Welcome to "1h4 Girls in STEM – Part II"!

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What are we going to do today?

1. Input on the topic of gender-sensitive STEM didactics
2. Group discussions in breakout rooms: Successful strategies and challenges
3. Impressions from the breakout rooms in the plenary session
4. Goodbye and preview on upcoming events

Introduction

- Recent numbers show that girls and women are still significantly underrepresented in STEM, despite some positive trends (Anger, Kohlisch, & Plünnecke, 2022)

- There are major differences between the various STEM disciplines: While mathematical and scientific occupational fields have a relatively high share of female employees at 37.5 %, technical and computer science occupations are significantly lower (Bundesagentur für Arbeit, 2019)

Introduction

- In addition to individual characteristics (e.g. lower interest, lower confidence in one's own STEM abilities), **socialization and environmental influences** by parents, teachers, peers and the media are discussed as possible reasons

- Environment and media convey stereotypical behavior patterns and ideas

Introduction

- One important aspect of the environment that has a lasting influence on girls' interest in the individual STEM fields is the didactic design of STEM lessons and STEM education programs (Kampshoff & Wiepcke, 2021)

- Which didactic measures are especially effective in sustainably promoting girls' interest in the STEM fields?

Hints from research

- Systematic hints from research (Happe, Buhnova, Koziolek & Wagner, 2021)

- Interest as an important prerequisite for sustainable learning success

- Different recommendations for different phases of STEM interest

Six different phases of STEM interest

Taking into account the different preferences of girls and boys in the didactic design of learning situations in order to ...

... combat false stereotypes

... spark initial interest

... facilitate a suitable first contact

... design suitable learning environments

... strengthen confidence in one's own abilities

... maintain long-term interest

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I. Strategies that combat false stereotypes

- Provide non-stereotypical role models, for example by meeting STEM persons who do not fit the stereotype of the eccentric loner, but who also meet friends and have hobbies such as sports and music (Boston & Cimpian, 2018)

- Introduce girls to successful female STEM role models

I. Strategies that combat false stereotypes

- Presenting work in the STEM field as community-oriented in order to revise stereotypical ideas about what computer scientists do (Boston & Cimpian, 2018)

- Provide opportunities to do STEM activities as part of a group

II. Strategies that spark initial interest

- Include visible physical evidence of the success of women in STEM in the learning environment, for example through portraits of successful female STEM scientists

- Highlight the social impact and interdisciplinary nature of STEM to evoke a sense of belonging and to demonstrate the relevance of the topic and the opportunities for success in the STEM field

III. Strategies enabling appropriate first contact

- Digital games and creative arts activities developed for girls to provide a suitable introduction to the world of computers

- Start with context-related offline activities to keep entry barriers as low as possible

- Programming environments with a visual development interface to make introductions to programming more appealing

IV. Strategies that make the learning environment less daunting for girls

- Non-competitive environment: Split classes by experience level to counteract the situation where the students with the most experience take up most of the teachers' and providers' time

- Collaborative tasks to broaden the range of skills and experiences acquired in the classroom

V. Strategies that strengthen confidence in one's own abilities

- Provide low-stakes learning opportunities for girls to have a sense of achievement, experience success and build self-confidence

- Introduce a growth mindset, i.e. the belief that skills can be improved through effort and commitment, as well as through learning strategies and mentoring

- Take a positive, constructive attitude towards failures and mistakes as valuable learning opportunities (Boston & Cimpian 2018)

VI. Strategies that maintain long-term interest

- Provide girls with interesting hands-on experience opportunities based on real-world situations, as girls are particularly motivated by inquiry-based learning and by the opportunity to make a lasting impact

- Highlight the social impact and interdisciplinary nature of STEM to increase the sense of belonging, to emphasize the relevance of STEM for society and to highlight the opportunities for success in the field

- Enabling girls to be part of a group and be part of the STEM community

Important challenges

- Offer girls attractive practical experiences

- Provide opportunities for girls to be successful with their strengths

- Highlight the social impact of work in STEM fields

Important challenges

- Provide girls with suitable female STEM role models

- Provide appropriate training to teachers and important key persons in the girls' environment to sustainably promote a greater interest in the STEM field
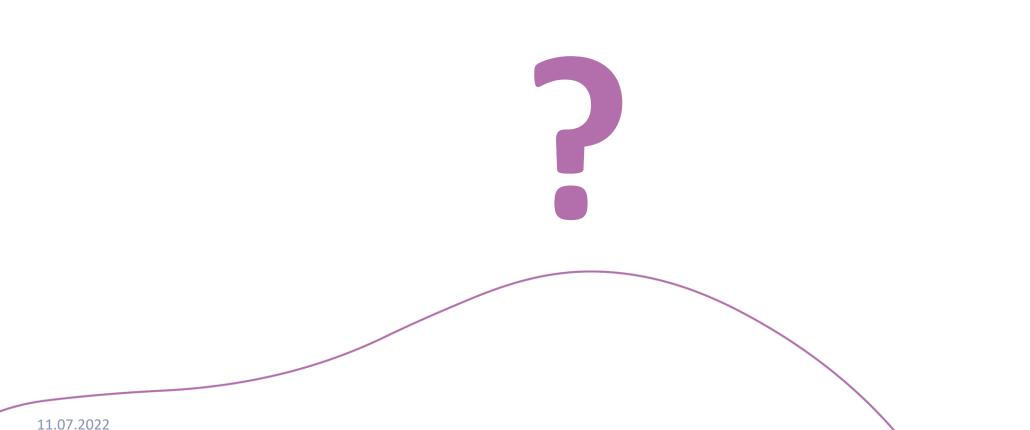

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What are your experiences?

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Discussing in breakout rooms

- approx. 20 to 25 minutes

- Guiding questions for your exchange

- Have fun and good conversations!

Guiding questions for breakout rooms

- In your experience, what STEM contents are girls most interested in?

- How do you implement these STEM contents in your courses and classes?

- For example, have you ever tried group work, hands-on experience opportunities or emphasizing social impact of STEM work? What other didactic measures and strategies do you use?

- But where have you possibly also reached your limits? Maybe someone in your breakout room can give you some tips?
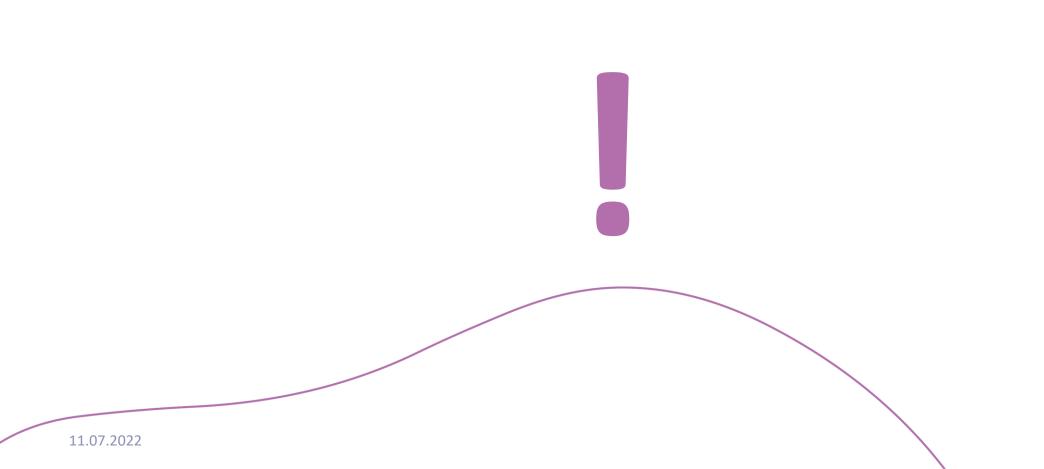
Back in the plenum

- Short reports from the different breakout rooms

- What can you pick up from today's online event as a little take-away?

Thank you for your attention and your active participation!

References

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