APSSE 2021

Title

Actual problems of systems and software engineering

Software Engineering Education: Discovering Future Skills

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It seems that new skills and capabilities should be needed, as tomorrow's technology workforce will be different from today's.

Do we have a clear vision how is skills demand evolving and where the gaps will be?

What is the research area?

Employees with IT skills and software engineers are in high demand, but they need to adapt constantly

Employment requirements became more stringent as the workforce needs to understand and become familiar with new technologies

Facts:

Industry processes become more automated, jobs and roles change accordingly to sustain technological evolution

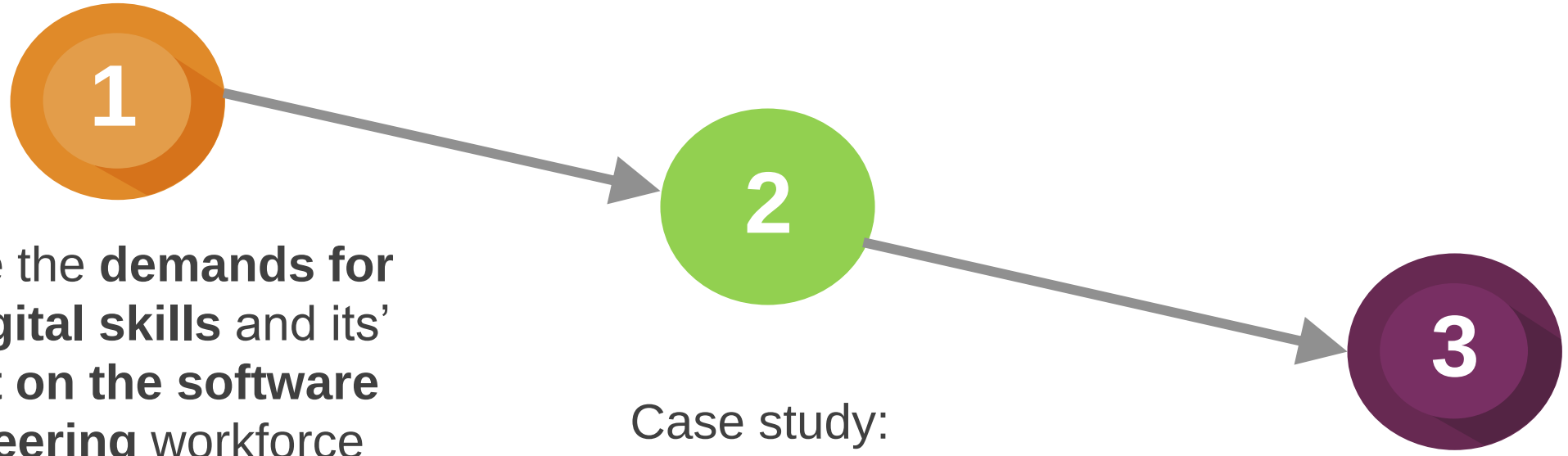
- Most tactical, algorithmic, and structured work will be automated by machines over time, reducing the need to perform several repetitive tasks manually.
- Automation allows employees to concentrate on more important tasks, leaving much creative and strategic work for human talent.

Research question:

How should software engineers develop their future skills and change themselves to adapt to the changing technologies and evolving industry landscape?

The Goal of the Research

To understand how software engineering specialists should develop and grow in their future skills and how to upskill students with a software engineering background:



Analyze the **demands for IT & digital skills** and its' **impact on the software engineering** workforce

Case study: identify the **gaps** in software engineering **skill development.**

Propose a **high-level approach** on how software engineers should develop their **future skills**

Six emerging trends and their impact on the software engineering workforce were analyzed

Blockchain

AI (Artificial Intelligence)

Robotics

Nanotechnology/ Biotechnology

IoT (Internet of Things)

Augmented Reality/Virtual Reality

Result: Systematization of (Hard) Skill Requirements for Software Engineering Specialists

Future Changes in the Software Engineering Skills Workforce: Literature review

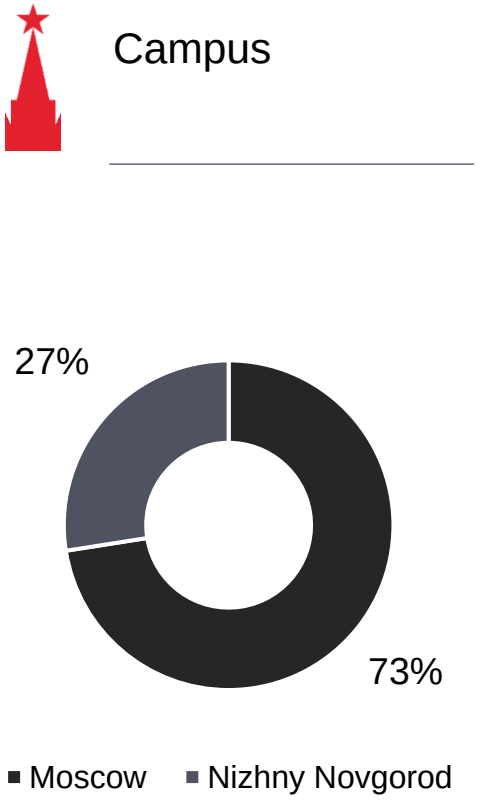
TOP-5 skills (Soft) demanded

1. Creative thinking
2. Flexibility
3. Critical thinking
4. Adaptability & Resilience
5. Communication

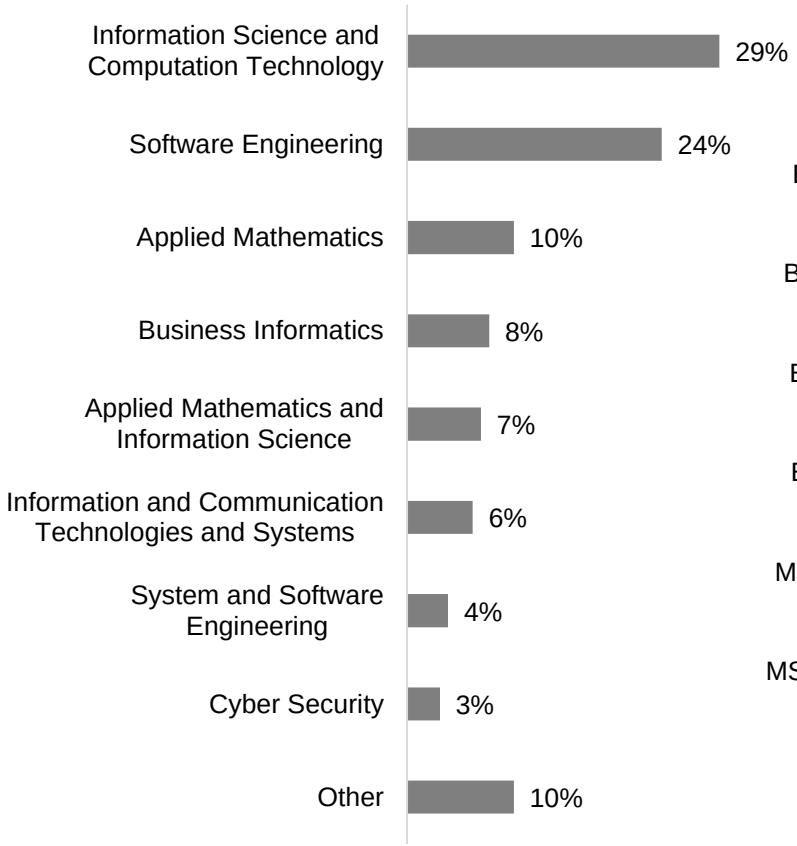
Now, employers working with new emerging technologies want to see in their employees **not only highly qualified specialists** with all the necessary professional skills, but also **individuals with such qualities as communication skills, flexibility, and adaptability to change**

HSE students online survey (131) was conducted

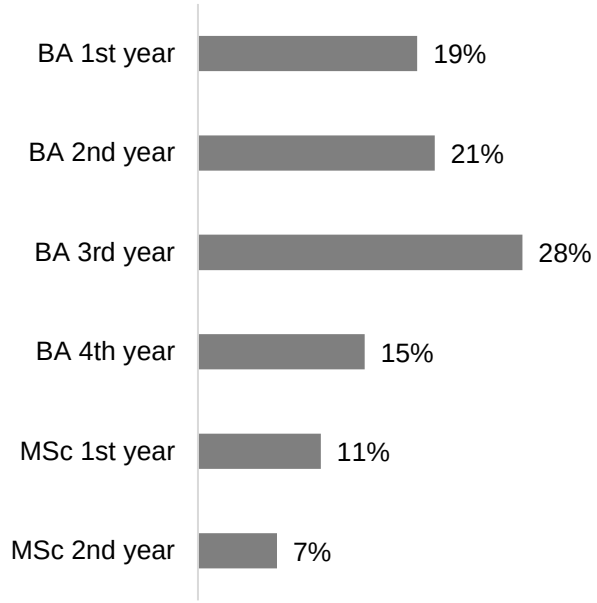
Campus



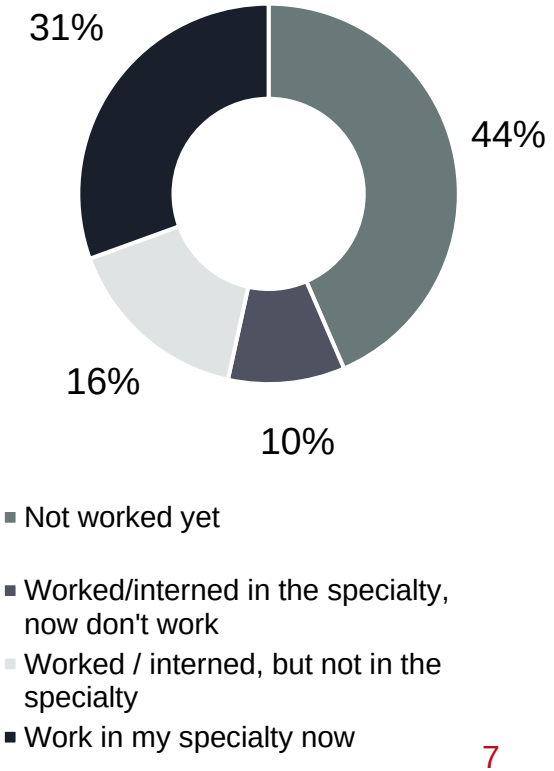
Specialization



Course



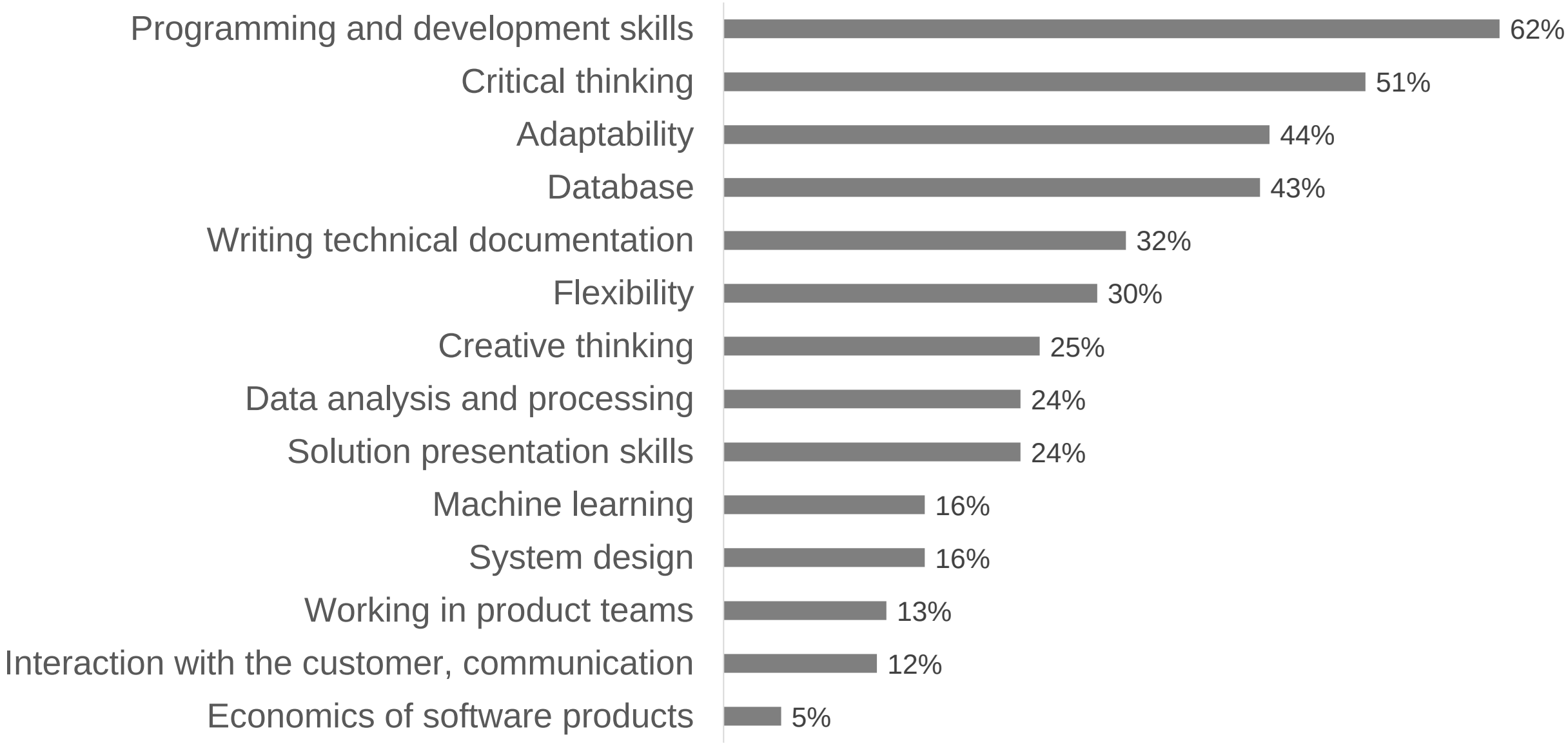
Work experience



Q1: Whom do you want to work with after graduation, in what role?

* Because respondents chose multiple answers, the total amount is not equal to 100%

Q2: Which IT subjects were most useful in studying?



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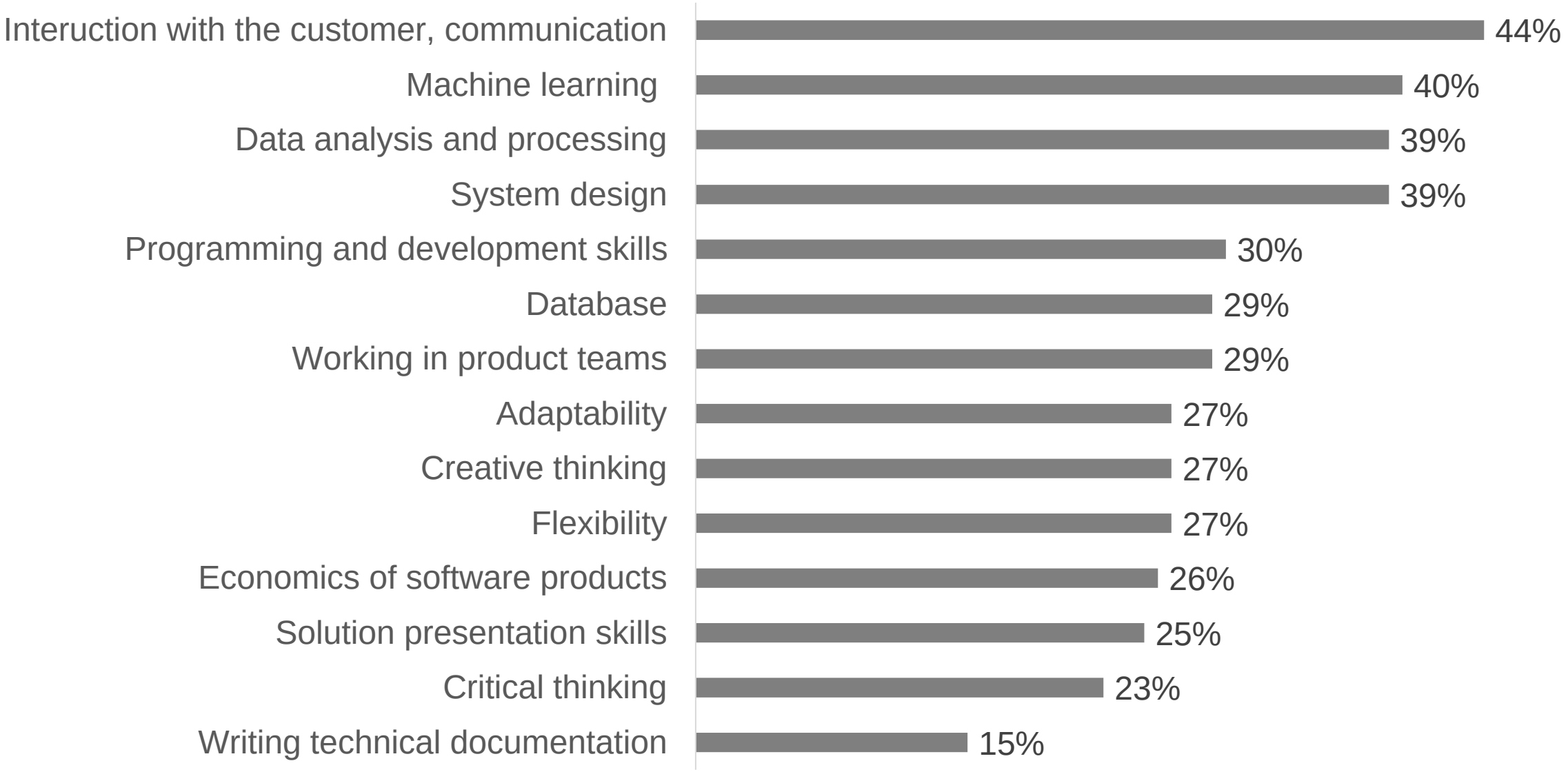
Q3: What useful IT skills have you acquired for your future career while studying?



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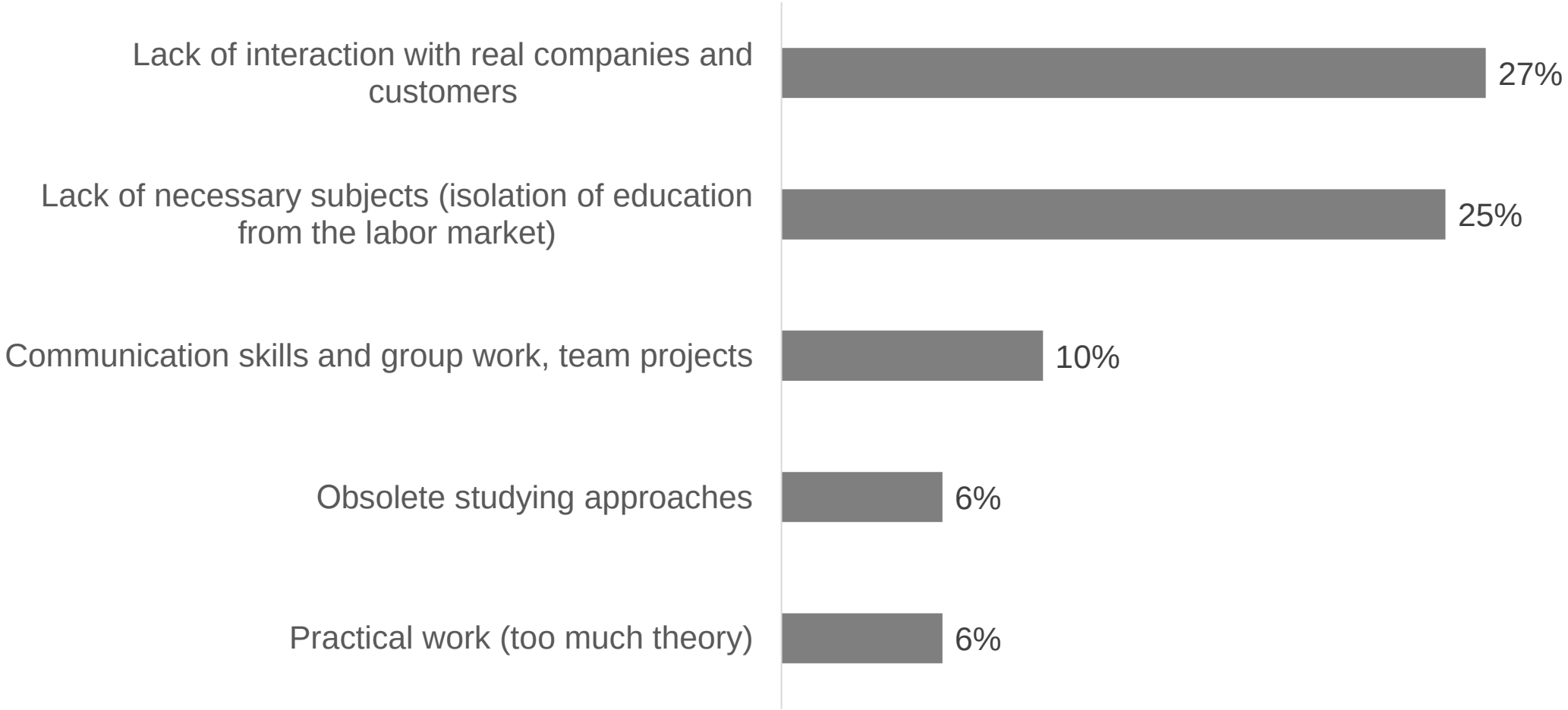
Q4: What are you missing in the current training (besides the usual offline interaction) and what can be strengthened in the current online/ offline training format?



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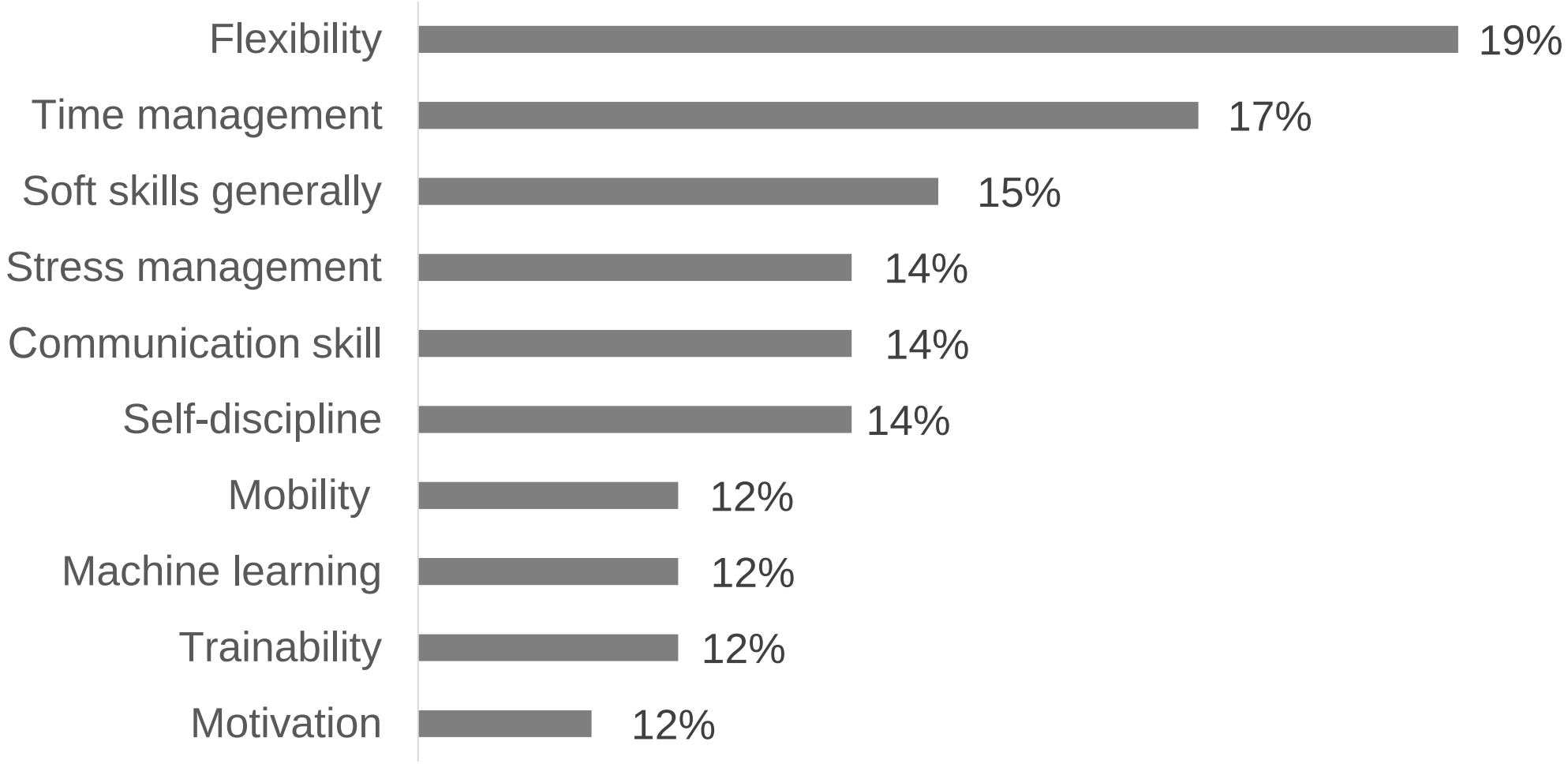
Q6: What new skills are you most likely to need to work in the new post-crisis environment and what should you upgrade during your training?



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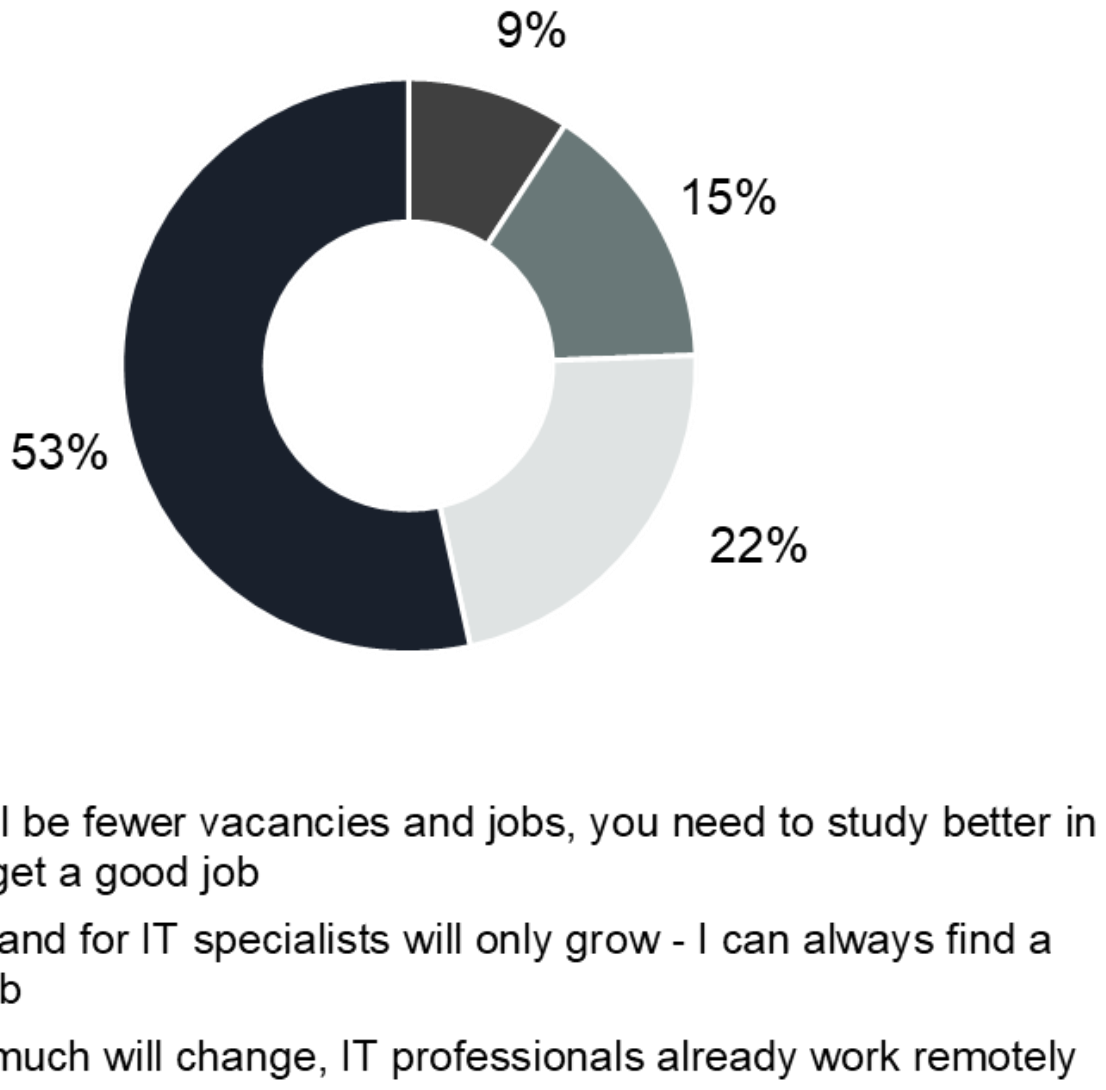
Q5: How do you think the coronavirus will affect your future employment as an IT professional?



Case Study Results: findings from the survey validate findings from the research

Trending skills	IT Students survey
Programming and development skills	Valid (62%)
Critical Thinking	Valid (51%)
Adaptability and resilience	Valid (44%)
Database	Valid (43%)
Writing technical documentation	Valid (32%)
Flexibility	Valid (30%)
Creative Thinking	Valid (25%)

1. To adapt to emerging trends, soft skills are a significant part of a student's development as well as hard skills.
2. More practical work is to prepare students for the future market challenges by using industry emerging practices.
3. Hard skills are crucial to keep up with emerging technical trends.

The automation process will change the workforce: we need to mold SE specialists into digital talents because new skills are required as new business opportunities arise

Limitations

1. The research was completely remote.

2. Even though we followed a protocol to conduct the survey, the limited number of participants of this empirical study might affect its validity, scalability, and applicability of the results to broader contexts.

3. The survey was circulated only among HSE university students.

Future plans

1. **IT professionals were NOT included as survey participants as our goal was to discover skills needed by software engineering students and young specialists for their future, to work with emerging technologies.**

2. **In future we are hoping to involve IT professionals to identify the required skills and to update the research results considering their needs.**

This will help to leverage the supposed student's career development plans with the IT professionals' expectations.

Thank you!

Q & A

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HSE University, 2021

Attachment: What company you would like to work as software engineering specialist ?