

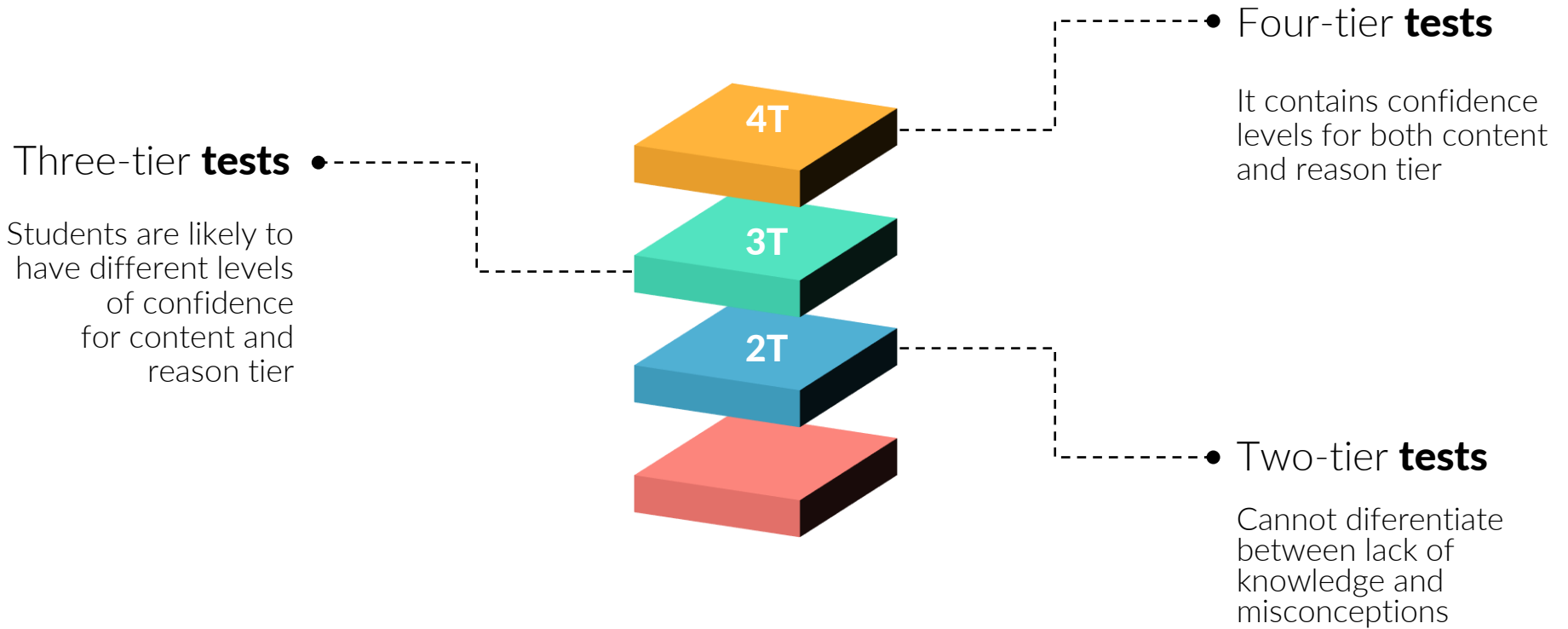
Diagnosing Students' Misconceptions in General Chemistry using Four-Tier Multiple-Choice Test

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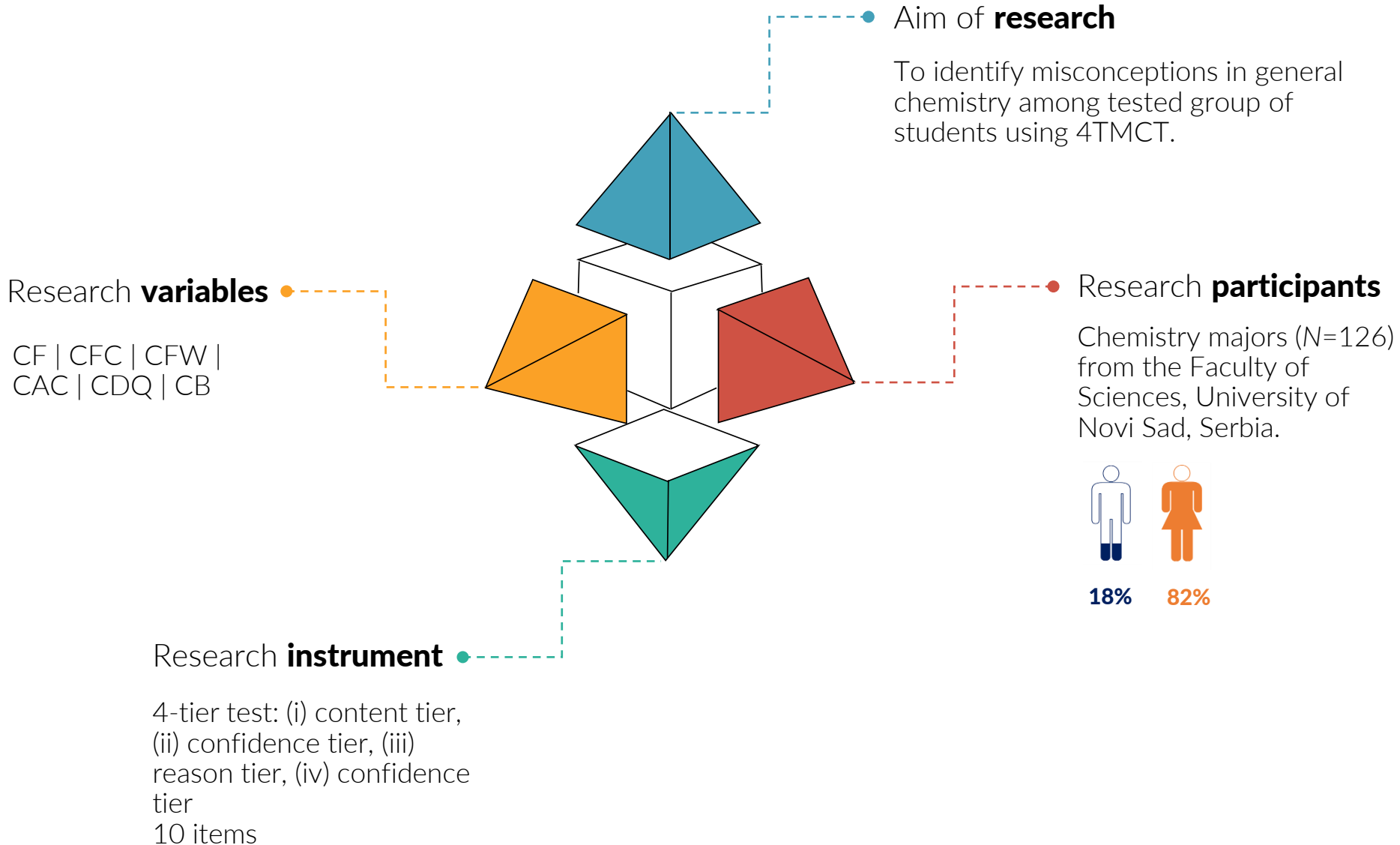
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Theoretical **Background**

Multi-tier tests

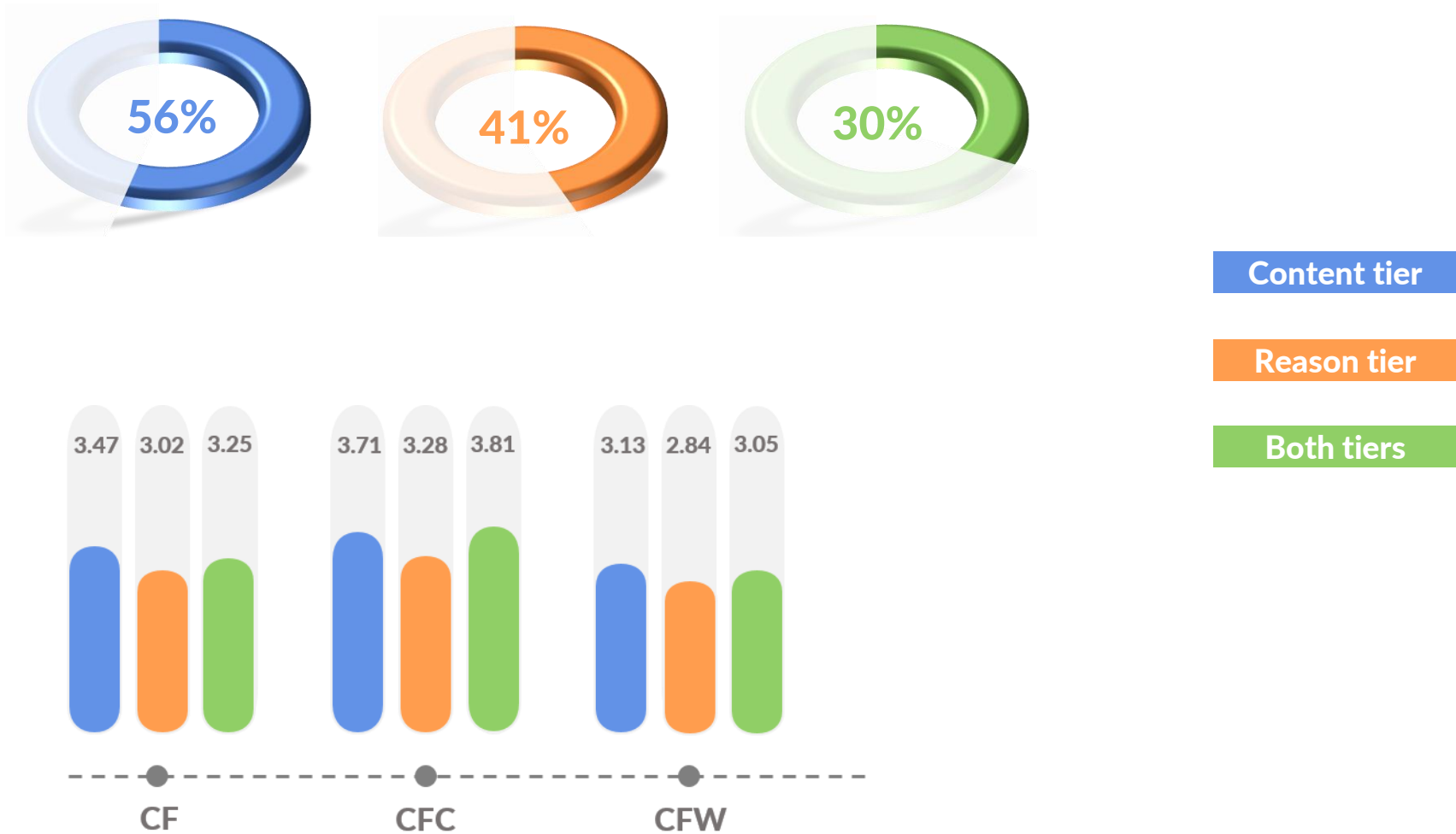


Research **Methodology**



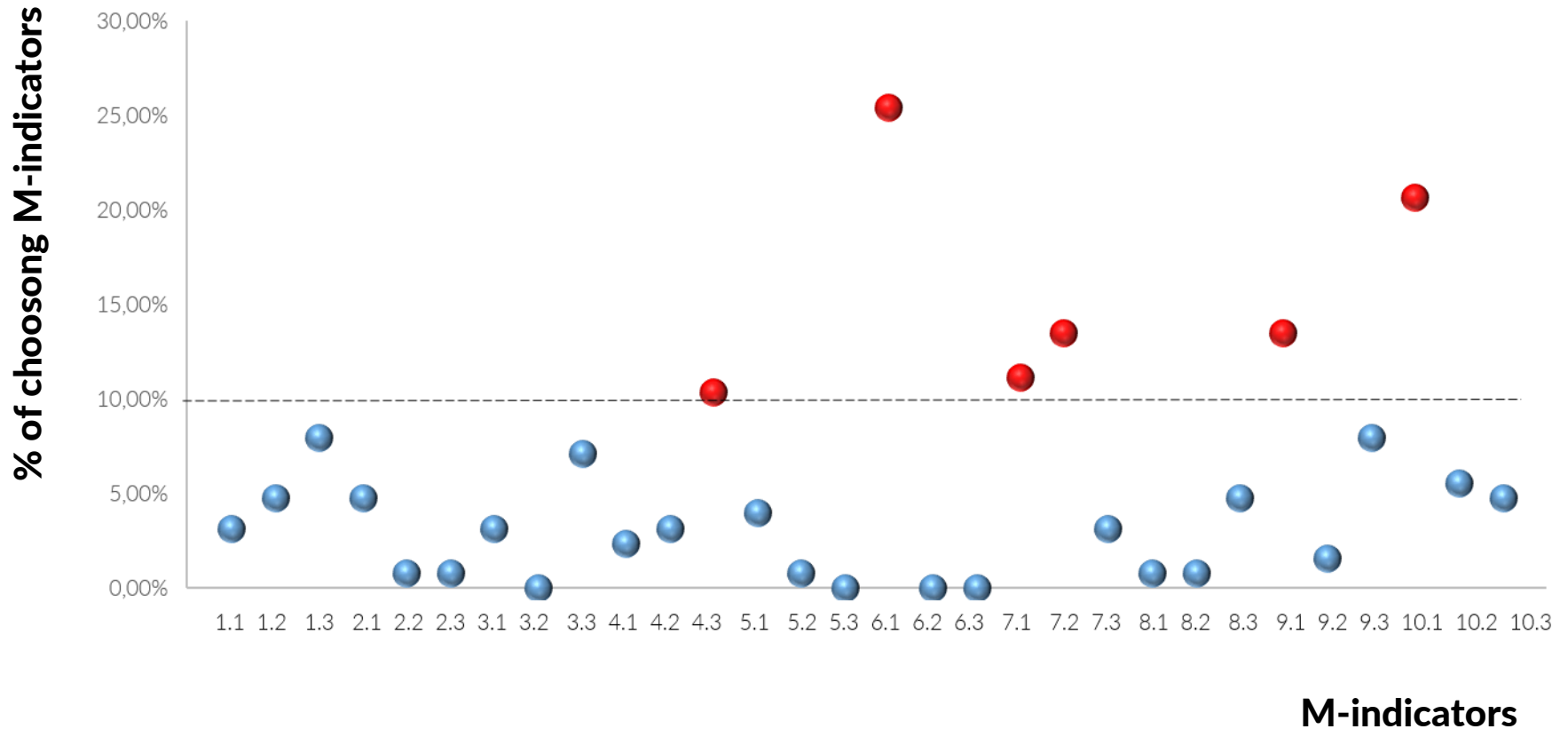
Results & Discussion

Students' performance in the diagnostic test with relevant confidence measures



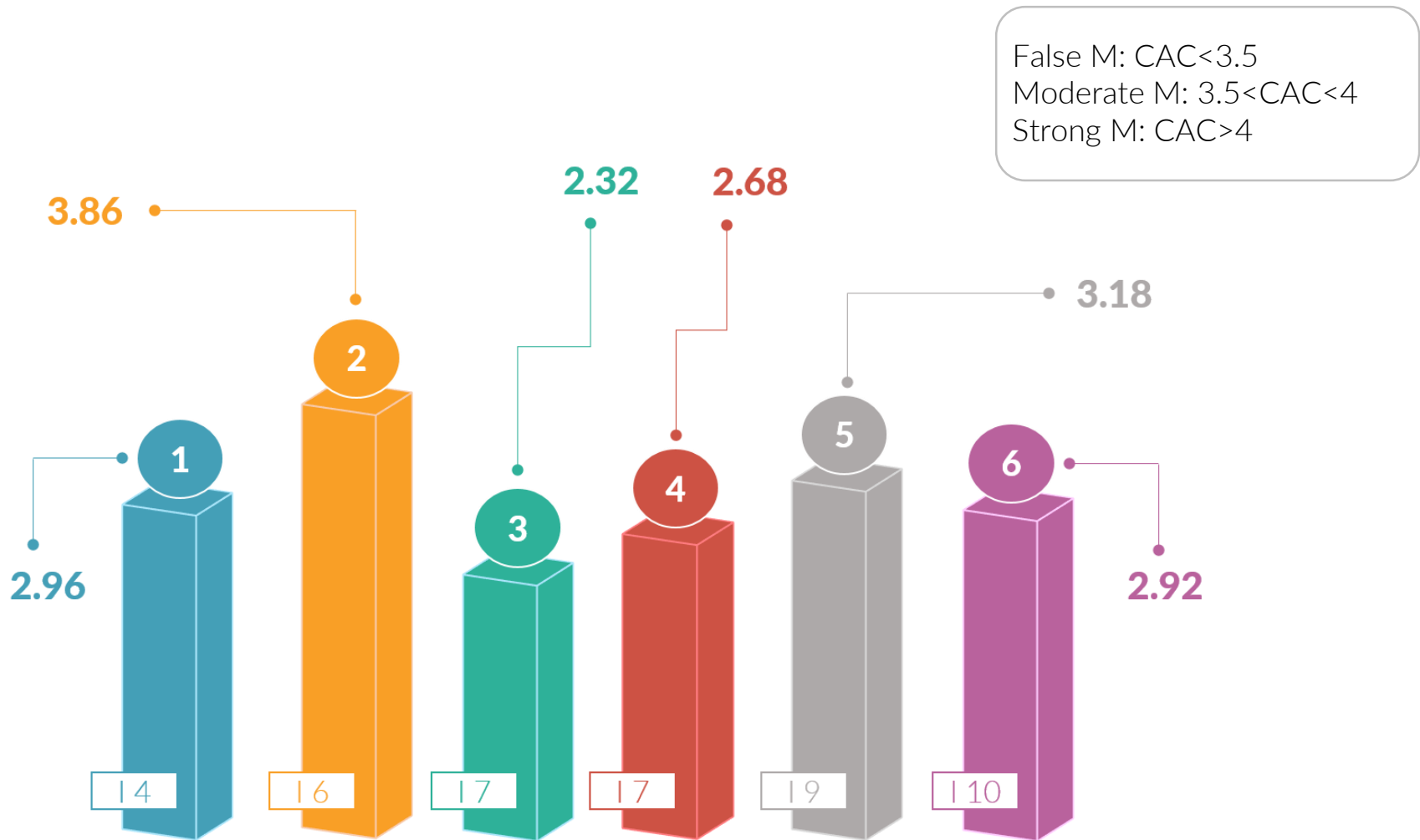
Results & Discussion

Identified misconceptions



Results & Discussion

Confidence with which a misconception is expressed



Results & Discussion

Circle the letter of the correct answer. Which of these substances is a simplest pure substance considering the level of particles?

- a) distilled water
- b) graphite
- c) sodium chloride
- d) ethanol

- 1) just guessing
- 2) very unconfident
- 3) unconfident
- 4) confident
- 5) very confident
- 6) absolutely confident

Content tier

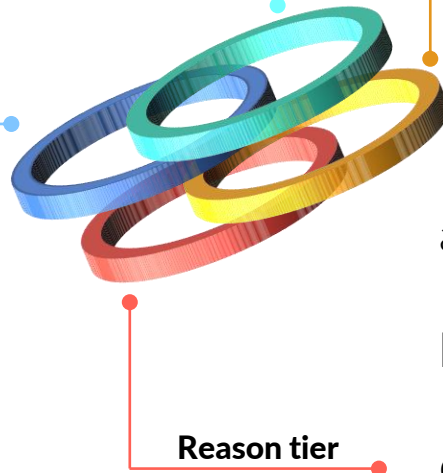
Confidence rating

Confidence rating

Reason tier

- 1) just guessing
- 2) very unconfident
- 3) unconfident
- 4) confident
- 5) very confident
- 6) absolutely confident

- a) it is made up of only one kind of molecule
- b) it is made up of only one kind of atom
- c) it has a crystal structure
- d) it does not contain impurities



Concluding **Remarks**

- The analysis of four-tier test is more time consuming than the analysis of common multiple choice tests, however, the reliability of the results obtained in this way is much higher.
- In this research we identified 6 misconceptions, however four-tier test has enabled us to find that 5 out of 6 misconceptions are actually false and are likely lack of knowledge.

Acknowledgement

Project #179010 | Ministry of Education, Science and Technological Development of the Republic of Serbia

Thank You



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