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From Stage to Classroom –
the Transfer of Knowledge through the Festival "Science on Stage"

The paper to this presentation has been submitted to *MRS Advances.*

Introduction

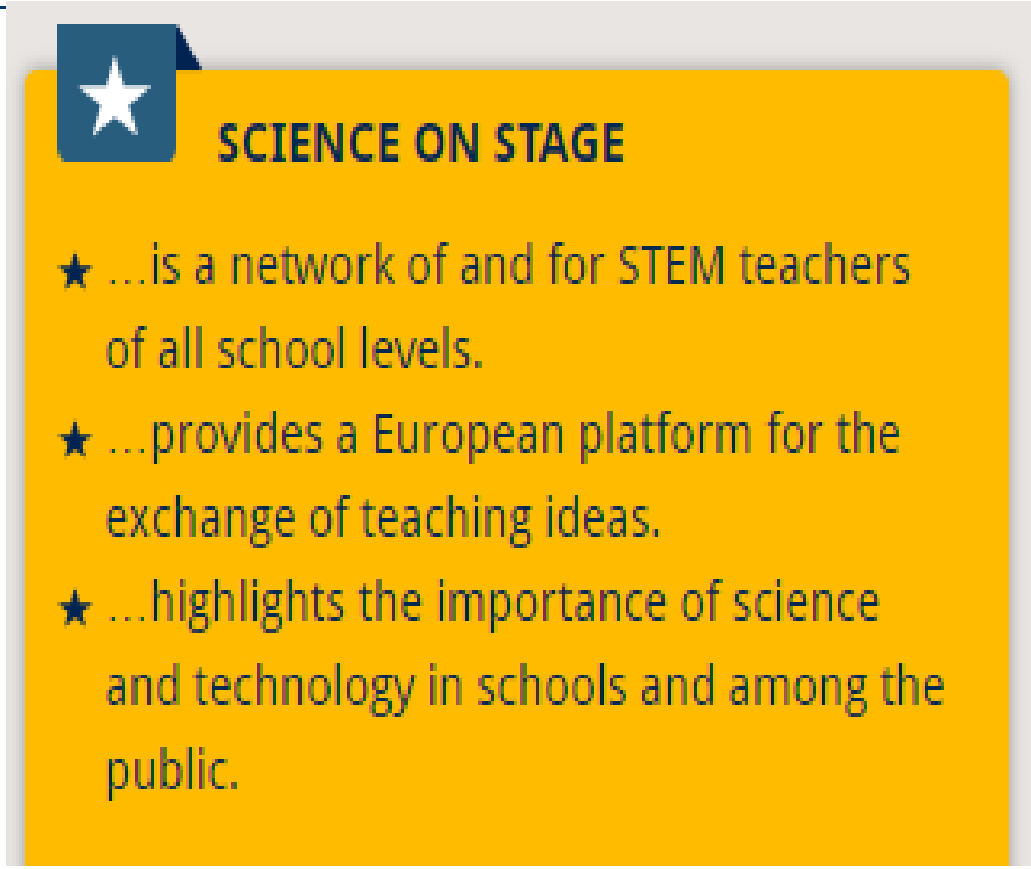
- Science festivals
  - ➥ *to raise public interest*
  - ➥ *to increase number of scientists*
  - ➥ *„Despite large numbers of participants and strong media coverage, many of these activities significantly **lack sustainability** if the **involvement of schools and teachers** remain **unconsidered**"*

    Weingart, Pansegrau et al. 2007, University Bielefeld report
- STEM teachers
  - ➥ *Key disseminators of scientific knowledge*
  - ➥ *Acquire knowledge through pre- and in-service training*
  - ➥ *Individual decision on what to bring into the classroom*
- **Which aspects of STEM teacher trainings assure efficient transfer of up-to-date knowledge to real classroom activity?**

Science on Stage

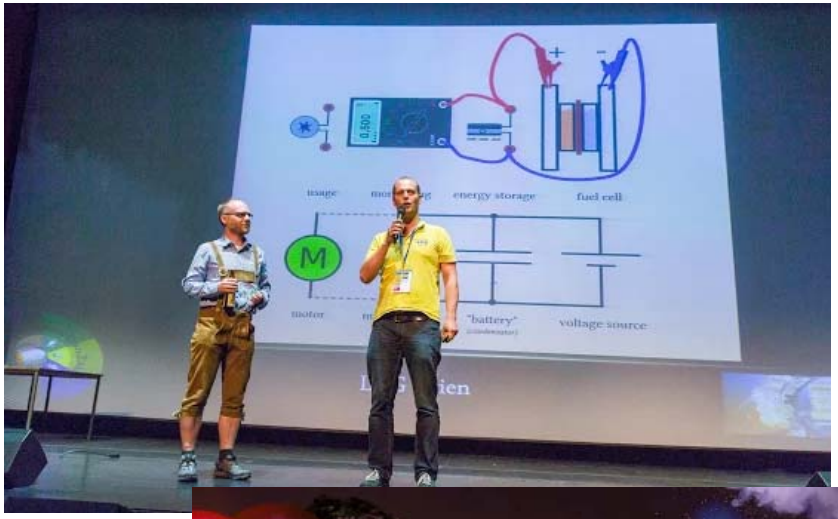
European large scale STEM teacher training initiative

- SonS Festivals
  - *2008 Berlin (Germany)*
  - *2011 Copenhagen (Denmark)*
  - *2013 Słubice/Frankfurt (Oder) (Poland and Germany)*
  - *2015 London (UK)*
  - *2017 Debrecen (Hungary)*
- Componets of festivals
  - *On-stage performance*
  - *Exhibition („fair“)*
  - *Workshops, seminars*
  - *Award ceremonies*



Source: www.science-on-stage.de

On stage-performance



Photos: Lässig

Fair of projects

Photos: Lässig

Award ceremonies

Photos: Lässig

Funding

- *Federation of German Employers' Associations in the Metal and Electrical Engineering Industries*
- Employees (Sept. 2016): 3.835.700

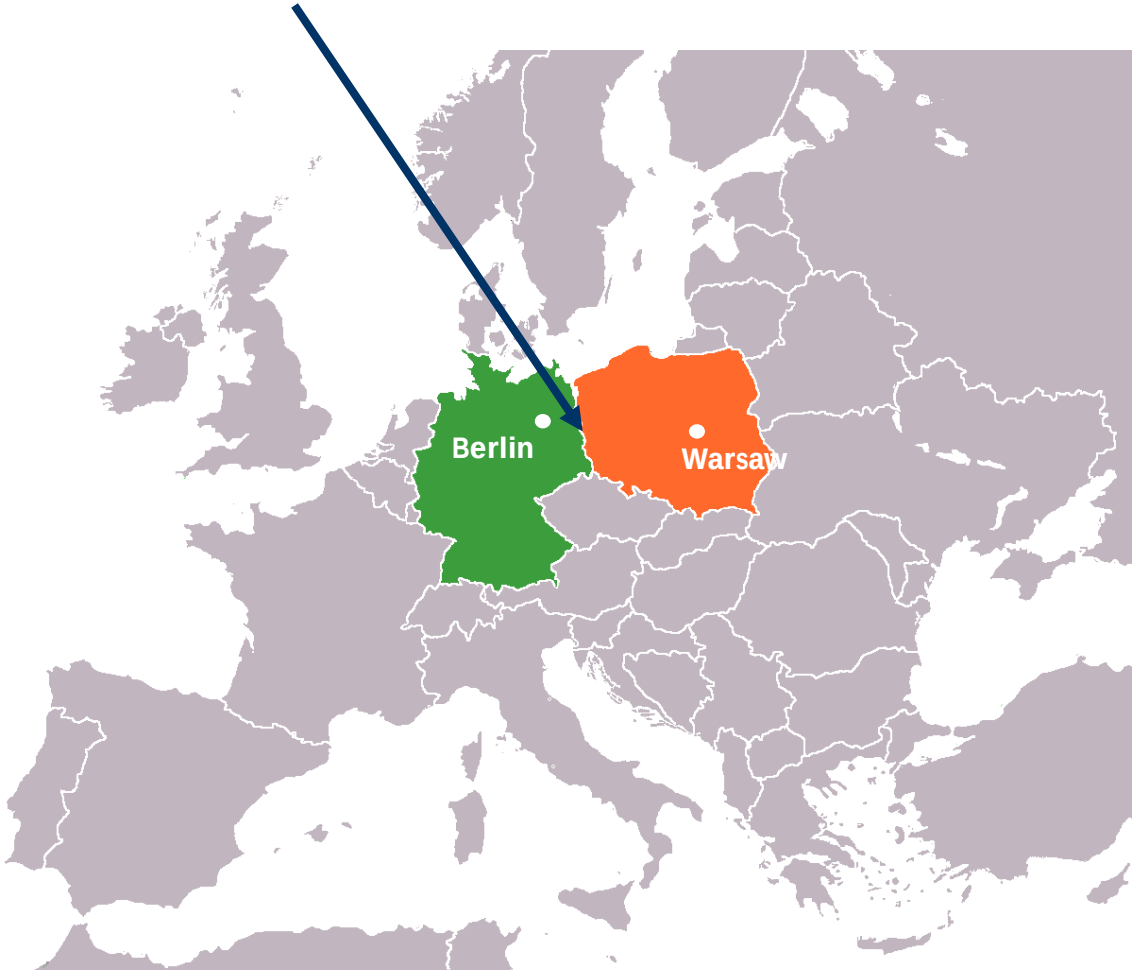
GEFÖRDERT VON

GESAMTMETALL
Die Arbeitgeberverbände der Metall- und Elektro-Industrie

think ING.
Die Initiative für Ingenieurnachwuchs

SonS 2013

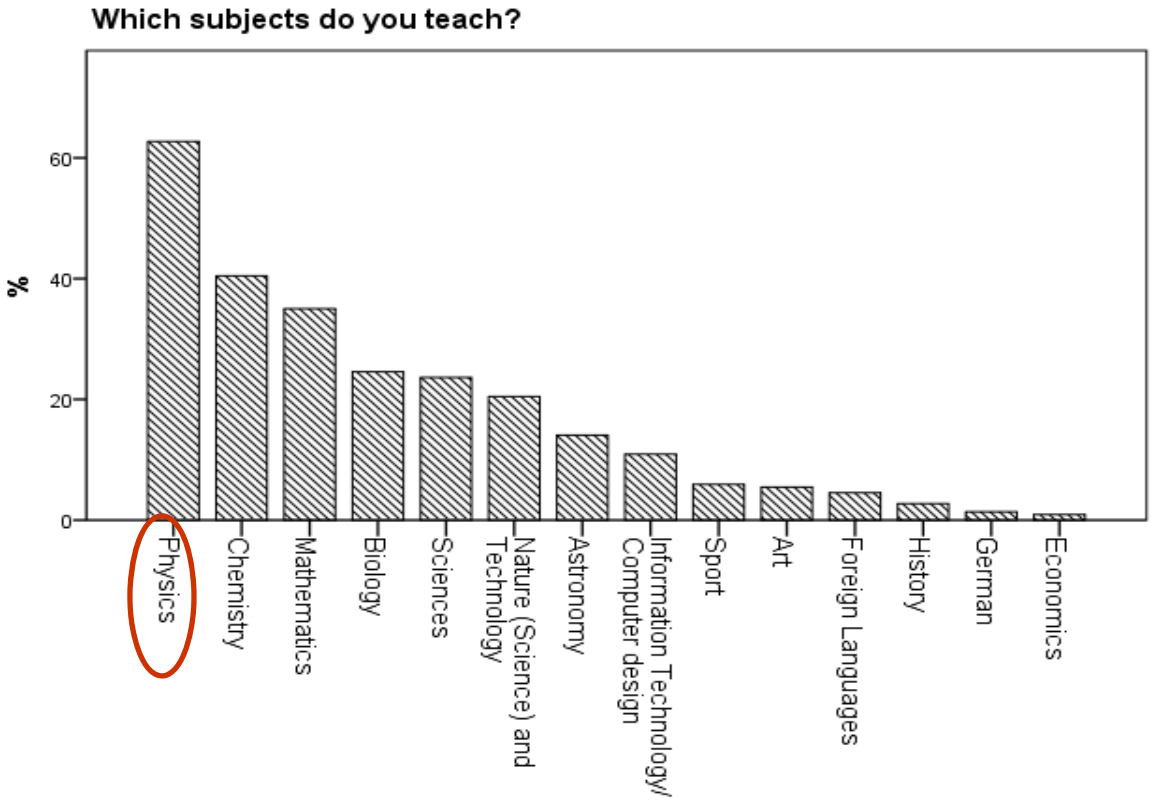
- Festival 2013, hosted by Germany and Poland in **Słubice/ Frankfurt a.d. Oder 2013**



Participants

- 234 teachers from 27 countries

physics teachers > 60%



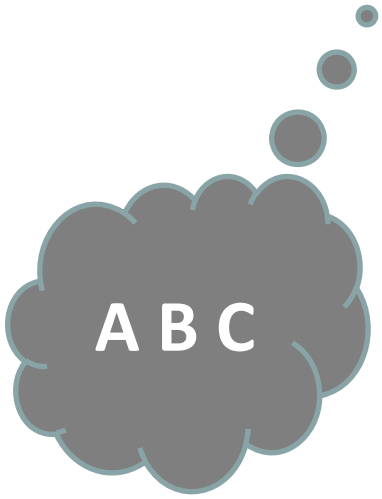
Evaluation

- Research question
- **What is the relevance of the individual aspects of SonS?**
- **In which way is science on stage successful?**
  - ➥ *To increase one's own knowledge?*
  - ➥ *To learn from experts?*
  - ➥ *To be on stage?*
  - ➥ *To win a price?*
  - ➥ *To meet colleagues?*
  - ➥ *To share experiences?*
  - ➥ *…?*

Evaluation

A measure is regarded successful when the effects meet the objectives and expectations of the initiators and sponsors.

What are the **goals**?



A B C = X Y Z
successful

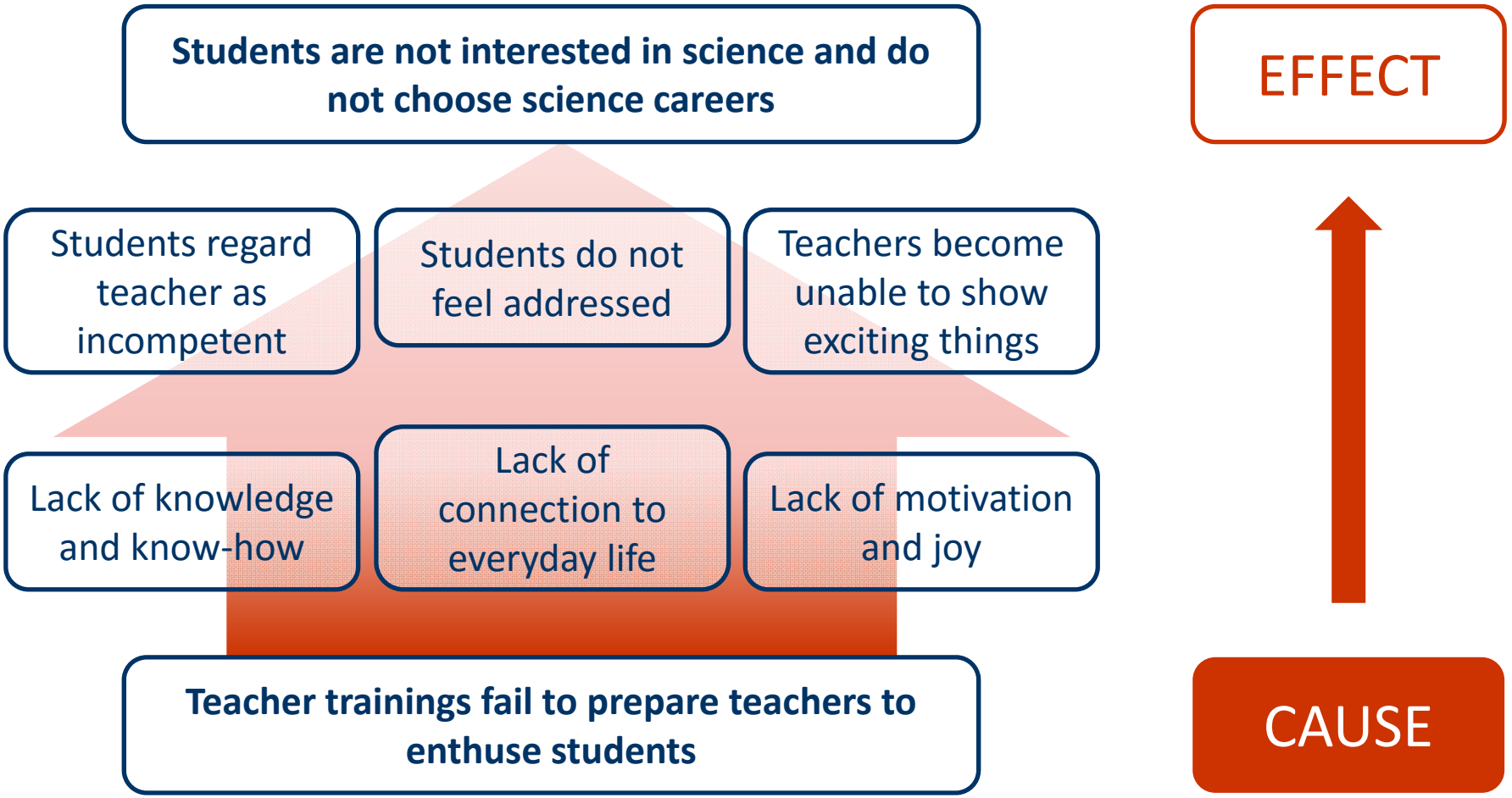
What are the **effects**?

Bortz, Döring 2006 (Springer); Zarinpoush 2006

Methodology

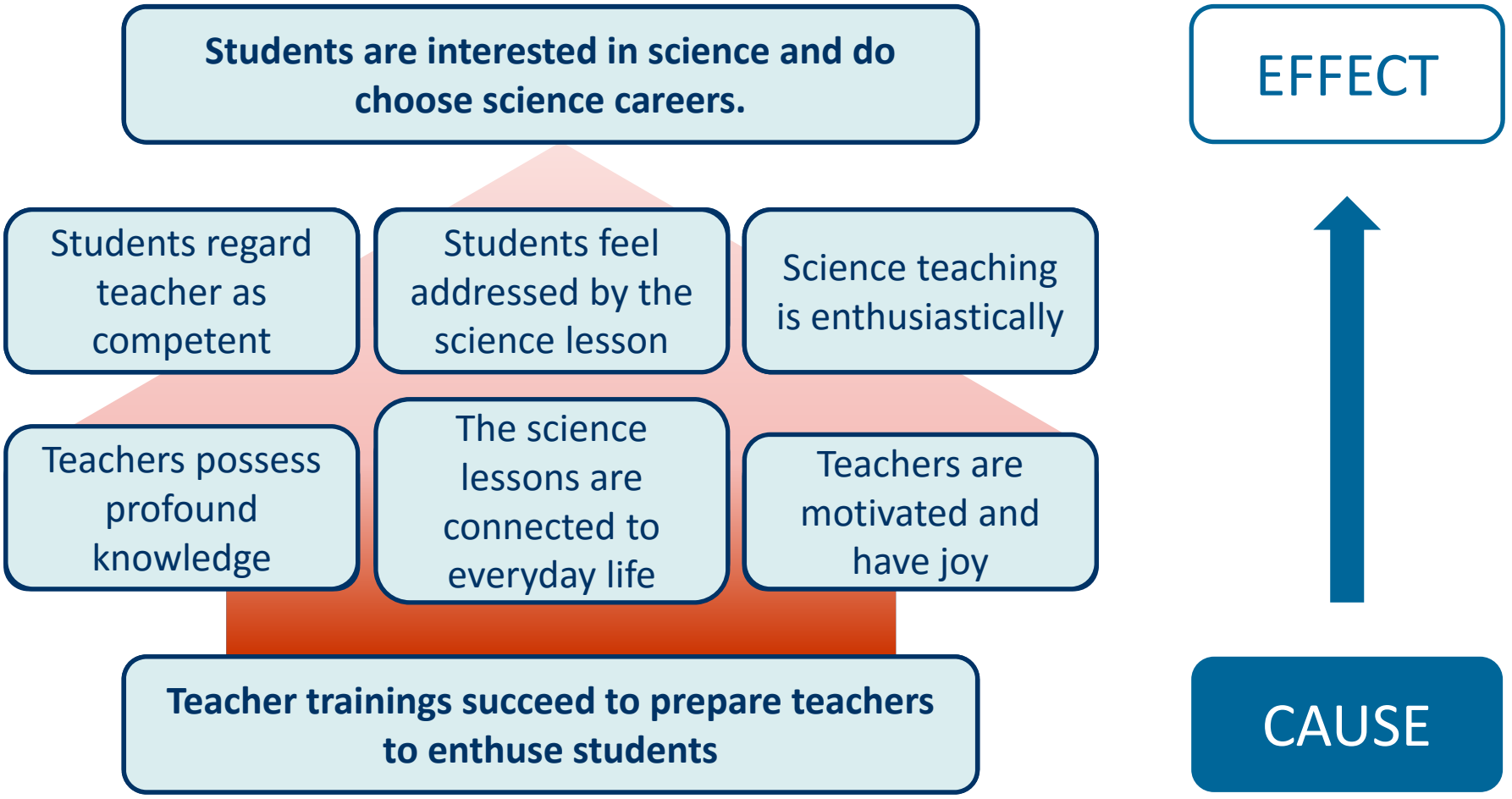
- Objective analysis (steering committee) ➔ **A B C**
- Pre-test (6 months before the festival)
- Interviews (during the festival)
- Post-test (immediatily after the festival) ➔ **X Y Z**
- Follow-up test (1 year after the festival)

Objective analysis – **Problem tree**



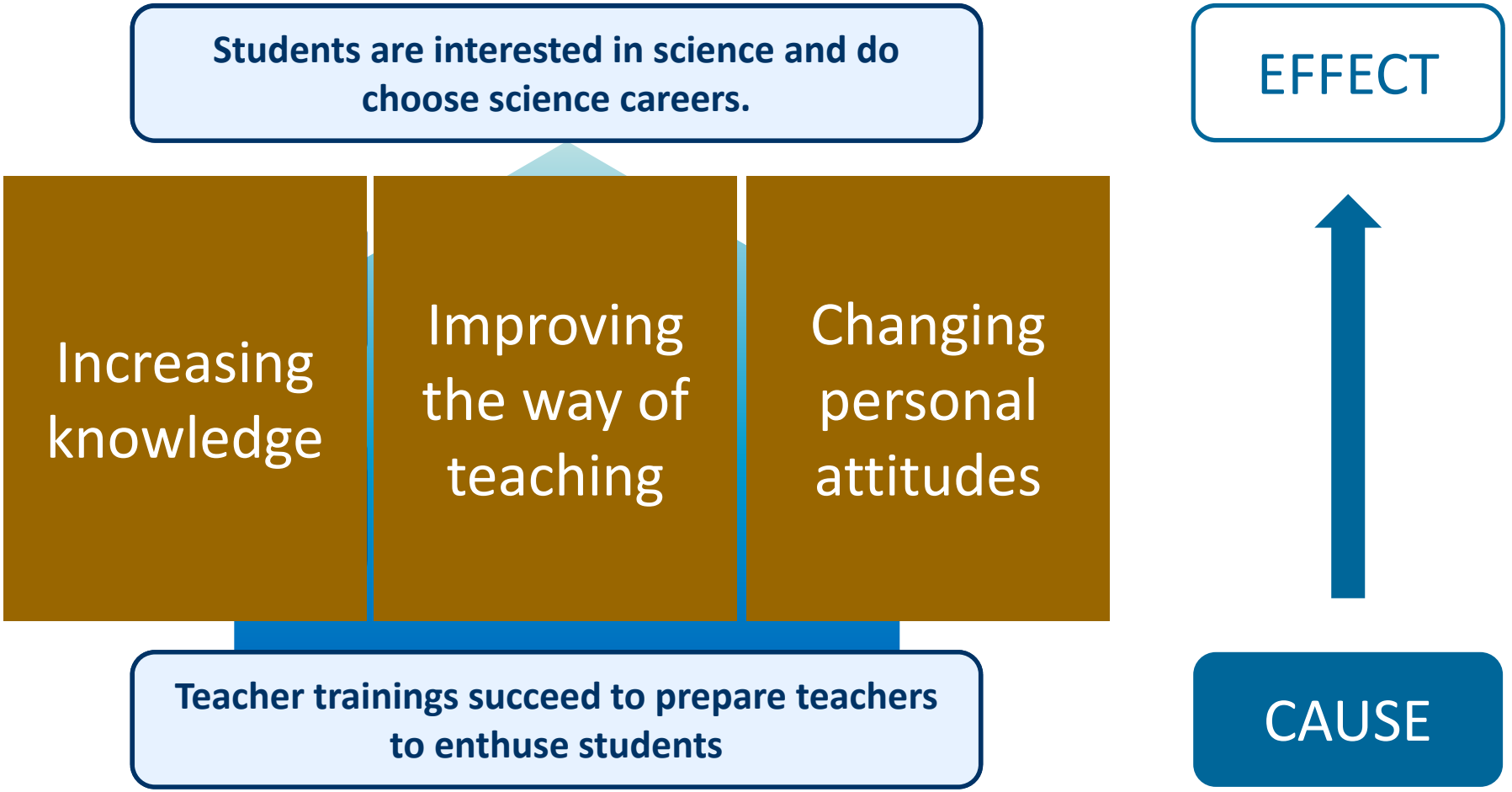
The logical framework approach, AusGUIDElines 2005, Tajmel, Starl et al. 2009

Objective analysis – **Objective tree**



The logical framework approach, AusGUIDElines 2005, Tajmel, Starl et al. 2009

Objective analysis - **Dimensions**



The logical framework approach, AusGUIDElines 2005, Tajmel, Starl et al. 2009

Questionnaire

- Pretest: **What would you need?**
- Posttest: **What was your benefit from SonS?**

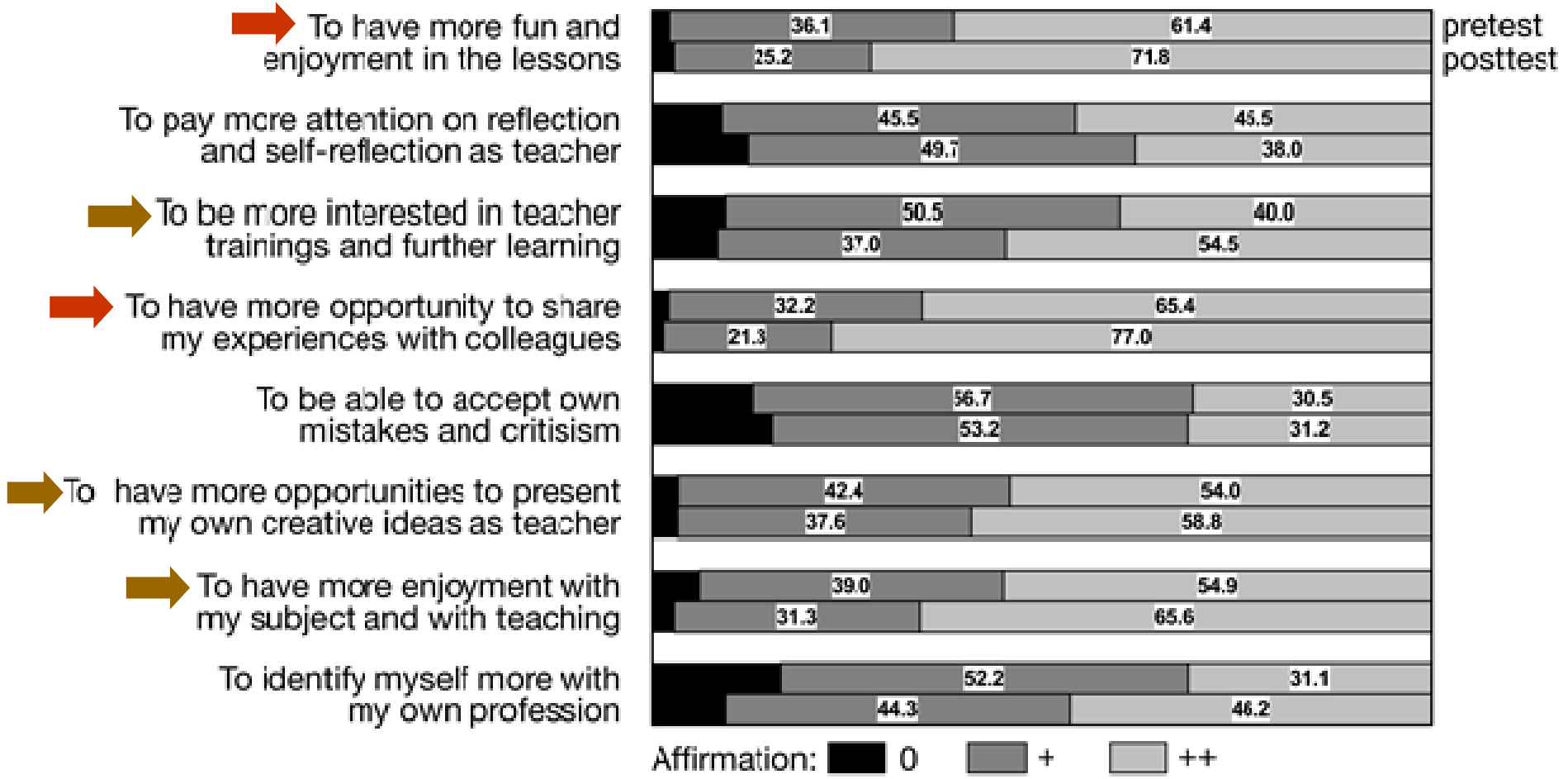
- 3 Dimensions, 20 items:
  - ***Increasing knowledge***
  - ***Improving the way of teaching***
  - ***Changing personal attitudes***

Online Questionnaire: Carsten Schmitz,
LimeSurvey Project Hamburg, Germany (2015)

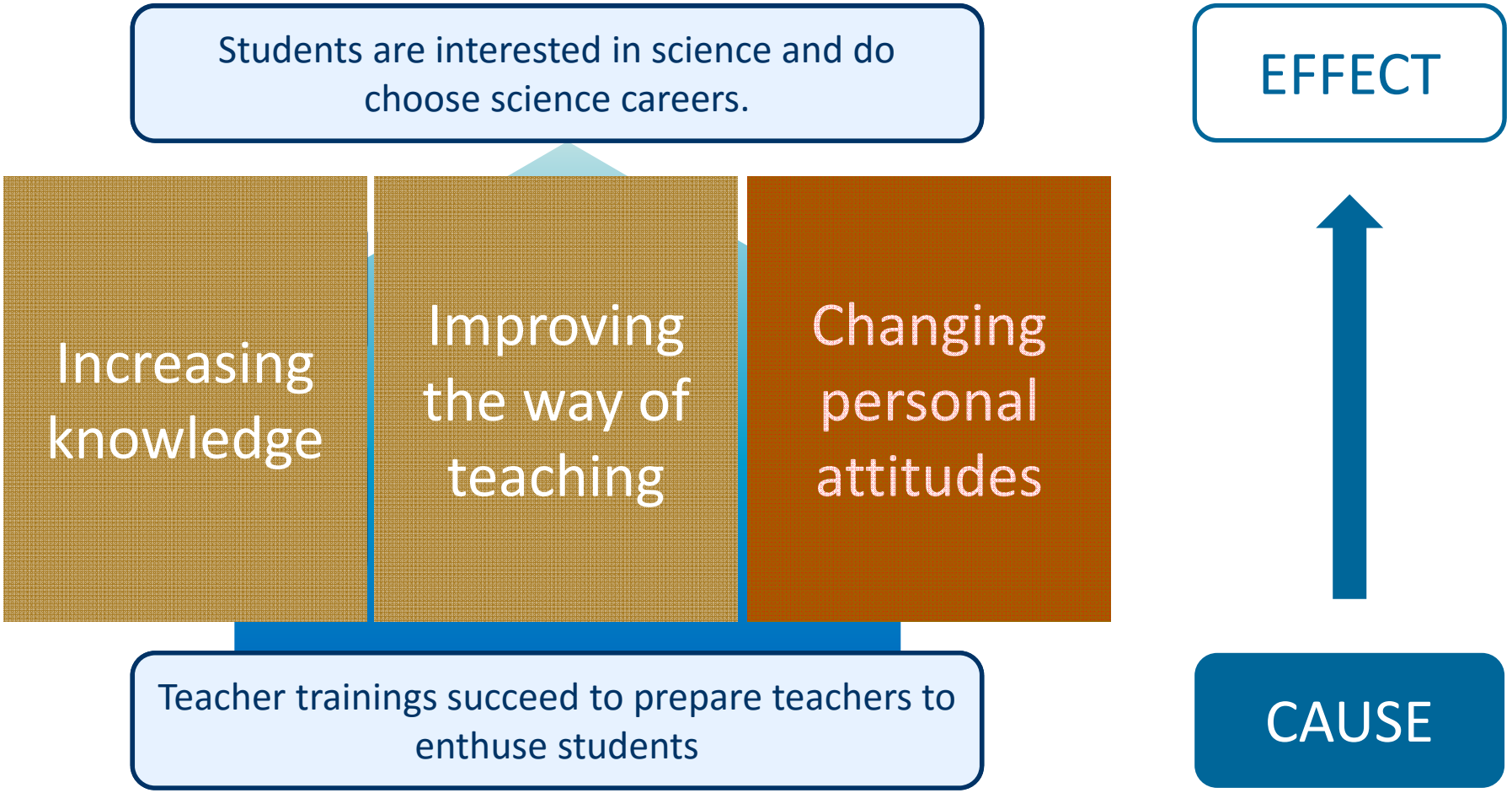
Changing personal attitudes

(very strong affirmation of more than 70% teachers)

(50 -70% teachers)



Strengths


Students are interested in science and do choose science careers.
EFFECT
Increasing knowledge
Improving the way of teaching
Changing personal attitudes
Teacher trainings succeed to prepare teachers to enthuse students
CAUSE

Impact

- Impact on science lesson
  - ➥ *Post-test: 58% planned to implement >3 ideas*
  - ➥ *Follow-up: **44%** already implemented **>3 ideas**, 84% at least one*
- International impact
  - ➥ ***69%** stay in (international) contact with more than **two persons** they met at the festival*
  - ➥ ***64%** base their own **teacher-training** activities in their home countries on SonS*

Conclusion

- Research question
- **What is the relevance of the individual aspects of SonS?**
- **In which way is science on stage successful?**
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  - ➥ *To be on stage*
  - ➥ *To win a price*
  - ➥ *To meet colleagues*
  - ➥ *To share experiences*

Thank you!

Citations

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www.science-on-stage.de

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