Teachers as Designers: Embedding Lesson Study in Makerspaces to Create Artefact-Based Interdisciplinary STEAM Activities

Sveva Grigioni Baur, Engin Bumbacher & Yves Debernardi
Teacher University Vaud (HEP) Switzerland

Integrative STEAM education through teacher training

Growing call for interdisciplinary and student-centered approaches to STEAM learning (Science, Technology, Engineering, Arts and Mathematics). (Kim et al., 2021)

Impeded by

- traditional disciplinary structures, logistical requirements (Abd-El-Khalick, 2004)
- inadequate teacher preparation (e.g., Faikhamta, 2020)

Teacher education as a window of opportunity.

→ How to engage student teachers in the development of novel approaches to STEAM learning?

Prior Work: Integrating Lesson Study in interdisciplinary teacher training

Lesson Study in Teacher Ed: Teachers of different disciplines collaboratively experiment with novel **interdisciplinary** and **student-centered** approaches.

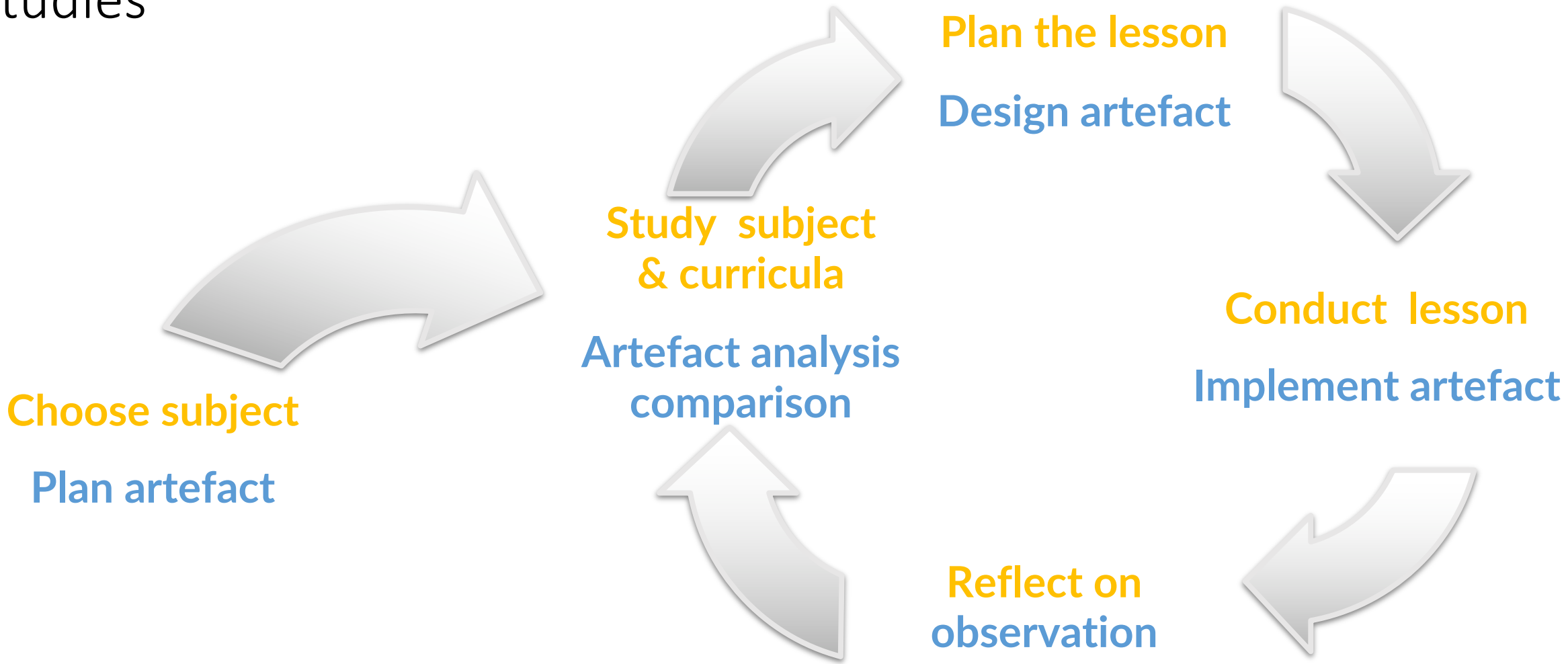
Project 2020: Pre-service high school teachers in Biology and Physics

- Currently evaluating the projects in terms of level of interdisciplinarity and teaching approach (student- versus teacher-centered) (e.g. Finson, 2016)

Preliminary Results:

- Learn about different perspectives on same topic.
- Significant time needed to converge on interdisciplinary views of content. Final lessons consisted mainly of **traditional teaching**, at the cost of student learning.

Nested Loop model of artefact design integrated in Lesson Studies



Research Questions

1. How does the integration of artefact development during lesson study influence how teachers co-develop a lesson plan?
2. Does the integration of artefact development during lesson study foster the development of student-centered interdisciplinary lesson plans?
    - Nature of learning activities
    - Helping students overcome the problems in the subject-specific learning process

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