K-6 Teachers' Wishes and Expectations for Computer Science Training

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Introduction

Many countries face shortages of qualified computer science (CS) teachers and recruit STEM professionals or teachers from other subjects. In Germany, while eight federal states have integrated CS into primary curricula [4], secondary schools struggle to attract qualified CS teachers. Training programs aim to develop professional CS teaching competencies, yet voluntary program attendance remains low with poor teacher satisfaction [2]. Since teachers rarely adopt top-down approaches, understanding their expectations is essential for effective program development and CS integration in schools.

Research Questions

1. What subject matters do K-6 teachers wish or expect in a computer science training course?

2. Why do K-6 teachers wish or expect these subject matters in further computer science training courses?

Theoretical Framework

Formed through experiences, **wishes** designate in which direction an individual is struggling and how to satisfy needs optimally. Researchers disagree whether wishes require fulfillment potential [5].

Expectations are beliefs about future events [6]. People evaluate likelihood for anticipation to materialize (LAM) based on experiences and context, adapting behavior accordingly. New experiences modify LAM, creating a feedback loop.

Participants n=8

she he they
n=5 "f"
n=3 "m"

interview + sketch
n=4

Length of service
<5 years

interview + mindmap
n=4

Design and Method

We employed an arts-based research (ABR) approach [1] combining guideline-based interviews with sketches and mind maps.

Results

Our qualitative content analysis [3] yielded 12 inductive-deductively developed main categories using MAXQDA. Analysis reliability was confirmed through intra- (κ=.61) and intercoder agreement (Fleiss's κ=.41–1.00).

Catalysts for Training

- IT systems (IS)
- security
- fun, interest
- students' (digital usage) behaviors and comptencies
- perceived importance of CS
- resource efficiency
- political occasion
- school-specifics

Training Programm

- material as teaching & learning support
- knowledge: comprehensive CS subject knowledge with disciplinary boundaries
- knowledge: CS, CS-pedagogical, technological, technological-pedagogical, openess
- participatory learning (hands-on-activites and theoretical input; through exchange)
- trainer role (subject expertise, structured leadership, learning facilitation and guidance)

Transfer (After/Through Training)

- to colleagues and school
- to classroom and students
- unspecific (e.g. for their own)

> "I would let myself be surprised [...] could be much better."

> "Yes, so that you don't stand in front of the students like a complete idiot at the blackboard [...] But rather that you can stand there confidently in front"

> "I find it great when I solve practical tasks myself [...] then I have deeper understanding."

> "There's also no subject in primary school, right? [...] which means you're supposed to incorporate it everywhere. While in secondary schools there is the subject for that. Then it also makes sense to attend CS training. For us [Primary school teachers], I don't even know if that's necessarily so, whether we can apply it [CS] [...] to our school type."

> "As soon as these technical prerequisites are there, I will definitely use them. And I would totally love that. What happens there, what can I do, because I really don't know it."

Research Findings

Teachers' wishes and expectations are structured antinomically functioning both as explanations and desired outcomes. These polarities likely stem from perceived pedagogical and CS specific antinomies.

1

deep proficiency (e. g. programming)	knowledge depth	surface-level (disciplinary awareness)		structured leadership	trainer role (leadership)	facilative guidance
protection	knowledge (content: data)	participation & use (e. g. Apps)		experts	trainer role (knowledge)	learning from participants
clearly defined content-specifity	knowledge (overall)	open-ended, exploratory		theoretical input	participatory learning	hands-on activities
use IS for understanding CS	knowledge (techno-logical)	how to use IS in general, and in classroom		teachers' progressing	material (resource orientation)	teaching students

Teachers use social comparison with colleagues to define "good" CS teachers, suggesting that biographical reflection and case-based approaches could support professional growth.

internal	explanation	external
presence	importance (when?)	future
students	importance (who?)	teachers
security	"good" lessons	innovation

2 Teachers justify wishes and expectation in CS through both intrinsic (personal interest, growth, enjoyment) and external factors (lack of security/competence, teacher shortages, encouragement from others). The core explanations centers on students' needs and life contexts, recognizing CS's importance for presents or future and technical infrastructure. Supporting one's own learning process is also cited as justification.

Future Work

- more diverse participants
- development through training participation and lesson integration

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