

## **Educating Future Engineers – Meeting challenges at secondary school and university**

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## Introduction

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**Alexander Paul**

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Hochschule Düsseldorf –  
University of Applied Sciences

Faculty of Mechanical and Process Engineering

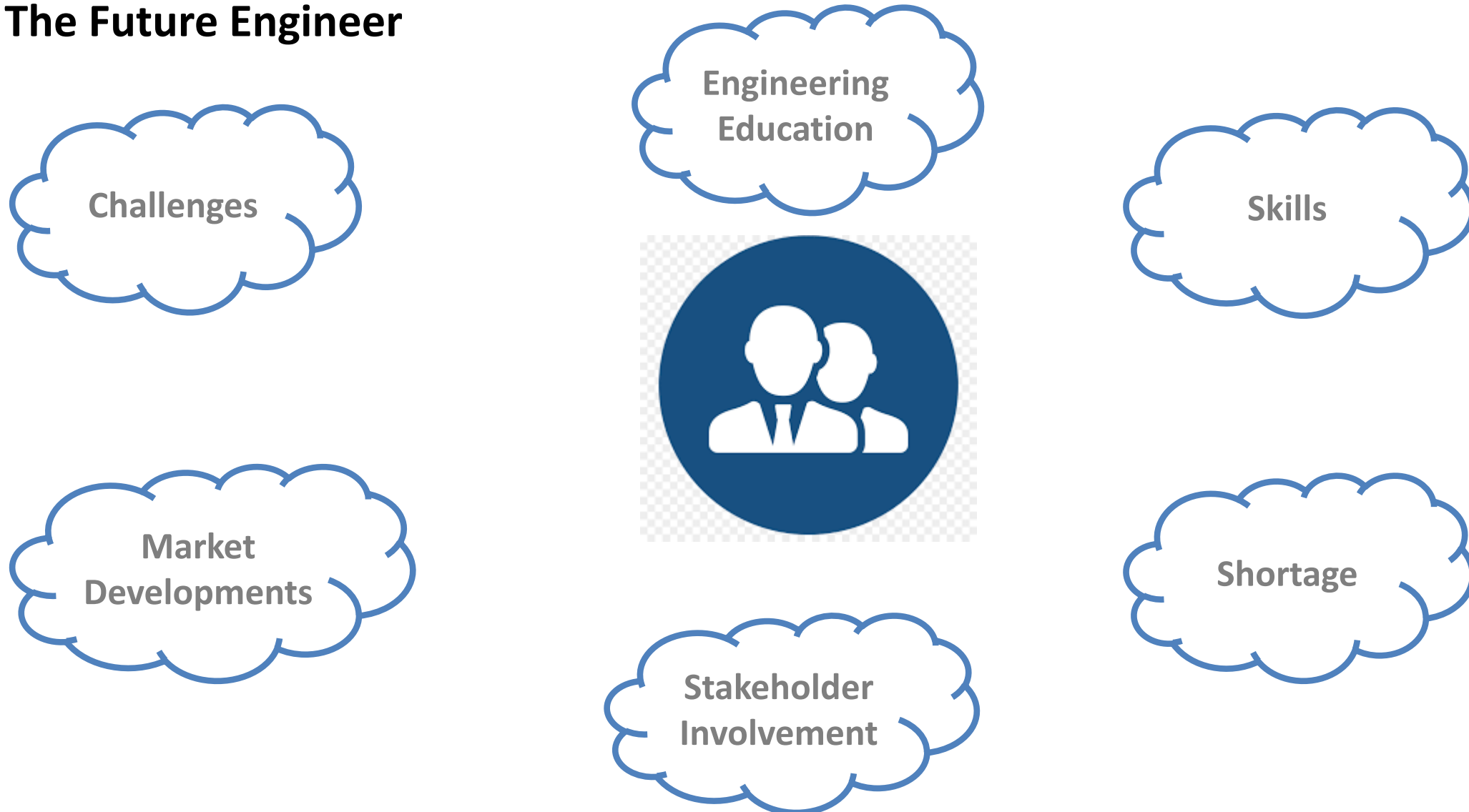
[flix@hs-duesseldorf.de](mailto:flix@hs-duesseldorf.de)

[www.mv.hs-duesseldorf.de](http://www.mv.hs-duesseldorf.de)

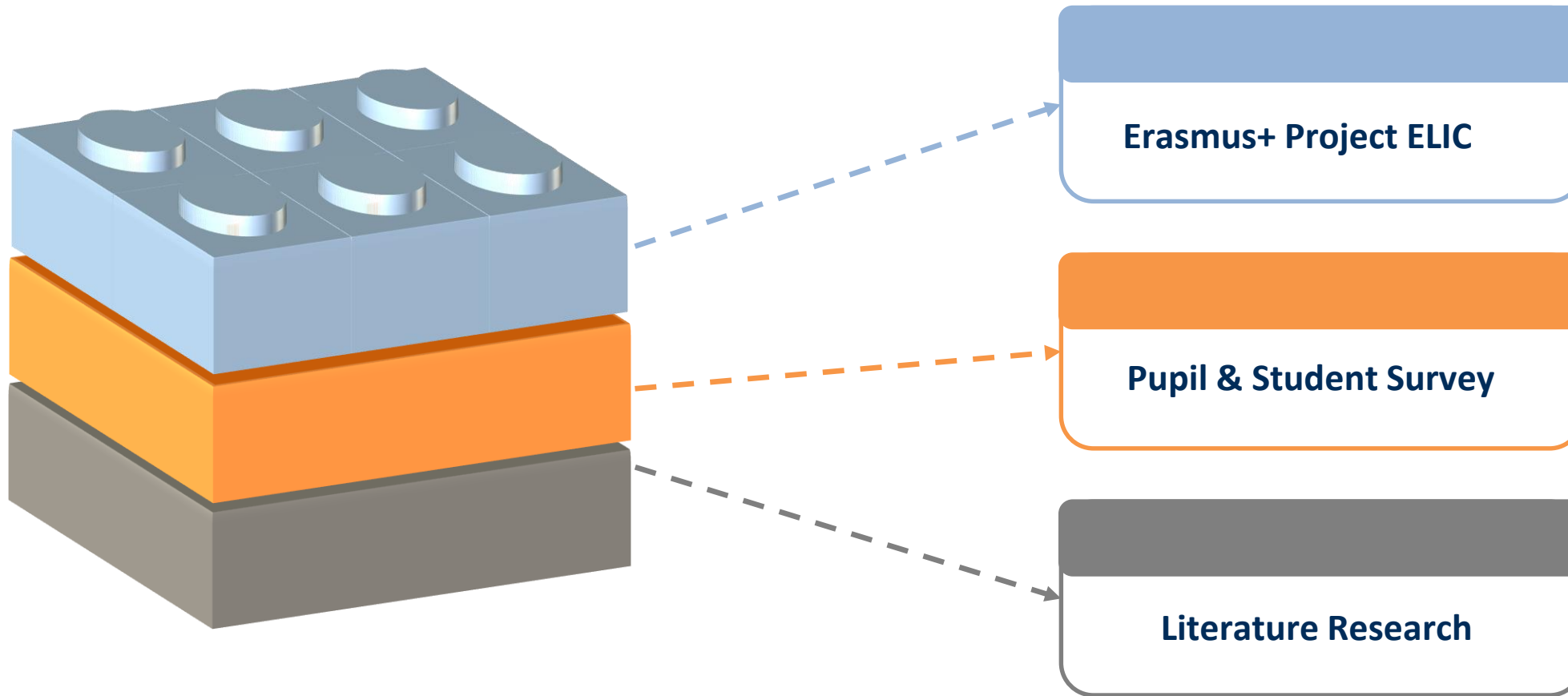


Picture: Industriekreis Düsseldorf

## The Future Engineer




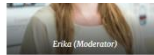
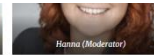
## Data Collection



## ELIC - Engineering Literacy Online / Teachers as Medium for Change

### Fact Sheet

- **Duration:** 01.10.2017 – 30.09.2019
- **Partner:** Universities, companies and schools from Austria, Italy, Czech Republic and Germany
- **Goal:** Increase the technical competence as well as technical didactic abilities of science teachers in order to motivate more students to choose an engineering career
- **Funding:** Erasmus+ KA201 - Strategic Partnerships for school education

 Tim (Facilitator Week 5)	 Erika (Moderator)	 Hanna (Moderator)
<b>Introduction</b> 3rd until 9th of February 2019	<b>Hot Engineering</b> 10th until 16th of February 2019	<b>Engine</b> 17th until 23rd of February 2019
<b>Week 4</b>	<b>Week 5</b>	<b>Week 6</b>
<b>Battery &amp; Light</b> 24th of February until 2nd of March 2019	<b>Hot Engineering</b> 3rd until 9th of March 2019	<b>Recap</b> 10th until 16th of March 2019

Facilitator: Tim Ahrens

Moderator: Erika Pernold & Hanna Sprenger

Time period: 3<sup>rd</sup> until the 9<sup>th</sup> of March 2019

**Description:** During this week which is going to focus on "Hot Topics in Engineering" current issues in engineering will be discussed which include energy management, autonomous driving and cyber security in engineering. The topics are currently crucial for the automotive industry and it will be shown to the participants how they can be introduced to the set teaching curriculum in diverse STEM subjects with innovative teaching methods and tools.

### CONTENT SECTION

Welcome to week 5! This week is dedicated to the hot topics of engineering. You will learn about autonomous driving, cybersecurity especially related to self-driving cars and finally about energy management. And there is even more, you will find many ideas to work on that topic in classrooms!

At the beginning of week 5 we want to focus on energy management. You will be introduced to energy transition, the electricity mix based on the example of Germany, as well as resource consumption and CO<sub>2</sub> emissions. Have fun in classroom with the game breaks and the case study!



[www.elic-mooc.com](http://www.elic-mooc.com)

ABOUT THIS MOOC

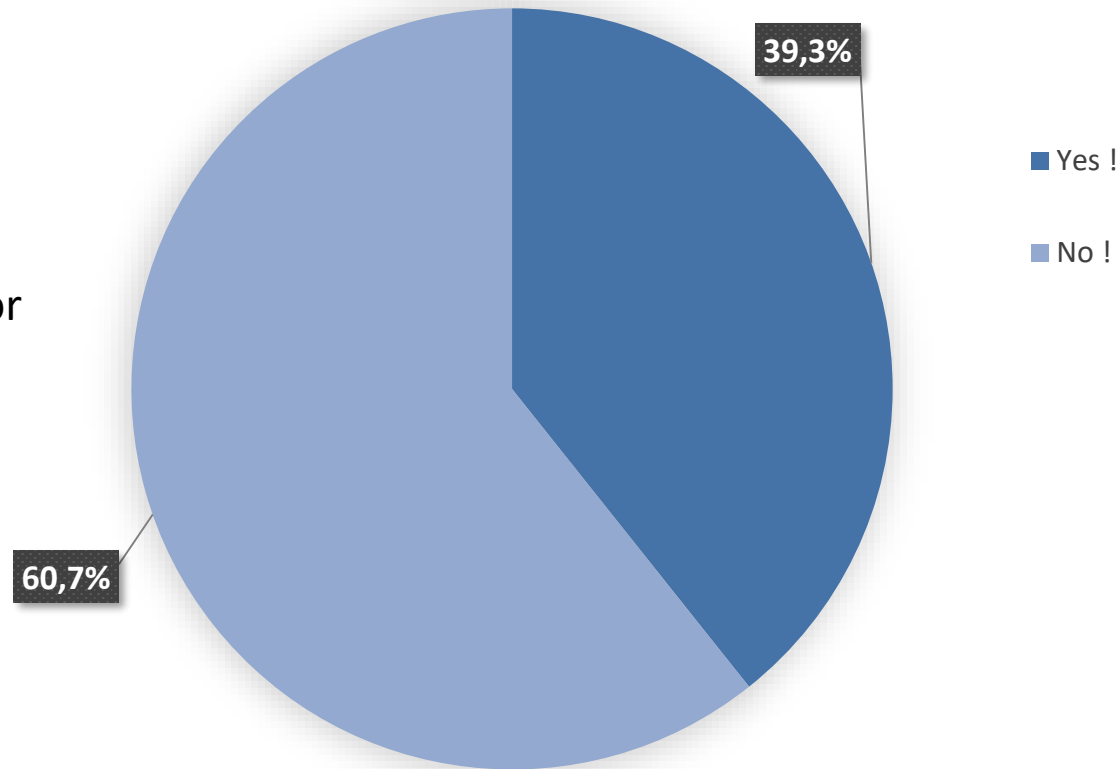


Co-funded by the  
Erasmus+ Programme  
of the European Union



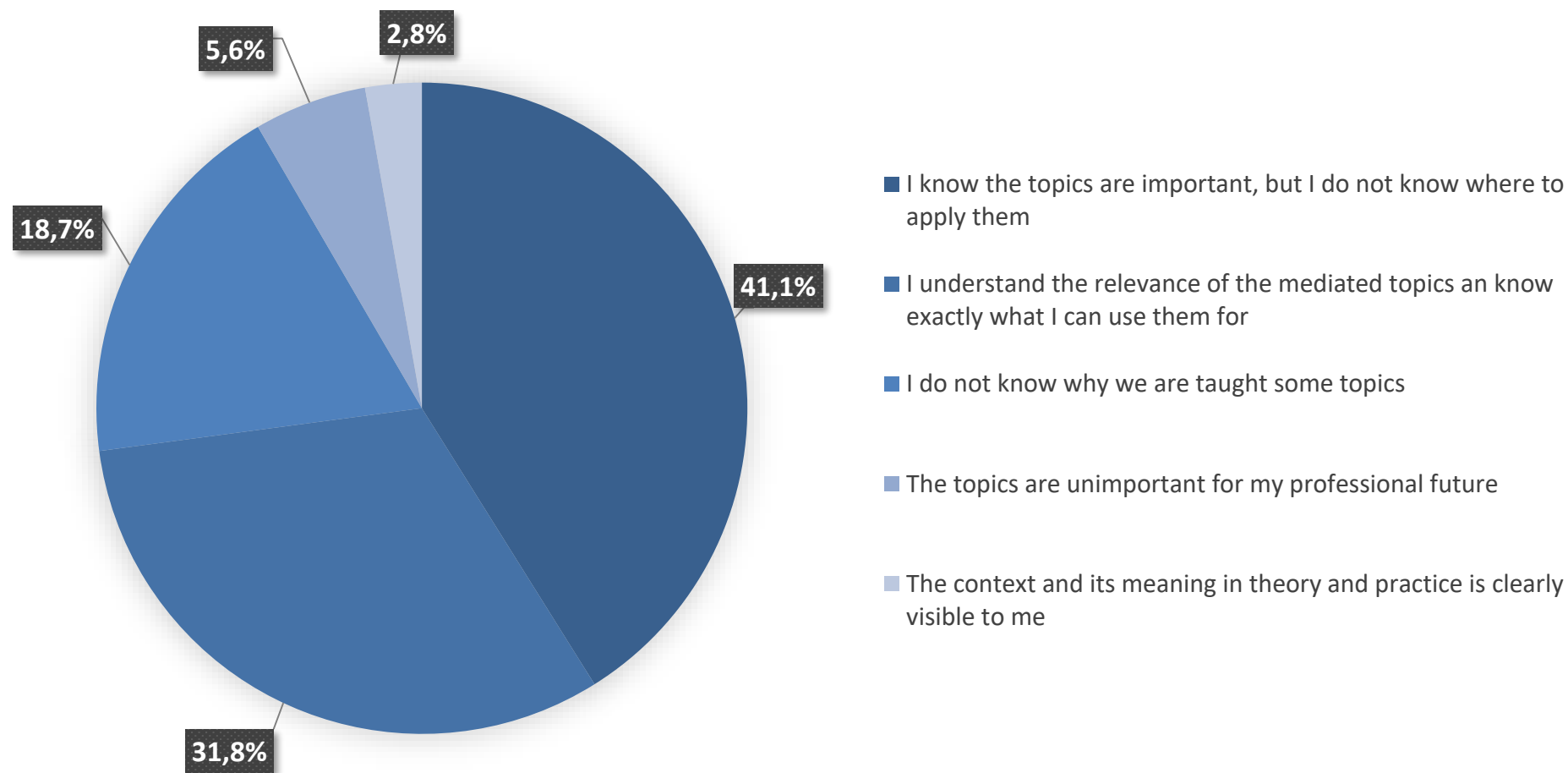
## Student Survey

Did you feel well prepared for studying an engineering study programme based on your school education?



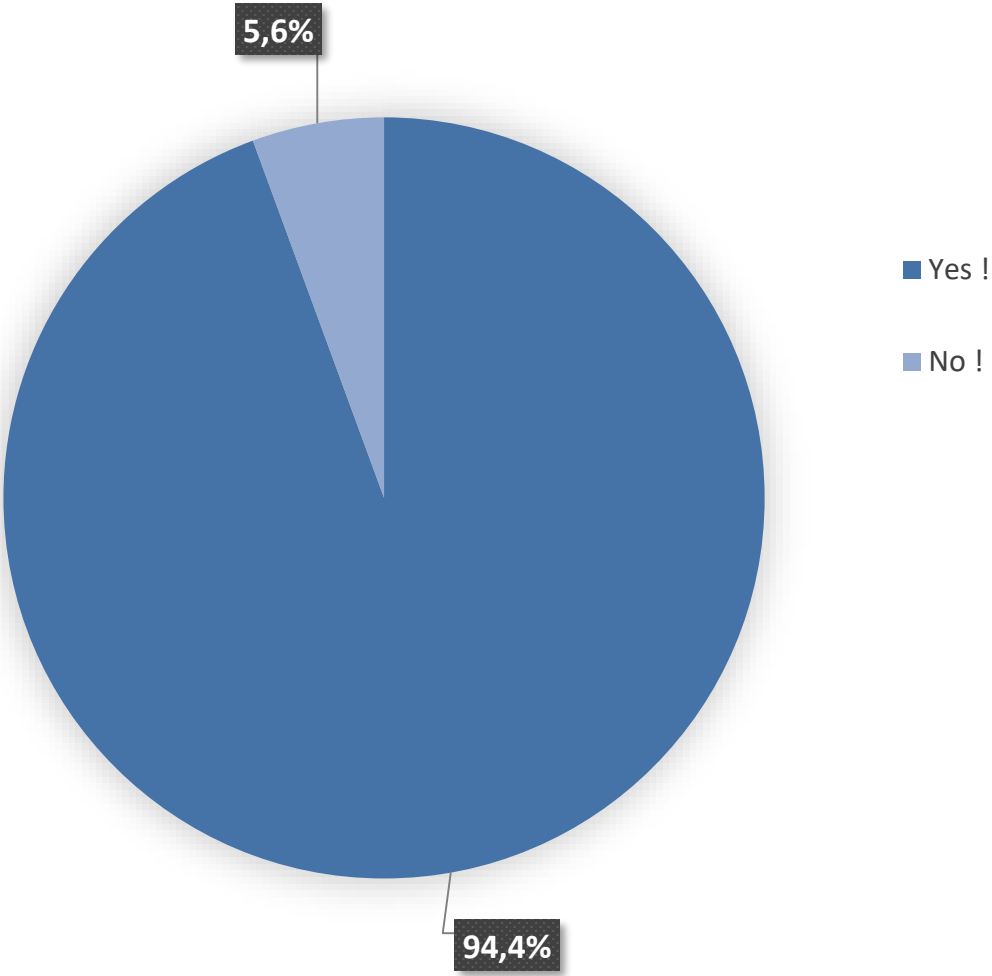
## Student Survey

Do you understand the importance of the taught topics and do you know where you could use your knowledge (from school)?



# Student Survey

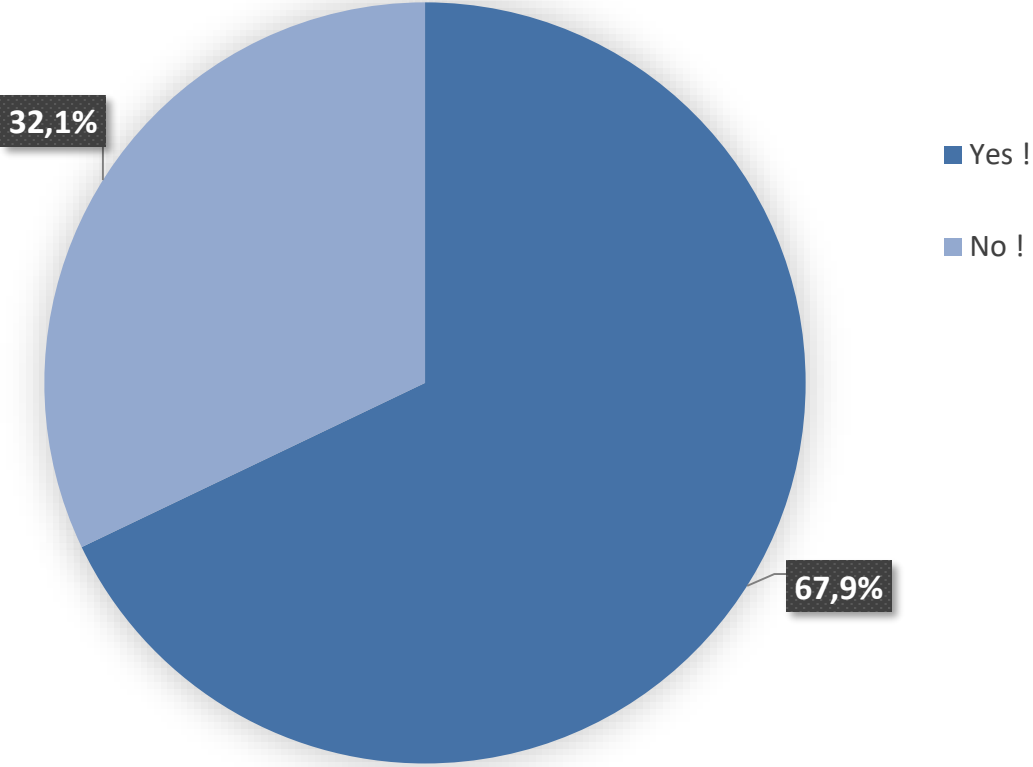
Would it be helpful for you to understand the taught topics by applying them on real-world problems ?





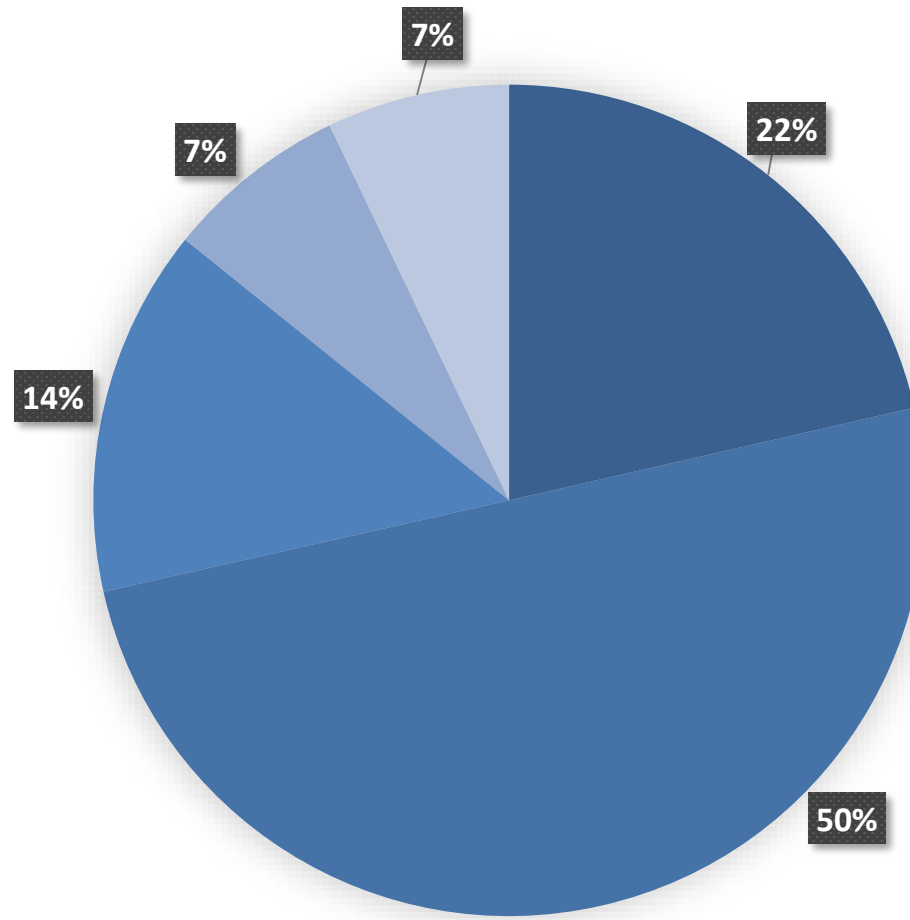
# Pupil Survey

Based on the taught topics,  
do you feel well prepared on  
your studies ?



## Pupil Survey

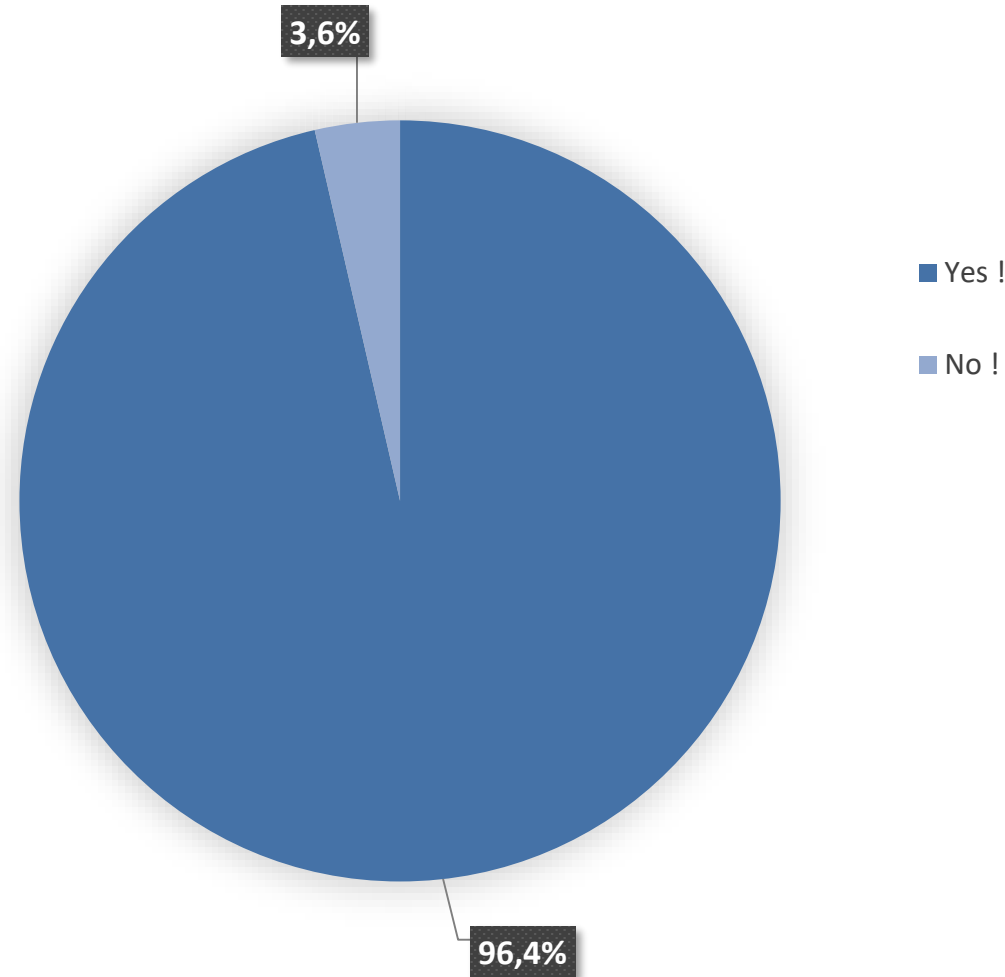
Do you understand the importance of the taught topics and do you know where you could use your knowledge (from school)?



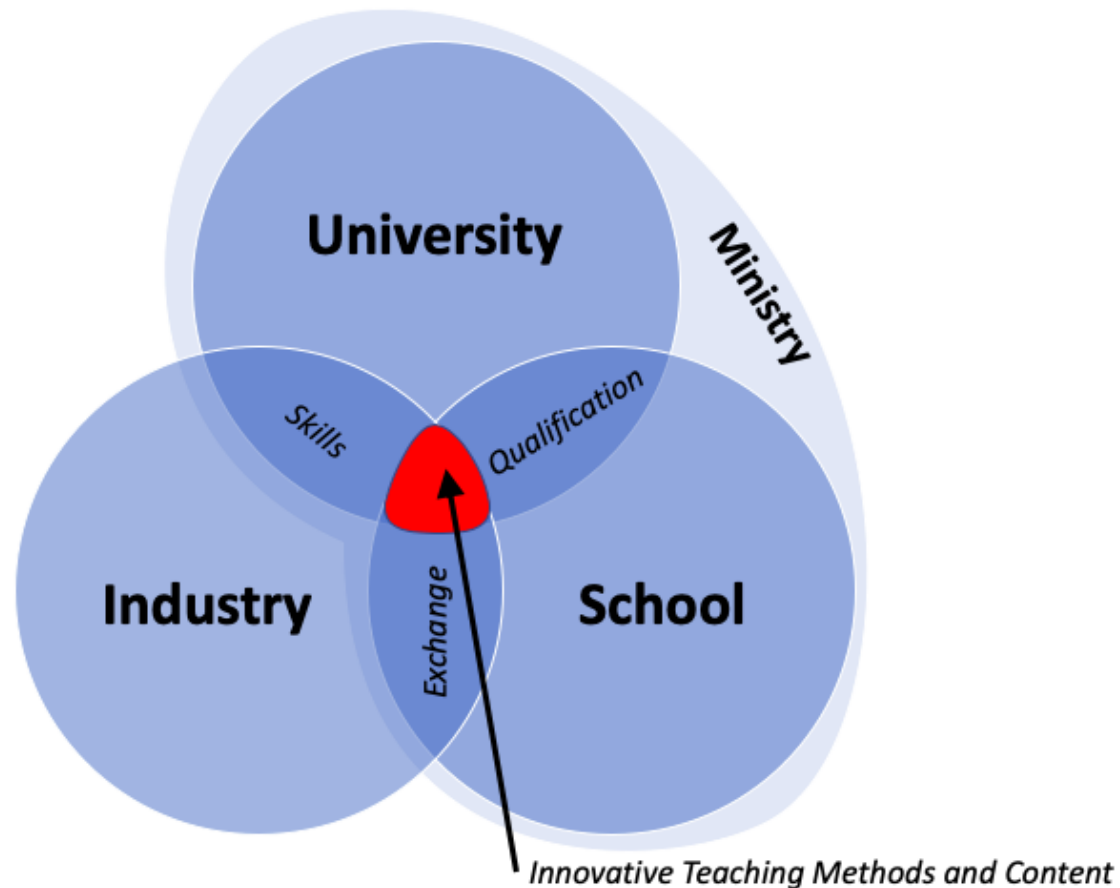
- I know the topics are important, but I do not know where to apply them
- I understand the relevance of the mediated topics and know exactly what I can use them for
- I do not know why we are taught some topics
- The topics are unimportant for my professional future
- The context and its meaning in theory and practice is clearly visible to me

## Pupil Survey

Would it be helpful for you to understand the taught topics by applying them on real-world problems ?



## Results & Outlook



- **Innovative teaching methods and content**
  - More practice orientation
  - Curriculum updates
  - More experiments
  - Problem based learning, flipped classrooms
- **Constant exchange between the stakeholders**
- **Additional money and time resources required**
- **Continuous progress evaluation in order to receive sustainability**

# Questions?



Picture: Tobias Vollmer