

STEAM Education Framework

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STEAM education framework - overview

- STEM, STE(A)M and STEAM
- STEAM instructional meta-methodology
- STEAM Body of Knowledge
- Specifications for OERs
- Learning activity templates

Aim of the framework

To bring together some of the defining elements of STEAM education, in order to present a synthetic overview, that would enable policy makers and other stakeholders to better design STEAM education programmes.

STEM vs. STE(A)M vs. STEAM

STEM aims to chart new ways to make students engage with technical subjects, under labour market pressure.

It seeks to bridge the gap between the qualifications on offer and those that were sought by learners.

STEAM was a natural development in response to the perceived limitations of STEM, which did not engage with the creative and aesthetic side of our nature.

It was also a way to reinstate the learner's agency, who is not just a product to be assembled and delivered to the labour market.

What is STEAM?

„An intentional, collaborative pedagogy for teachers that empowers learners ***to engage in real-world experiences through the authentic alignment of standards, processes, and practices*** in science, technology, engineering, the arts, and mathematics” (Huser et al., 2020).

STEAM instructional meta-methodology (1)

1. Learning design principles (Butler et al., 2020)

- Problem Solving Design and Approaches
- Disciplinary and interdisciplinary knowledge
- Engineering design and practices:
- Appropriate use and application of technology
- Use of real-world contexts
- Appropriate pedagogical practices.

STEAM instructional meta-methodology (2)

2. Curricular approaches (Perignat & Katz-Buonincontro, 2019)

- transdisciplinary,
- interdisciplinary,
- multi-disciplinary,
- cross-disciplinary,
- arts-integration.

Neo-disciplinary
(Ng, 2019).

STEAM instructional meta-methodology (3)

3. Teaching methods

Table 5. Ranking of instructional methods by teachers (Zendler, Seitz & Klaudt, 2018; Zendler, 2018)

No.	Computer science teachers	Maths teachers	English language teachers
1	problem-based learning	problem-based learning	project work
2	learning tasks	direct instruction	jigsaw
3	discovery learning	learning (at) stations	problem-based learning
4	computer simulation	learning tasks	learning tasks
5	project work	project work	learning (at) stations
6	direct instruction	discovery learning	presentation

STEAM Body of Knowledge

Bodies of knowledge are tools, of varying degree of length and complexity, that attempt to map a specific domain.

The aim of this body of knowledge is to provide a tool that would enable educators and policy makers to quickly map out areas pertaining to STEAM education

- 8 STEAM body of knowledge
- 8.1 The educator’s position.....
- 8.2 Organisation and regulation.....
 - 8.2.1 Policies.....
 - 8.2.1 Stakeholders.....
- 8.3 STEAM elements
- 8.4 Competences.....
- 8.5 STEAM learning design principles
- 8.6 Instructional design and assessment
- 8.7 Resources
- 8.8 Professional development.....

Specifications for OERs

The STEAMonEdu Project is committed to making available its products under an open use licence, that is meant to facilitate their dissemination and integration into STEAM practices.

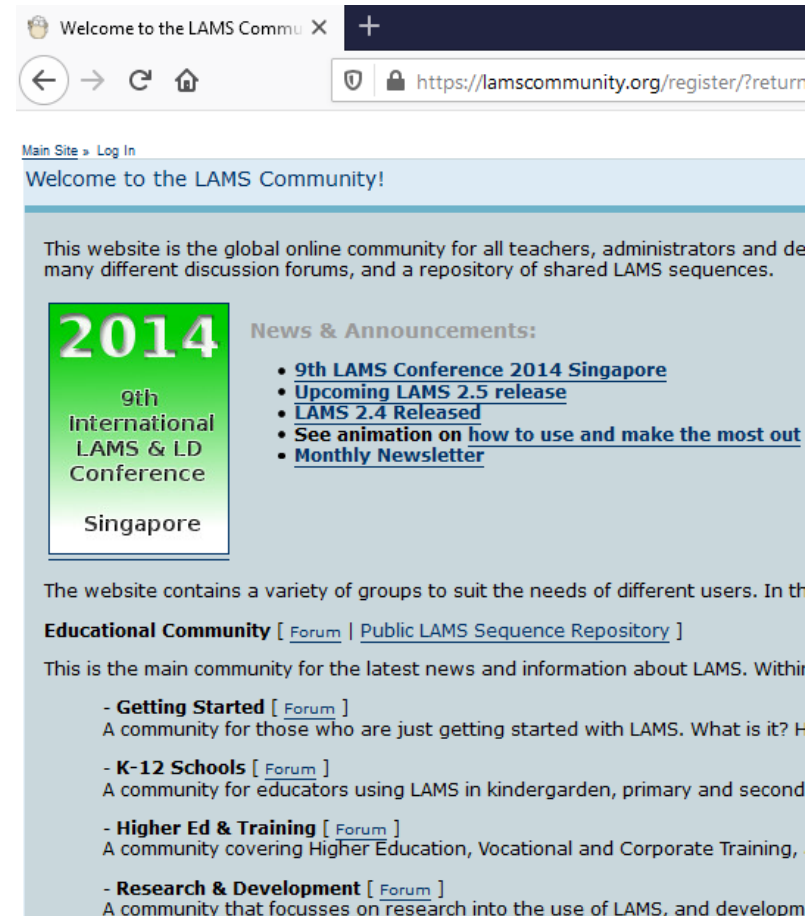
Elements considered (Rodriguez et al., 2011):

- description,
- reusability,
- interoperability.

Learning activity templates

A series of learning activity templates are under development.

They will be either stand-alone documents (e.g. a pdf file) or they will use a Learning Activity Management System (LAMS).



References

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Thank you!

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