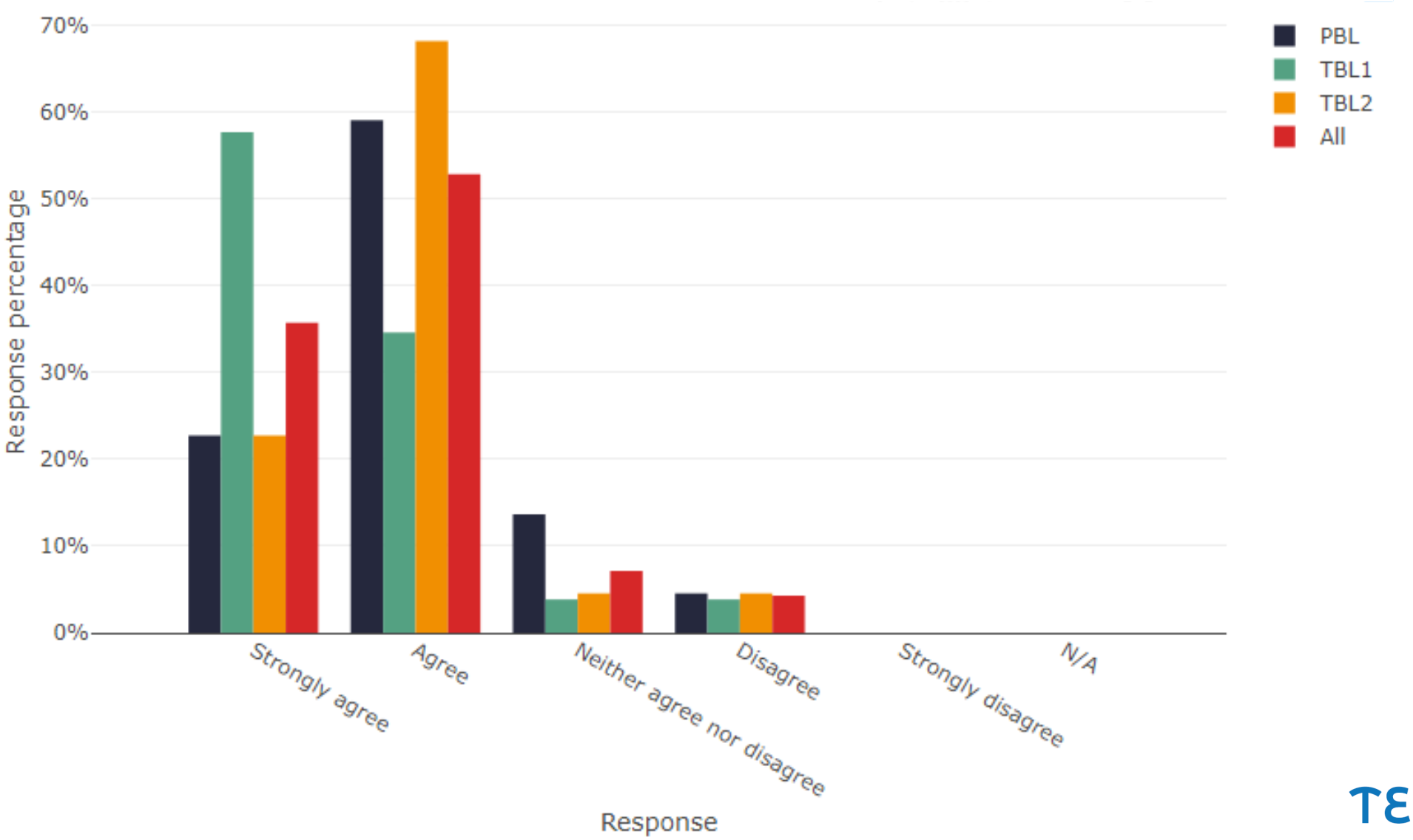


Analysis focused on learners

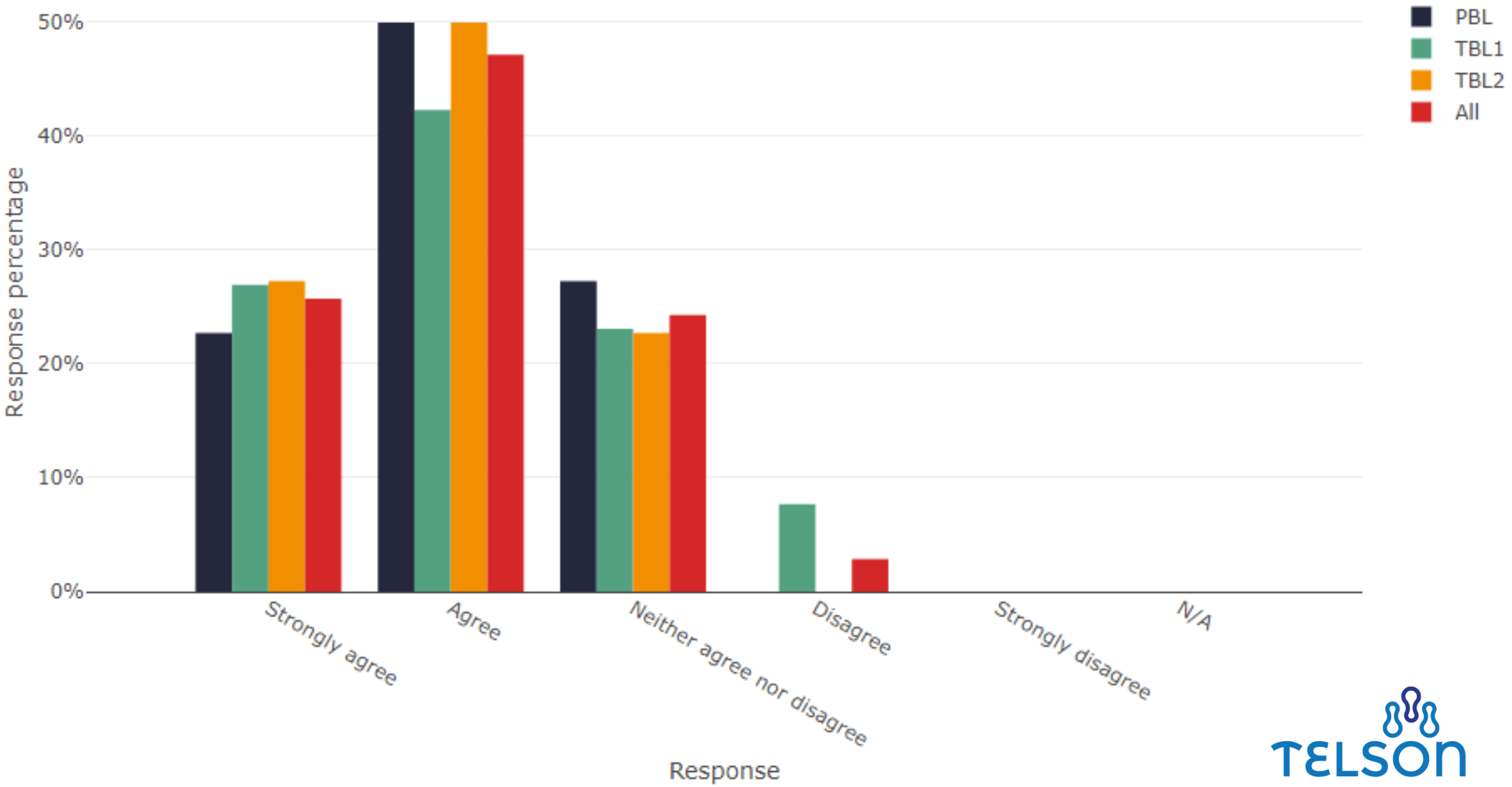
- Was the PBL/TBL learning approach engaging?
- Does the PBL/TBL method of learning encourage independent learning/problem solving/team work?
- Does the PBL/TBL approach allow application of prior knowledge?
- How do these approaches compare to traditional lectures/methods of learning?

Digging in the experimental data
and in the theoretical research questions…

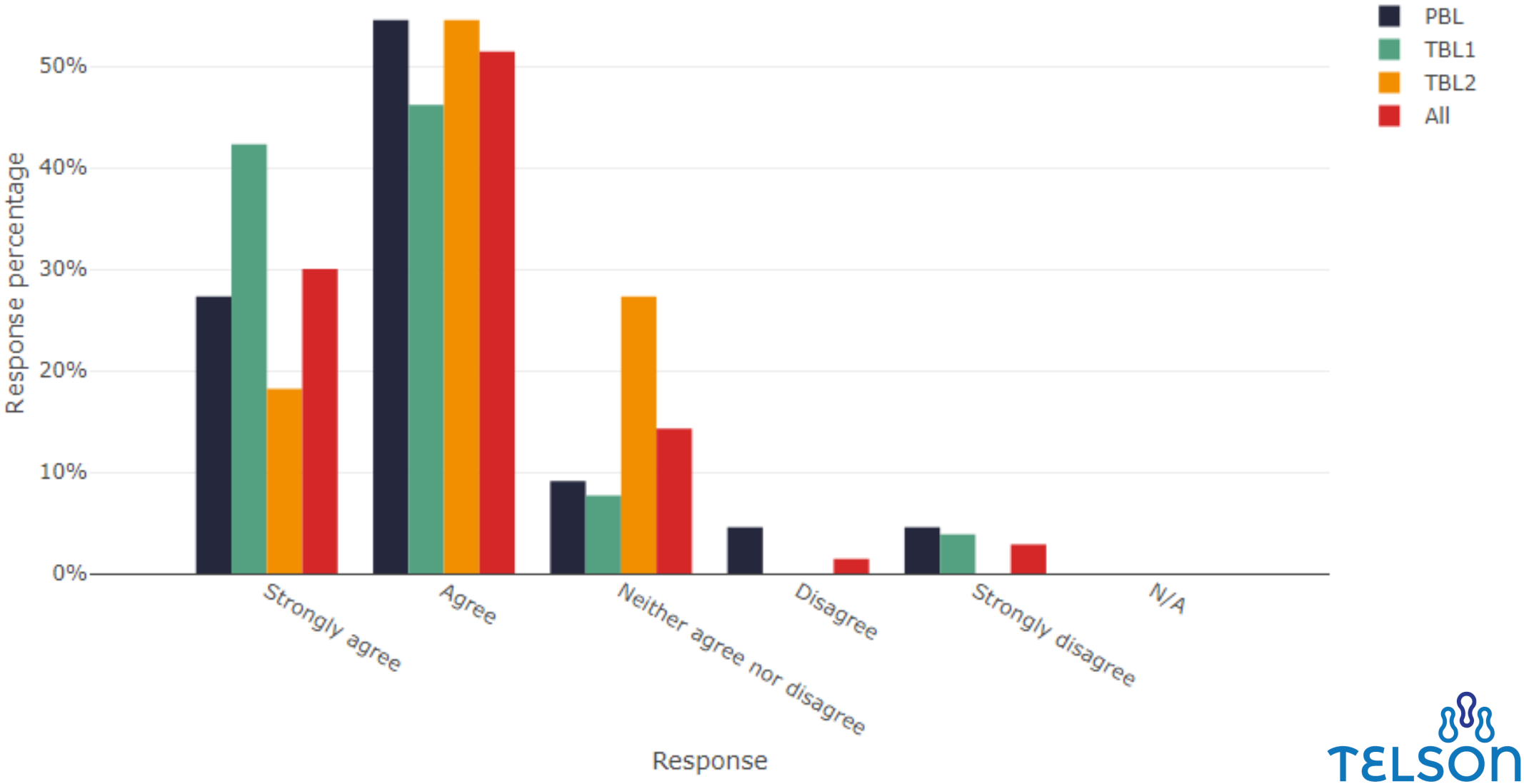
7a-2) The PBL/TBL activity was engaging (PBL: N=22, TBL1: N=26, TBL2: N=22)



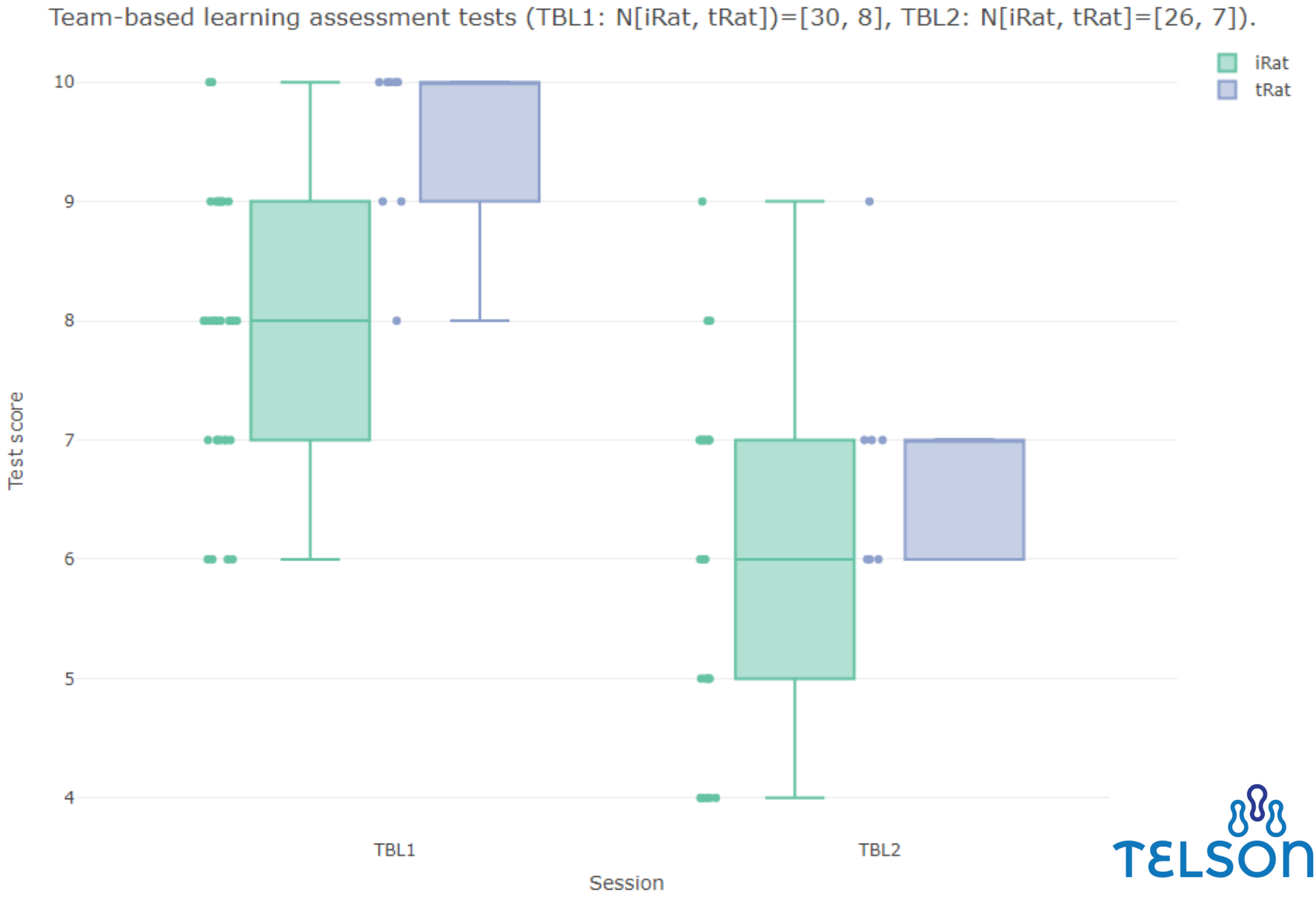
7a-4) The PBL/TBL session encouraged me to learn independently (PBL: N=22, TBL1: N=26, TBL2: N=22)



7a-2) The PBL/TBL session helped me to develop my problem solving skills (PBL: N=22, TBL1: N=26, TBL2: N=22)



Team cooperation effect on iRAT,tRAT scores



TELSON

Team cooperation effect in TBL1

Team cooperation effect in TBL2

Single-Best Answer (SBA)

Telson Project

Chandran Louis, Trupti Jivram and Luke Woodham,

27th November 2019

Funded by the Erasmus+ Programme of the European Union

Definition

SBA questions require that examinees select the single best response from multiple options

Basic rules for a good SBA:

- Each question should focus on an important concept
- Each item should assess application of knowledge, not just a fact
- The question must be clear, and it should be possible to arrive at an answer from the available options
- All answers should be in the same form and appropriate to the question – i.e. all diagnoses, tests, treatments etc.

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Menti Meter

www.menti.com

Code: 924658

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SBA creation tips

- Allow 90 seconds per question
- Set in clinical context (GP, emergency room)
- Addresses a range of topics, diseases and clinical context
- Avoids patient identifiable information
- Use clear and precise information, avoid ambiguity

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Content and structure

- Max 150 words
- Present tense
- Avoid superfluous information
- Avoid abbreviations

Structure the contents of the question stem as follows (including only information relevant to the question):

- Patient details (gender/age)
- Presenting complaint (PC)
- History of presenting complaint (HPC)
- Relevant past medical history, family history and social history
- Observations/Vitals/GCS/MMSE
- Physical examination findings
- Results (e.g. laboratory/radiology)

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Lead-in question

- Tests a range of cognitive functions (recall of causes and drugs, interpretation of results, judgement of likely diagnosis
- Students may have to work out the diagnosis, then recall the management
- Asks for the single best answer and not one which is true
- I.E what're is the most likely diagnosis?, what is the best description of the process?, what is the most likely site of the lesion

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Lead-in question

- Passes the cover test – i.e. students should be able to answer the question while covering the options
- Avoids asking what does not apply eg. What is the least likely diagnosis/treatment. Avoids double negatives!

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Answers

- Keep them short
- Ideally provide 5 answers
- They should be homogenous
- Avoid having multiple variables in the same answer (give morphine and oxygen)
- All should be plausible and familiar but one should be better then the others
- The best answer is evidence based and is widely agreed upon by experts
- Aim is to write one good stem that can be reused for diagnosis, investigation and management

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Recent examples

A 49-year-old male attends the GP surgery with a painful left wrist. The pain is reproduced when using scissors. On examination it is tender over the radial side of the wrist

- What is the most likely diagnosis?
- Which tendon is most likely involved?
- Which of the following provides definite treatment?

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Examples

www.menti.com

Code: 924658

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Example 1

A 56-year-old man decides that he would like to fly back to his birthplace in Debrecen in Hungary. He would like to fly direct back to his hometown

Which of the following airlines is this possible with?

- Air France
- British Airways
- Lufthansa
- Swiss airlines
- Wizz Air

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Example 2

A 56-year-old man presents to the GP surgery with a two-hour history of left sided facial weakness with associated weakness in both the left arm and left leg. He is also having difficulty finding his words. He has a background of hypertension and atrial fibrillation

Which is the most likely diagnosis?

- Brain Malignancy
- Ischaemic Stroke
- Meningitis
- Migraine
- Multiple sclerosis

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Example 3

A 56-year-old man presents to the ED department with a two-hour history of left sided facial weakness with associated weakness in both the left arm and left leg. He is also having difficulty finding his words. He has a background of hypertension and atrial fibrillation

Which of the following is the next best step in his management?

- Alteplase
- Clopidogrel
- Rivarxoban
- Simvastatin
- Warfarin

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Useful resource

"Constructing Written Test Questions For the Basic and Clinical Sciences"

3rd Edition

US National Board of Medical Examiners

Available at

https://www.nbme.org/PDF/ItemWriting_2003/2003IWGwhole.pdf

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- Collaborative learning methods

Experience & Data

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Single-best answer test questions

- Methodology behind SBA
- Several examples

Hands-on activity – group work

- Develop your own SBA items
- Feedback

Group Work

1. Choose a subject and a learning unit for which you would like to try student readiness testing.
    - Agree on your choices across the whole group…
2. Develop 1-2 SBA items and present them to the audience.




Group Work

First Aid Imaging methods Project management

Hemmorage Physiology of consciousness

Take home messages

1. There are significant differences in various SBL methods.
   - … in terms of spatial layout
   - … in terms of educators' roles
   - … in terms of students' attitudes

2. SBA items for testing work, but can be tricky without proper analysis and preparation.

3. Teams perform better than individuals.