

## Structured doctoral programs and individual doctorate - different ways to future skills?

## Relevance – goals of this presentation

1. Why is it relevant to talk about future skills?
2. The role of tertiary education institutions
3. Future skills trained in structured doctoral programs and the individual doctorate – and why certain elements of the models should be integrated into each other
4. Best Practice – mindSET project

TRAINING THE  
**mindSET**

# Why is it relevant to talk about future skills?

- 1. Changing labour market**
- 2. Current challenges of our societies, e.g. climate change and digitalization**
  - Solutions to current and future challenges afford new interdisciplinary skills and methodologies
- 3. Tertiary education institutions' responsibility regarding the training of their students in future skills / as global citizens**

## What are future skills?

**Skills that will become significantly more important for professional life and/or social participation in the next five years, across all industries.**

- **Technological Skills**
- **Digital Citizenship Skills**
- **Classical Skills**

Source: Future Skills: Strategic Potentials for Higher Education Institutions.  
Discussion paper 3. Stifterverband in cooperation with McKinsey & Company, 2019.

# What are future skills?

## Technological Skills:

- Digital skills that shape new professions and are carried out by an increasing number of employees; technological specialist knowledge; across all industries.

Source: Future Skills: Strategic Potentials for Higher Education Institutions.  
Discussion paper 3. Stifterverband in cooperation with McKinsey & Company, 2019.

# What are future skills?

## Digital Citizenship Skills:

- Digital skills that everyone needs in professional life and for participation in society in the future; those who master these skills can work collaboratively and agilely in a digital world and make critical decisions; this also includes digital literacy (handling complex amounts of data).

Source: Future Skills: Strategic Potentials for Higher Education Institutions.  
Discussion paper 3. Stifterverband in cooperation with McKinsey & Company, 2019.

# What are future skills?

## Classical Skills:

- Classical skills and qualities that everyone needs in professional life as well as for social participation in the future; e.g. creativity, entrepreneurial action or stamina; will become even more important in the future as the requirement profiles change rapidly.

Source: Future Skills: Strategic Potentials for Higher Education Institutions.  
Discussion paper 3. Stifterverband in cooperation with McKinsey & Company, 2019.

## Future skills - demand 2018 vs. 2022, top ten

| 2018 |   | Trending 2022 |   |
|------|---|---------------|---|
| 1    | Analytical thinking and innovation      | 1             | Analytical thinking and innovation      |
| 2    | Complex problem-solving                 | 2             | Active learning and learning strategies |
| 3    | Critical thinking and analysis          | 3             | Creativity, originality and initiative  |
| 4    | Active learning and learning strategies | 4             | Technology design and programming       |
| 5    | Creativity, originality and initiative  | 5             | Critical thinking and analysis          |
| 6    | Attention to detail, trustworthiness    | 6             | Complex problem-solving                 |
| 7    | Emotional intelligence                  | 7             | Leadership and social influence         |
| 8    | Reasoning, problem-solving and ideation | 8             | Emotional intelligence                  |
| 9    | Leadership and social influence         | 9             | Reasoning, problem-solving and ideation |
| 10   | Coordination and time management        | 10            | Systems analysis and evaluation         |

Source: Future of Jobs Survey 2018, World Economic Forum.



# The role of tertiary education institutions

**To what extent do tertiary education institutions need to develop new strategies to ensure an adequate training in future skills?**

**Task:** Preparing students for the digitized working environment and a changing labour market

- Universities are becoming increasingly important in imparting future competencies:  
Today, one in four companies works with universities to cover its competence requirements; in 5 years, it will be more than one in three

**Two central challenges** for Universities:

1. Training and further education of experts / technological specialists
2. All students must be taught the necessary digital and non-digital skills across all subjects

Source: Future Skills: Strategic Potentials for Higher Education Institutions.  
Discussion paper 3. Stifterverband in cooperation with McKinsey & Company, 2019.

## Structured doctoral programs – main characteristics

- Group of doctoral students
- Doctoral projects must be integrated into the existing program
- Curriculum accompanying the doctorate:
  - partly with compulsory attendance for seminars or lectures
  - own lectures
  - credit points
  - training of additional qualifications and soft skills
- Systematic and intensive supervision by a team of supervisors
- Limited to three years (a maximum of five years)

Source: <http://www.research-in-germany.org/de/karriere-in-der-forschung/infos-fuer-doktoranden/wege-zur-promotion/strukturierte-promotion.html> (06/06/19).

## Individual doctorate – main characteristics

- The most common route to a doctorate in Germany
- Doctoral students
  - have a university teacher as their supervisor, the so-called "Doktorvater" or "Doktormutter"
  - work very independently on their dissertation
- Offers great flexibility and freedom (doctoral projects can often be determined by the students themselves) – also depending on the contract as research assistant
- But: also requires a high degree of discipline and a sense of responsibility
- The work on the doctorate can be pursued:
  - at a university
  - at a non-university research institute
  - in a company
- Individual time planning, often depending on the length of employment as a research assistant (three to five years are common)

Source: <http://www.research-in-germany.org/de/karriere-in-der-forschung/infos-fuer-doktoranden/wege-zur-promotion/individuelle-promotion.html> (06/06/19).

## In comparison

| Structured doctoral programs  | Individual doctorate   |
|---|--|
| group of doctoral students  | individual doctoral student  |
| doctoral projects must be integrated into the existing program                                    | doctoral projects can often be determined by the students themselves |
| curriculum accompanying the doctorate, e.g. training of additional qualifications and soft skills | no mandatory curriculum accompanying the doctorate                   |
| systematic and intensive supervision by a team of supervisors                                     | have a university teacher as their supervisor                        |
| limited to three years (a maximum of five years)  | individual time planning   |

## Preliminary Assumption

**Structured doctoral programs seem to offer a particularly suitable framework for targeted training on interdisciplinary content and additional skills.**

## Questions

- 1. How can the individual doctorate catch up?**
- 2. To what extent can structured doctoral programs learn from the model of the individual doctorate?**

## Advantage structured doctoral programs?

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| 1             | Analytical thinking and innovation      |
| 2             | Active learning and learning strategies |
| 3             | Creativity, originality and initiative  |
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| 5             | Critical thinking and analysis          |
| 6             | Complex problem-solving                 |
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| 8             | Emotional intelligence                  |
| 9             | Reasoning, problem-solving and ideation |
| 10            | Systems analysis and evaluation         |

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Structured doctoral programs foster the acquisition of above skills because they offer the appropriate framework:

- Group of doctoral students
- Systematic training across disciplinary boundaries that is integrated into the curriculum
- Training is quality-assured
- Training can be more easily tailored to the needs of the labour market

Source: <http://www.research-in-germany.org/de/karriere-in-der-forschung/infos-fuer-doktoranden/wege-zur-promotion/strukturierte-promotion.html> (06/06/19).

## Advantage individual doctorate?

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| 4             | Technology design and programming       |
| 5             | Critical thinking and analysis          |
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## Advantage individual doctorate?

| Trending 2022 |                                    |
|---------------|------------------------------------|
| 1             | Analytical thinking and innovation |
| 5             | Critical thinking and analysis     |
| 7             | Leadership and social influence    |

The individual doctorate fosters the acquisition of above skills because it requires the candidates to learn and demonstrate the following competencies:

- Personal initiative
- Self-dependence
- Sense of responsibility

Source: <http://www.research-in-germany.org/de/karriere-in-der-forschung/infos-fuer-doktoranden/wege-zur-promotion/individuelle-promotion.html> (06/06/19).



## Conclusions

- 1. The individual doctorate can benefit if more structured elements of the training are (mandatorily) integrated.**
- 2. Structured doctoral programs should reflect whether they provide sufficient space for autonomy of their candidates on the one hand and actively promote personal decision-making and self-responsibility of the candidates on the other.**

## Best practice – mindSET project

### Training the mindSET - Improving and Internationalizing Skills Trainings for Doctoral Candidates

- Duration: **1.9.2018 – 31.8.2021 (36 months)**
- Maximum approved overall budget: **395.149,00 EUR**
- Type of funding: **Erasmus+ KA 203 Strategic Partnership**
- **Full partners:**
  - **Technische Universität Berlin (TUB)** – coordinator
  - **Norwegian University of Science and Technology (NTNU)**
  - **Politecnico di Milano (PoliMi)**
  - **Warsaw University of Technology (WUT)**
- **Associate partners:**
  - **CESAER** – Conference of European Schools for Advanced Engineering Education and Research
  - **T.I.M.E.** (“Top Industrial Managers Europe”) Association

## Best practice – mindSET project

### Training the mindSET -

#### Improving and Internationalizing Skills Trainings for Doctoral Candidates

- Development of a common **European core curriculum in transferable skills** for doctoral training, especially designed for the **SET disciplines**, including entrepreneurial, leadership, communication and organizational skills as well as education in research ethics and good scientific practice.
- Enhancing the possibilities of **cross-national mobility** of early stage researchers, trainers and academic staff and their orientation within an international employment market.
- Contribution to a deeper and broader **Europeanization of doctoral training**, an advancement of training in transferable skills

## Best practice – mindSET project

### Intellectual Outputs (IO)



# Thank you!

## References

- Future of Jobs Survey 2018, World Economic Forum.
- Future Skills: Strategic Potentials for Higher Education Institutions. Discussion paper 3. Stifterverband in cooperation with McKinsey & Company, 2019.
- <http://www.research-in-germany.org/de/karriere-in-der-forschung/infos-fuer-doktoranden/wege-zur-promotion/individuelle-promotion.html> (06/06/19).
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- [https://www.zewk.tu-berlin.de/v\\_menu/wissenschaftliche\\_weiterbildung/projekte/mindset/](https://www.zewk.tu-berlin.de/v_menu/wissenschaftliche_weiterbildung/projekte/mindset/) (06/06/19).