



European Society for Engineering Education
Europäische Gesellschaft für Ingenieur-Ausbildung
Société Européenne pour la Formation des Ingénieurs

New trends in Engineering Education – a SEFI perspective



Société Européenne pour la Formation des Ingénieurs European Society for Engineering Education

- Non governmental non-profit association
- Established by 21 Rectors of Technical Universities in 1973
- European forum to its members

Diversity of stakeholders:

48	countries
320	members
150	engineering education institutions
158500	academics
1000000	students

Diversity of educational contexts in Europe

1. Research intensive universities <> teaching-oriented universities
2. Engineering dominant colleges <> comprehensive universities
3. Open-admission institutions <> highly selective institutions
4. Countries with no university fees <> with high university fees
5. Etc.



Broad spectrum of educational methods

Common goal = improve the processes and results of education

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Mission of SEFI

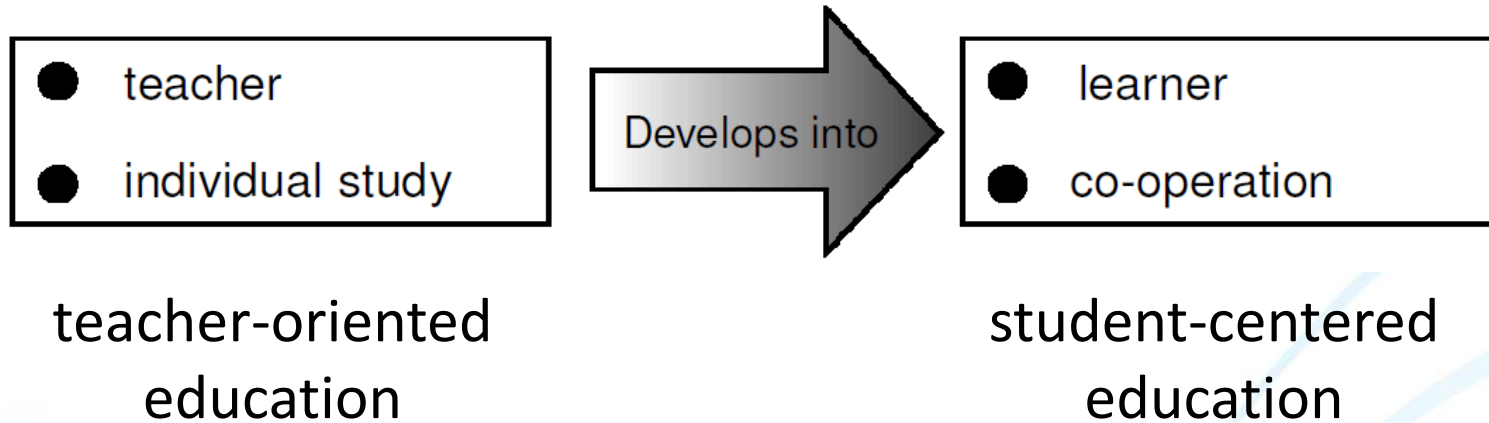
- *To support, promote and improve European Higher Engineering Education (EHEE)*
- To enhance the status of both engineering education and engineers in Society

Values of SEFI

- Engagement and responsibility
- *Respect for diversity and different cultures*
- *Institutional inclusiveness*
- Multi-disciplinarity and openness
- Transparency
- Sustainability
- Creativity and professionalism

Broad spectrum of educational methods

Common goal = improve the processes and results of education



Broad spectrum of educational methods

1. Traditional teaching methods (chalk & talk)
2. Project-assisted learning or mixed-mode (e.g. KU Leuven)
3. Project-based and problem-based learning (e.g. Aalborg University)
4. Design-based learning (e.g. Technische Universiteit Eindhoven)
5. CDIO concept (conceive – design – implement – operate) (e.g. Chalmers)
6. Etc.

How can we inform prospective students?

Rankings in higher education – diversity of stakeholders

“Rankings are used by some **governments** in their higher education policy, by **institutions** looking for international partners and by **prospective students** searching for a place to study – due, often, to the lack of other widespread metrics.” (EAIE, april 2016)



Rankings in higher education – our view

What unites us is not the pursuit of rankings in higher education, but rather a search to improve and to share what we do in engineering education.

The quality of engineering education is our first goal.

Main goal of this Seminar

= define a **new generation of indicators and criteria** that can be applied to rankings in the field of Engineering and Technology. These indicators should tell how well engineers are educated and trained to meet the needs of industry and other stakeholders in higher education

Some recommendations for these new indicators

1. Diverse and inclusive

Broad set of indicators that value different educational contexts and profiles

2. Institution-dependent

Each institution should be able to select the indicators that fit their mission

3. Flexible

Each stakeholder is interested in other indicators. Data should be readable in a flexible way (\approx Umultirank)

4. Focus on the improvement

Some facts cannot be changed because of contexts. The focus should be on manageable facts AND on new trends.

New trends

Well-educated engineers

- are accustomed to technological change since they **will work in an unknowable future**
- have 21st century skills since they **are the drivers for this accelerated change** (curiosity, openness, entrepreneurial mindset, interdisciplinarity, global awareness, ..)
- have I- or T-profiles, since **industry needs different professional roles in this multidiverse society**

Engineering Education Research

1. Industry needs different professional roles in this multidiverse society
→ **some results of the EU knowledge alliance project PREFER**
2. Diversity of the educational contexts
→ **some results of the EU strategic partnership project readySTEMgo**

Industry needs different professional roles (PREFER project)

OPERATIONAL EXCELLENCE	PRODUCT LEADERSHIP	CUSTOMER INTIMACY
<p>BEST TOTAL COST</p>	<p>BEST PRODUCT</p>	<p>BEST SOLUTION</p>
<ul style="list-style-type: none"> ▪ Technological process optimization ▪ Incremental innovation of products and processes ▪ Focus on increasing efficiency & reliability <div> <ul style="list-style-type: none"> › Cost, logistics & resource efficiency › Quality assurance: › Sustainable maintenance › Standardization & flow optimization: process (re-)design </div>	<ul style="list-style-type: none"> ▪ Technological innovation ▪ Radical innovative ideas, products or procedures ▪ Focus on new cutting edge products <div> <ul style="list-style-type: none"> › High level of specialised knowledge › Commercial exploitation › Market exploration › Superior branding › Fast development </div>	<ul style="list-style-type: none"> ▪ Customized technological solutions ▪ Tailored innovation ▪ Focus on customer satisfaction <div> <ul style="list-style-type: none"> › Individual customer needs analysis › Client-centred customized solutions › Client acquisition & establishing long-term client relations </div>

PREFER



Erasmus+ Knowledge Alliance 575778-EPP-1-2016-1-BE-EPPKA2-KA

<http://preferproject.eu>

Diversity of the educational contexts (readySTEMgo project)



KU LEUVEN



TUHH

Technische Universität Hamburg-Harburg



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A!
Aalto University
School of Engineering

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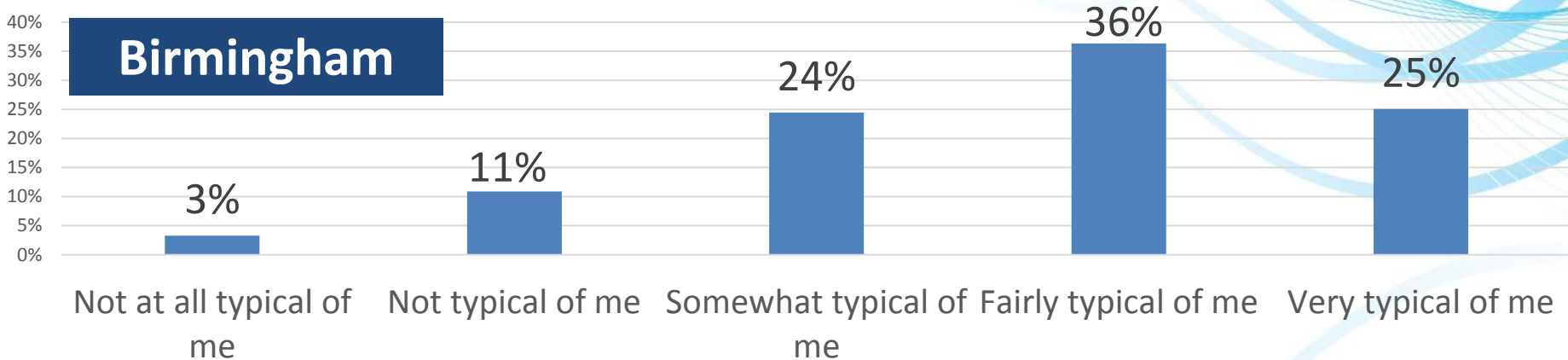


Erasmus+ Strategic Partnership
2014-1-BE02-KA200-000462

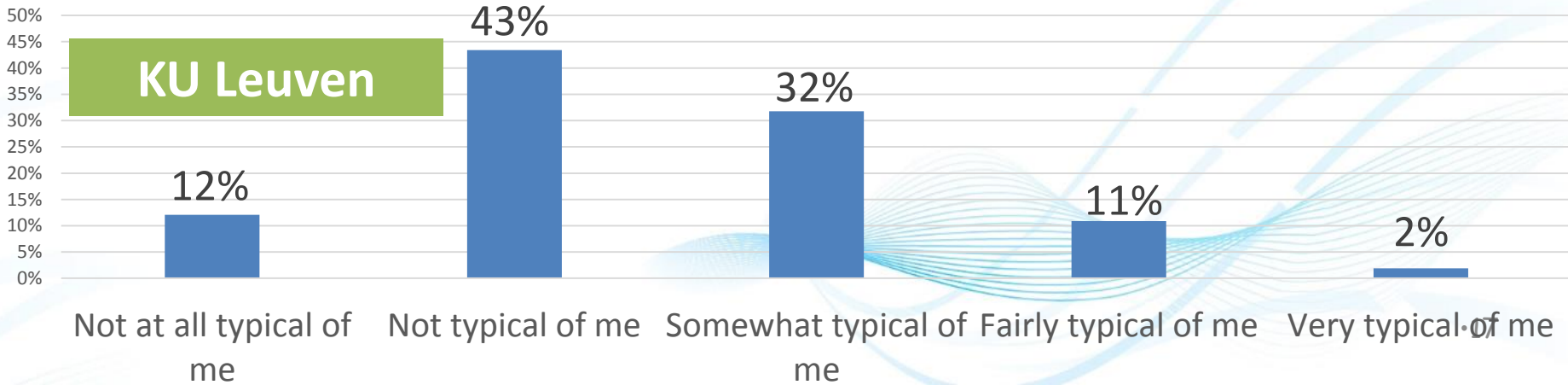
<https://iiw.kuleuven.be/english/readystemgo>

Diversity of the educational contexts (readySTEMgo project)

“I had to study hard to obtain my A-levels in secondary school”



“I had to study hard for my obtained study results in secondary education”

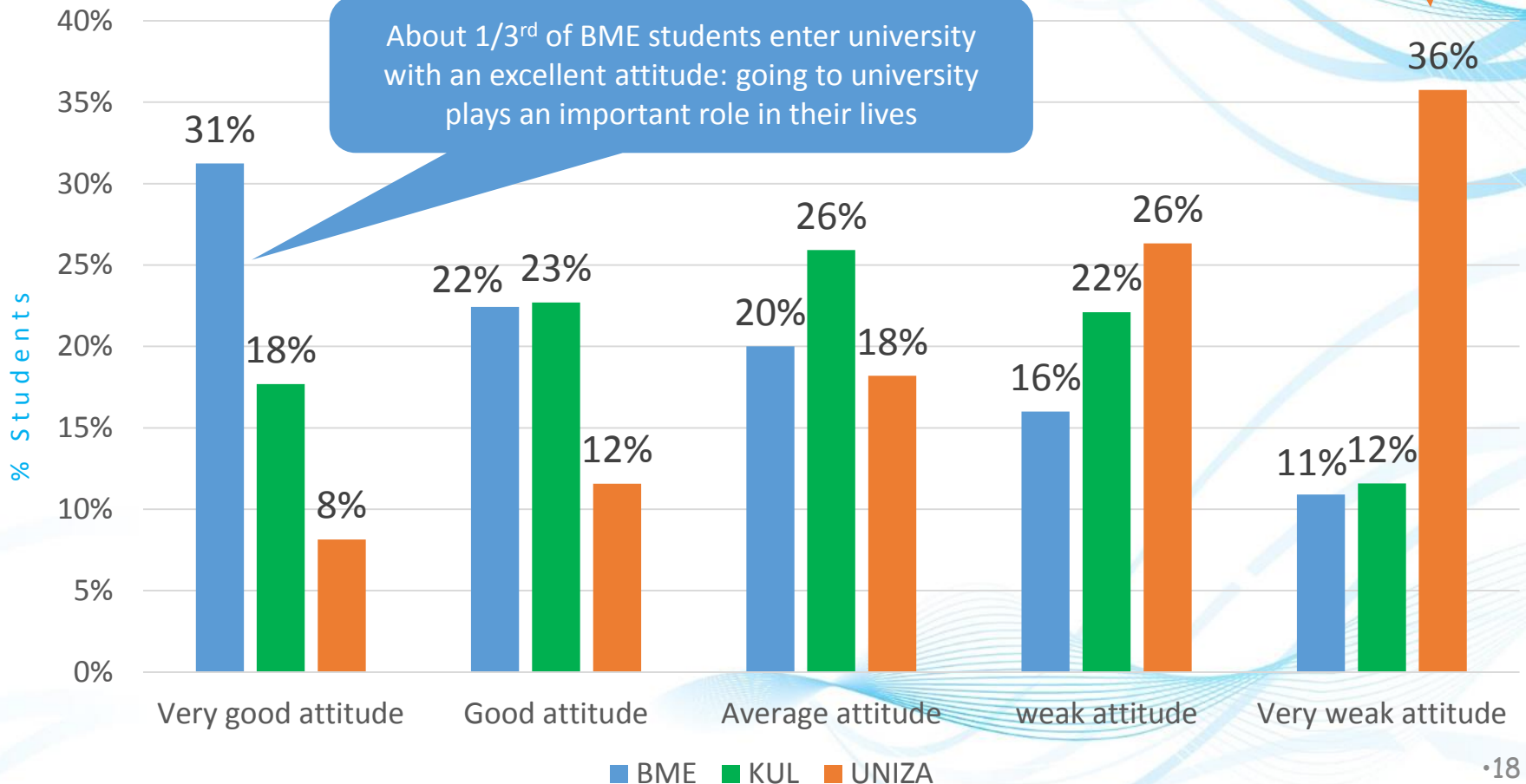


More than 1/3rd of the UniZa students enter university with a poor attitude: going to university & academic success does not seem to be very important to them

Diversity of the educational contexts (readySTEMgo project)

Attitude (Is going to university important for me?)

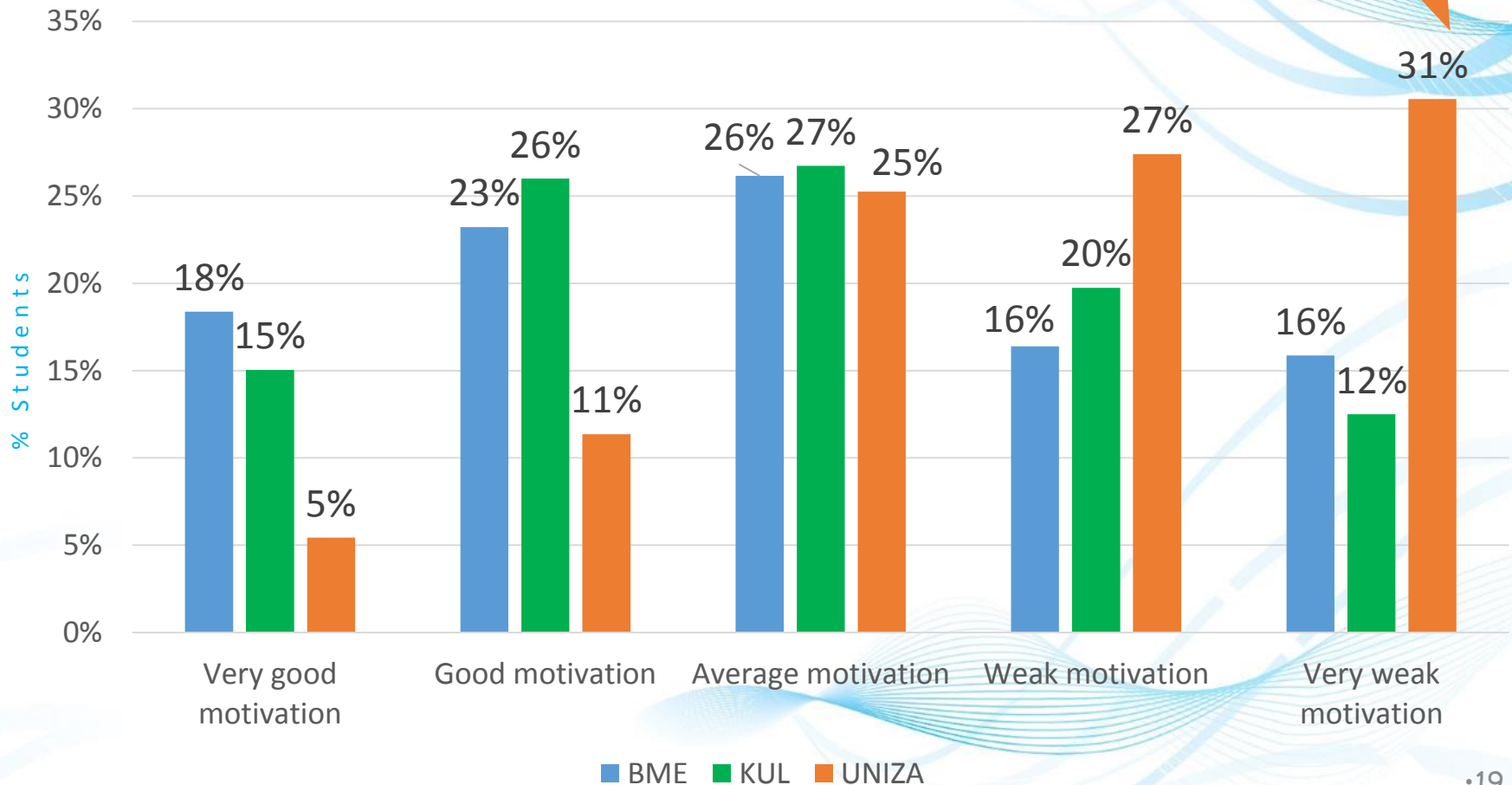
About 1/3rd of BME students enter university with an excellent attitude: going to university plays an important role in their lives



High proportion of UniZa students have a very weak motivation: they have difficulties persisting when confronted with challenging tasks

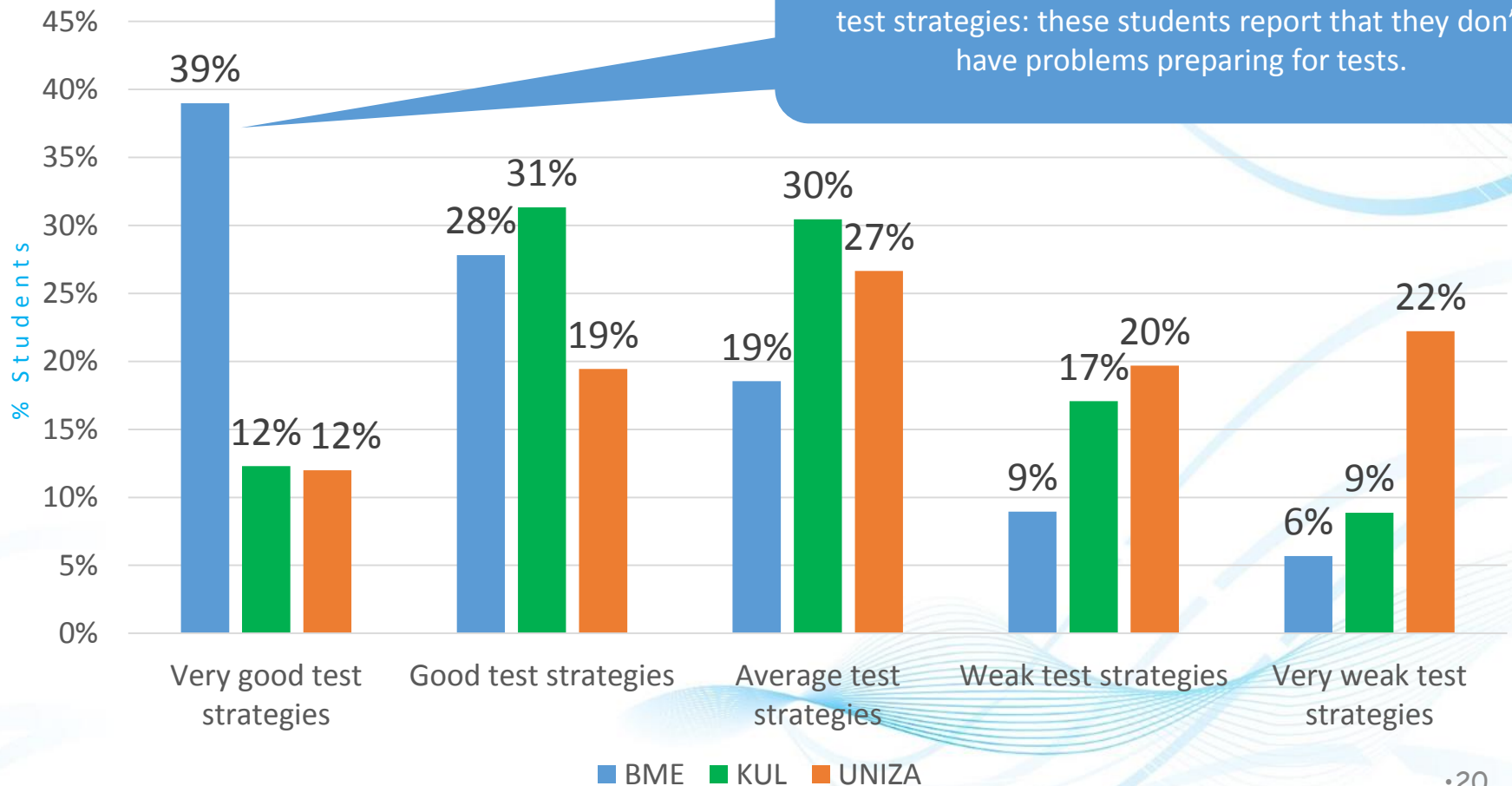
Diversity of the educational contexts (readySTEMgo project)

Motivation



Diversity of the educational contexts (readySTEMgo project)

Test strategies



Conclusion

We live in a superdiverse, rapidly changing society

- It's important to nourish the diversity in education
- It's essential to develop flexible and inclusive indicators
- Each university should have the opportunity to focus on delivering on its mission

Rankings should honor the universities that achieve their personal goals

Thank you!

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