Workshop proposal for Networked Learning Conference

Convenors and/or Presenters:
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Workshop Title:
(How) Can computational things be utilized in networked learning?

Workshop Description:
The aim of this workshop is to discuss with participants what roles (if any) "computational things" can have in networked learning practice and, vice versa, what roles (if any) networked learning can have in learning with "computational things".

"Computational things" are physical artefacts which use computer programs to bring about observable changes in themselves or other artefacts. Typically, the interaction between the computational thing and the environment is mediated through sensors and actuators. Lego Mindstorms, Kubo robots, e-textiles, as well as things integrating Arduinos and Microbits are all examples of computational things. Increasingly, computational things are introduced in education at all levels to support the learning of computational thinking. Because of their materiality, they are useful for concretizing abstract processes and lend themselves to tinkering, which is generally found to support student engagement and motivation (Kafai, 2016; Kafai & Resnick, 1996; Resnick, Berg, & Eisenberg, 2000). On the face of it, however, precisely because of their materiality, they would seem more suited for learning anchored in specific places; i.e. for learning in what Carvalho et al. have termed "place-based spaces for learning" (Carvalho, Goodyear, & de Laat, 2017). On the other hand, research provides examples of competences that may be fostered through networked learning despite their dependency upon physical presence, e.g. beer brewing (Wright & Parchoma, 2014). And Kafai's work on computational participation, though focused mainly on screen-based programming e.g. in Scratch, includes examples of what might be termed networked learning with computational things in the form of e-textiles (Kafai & Burke, 2014).

The workshop will have both a theoretical and a practice focus, dealing with questions such as:

- How can computational things, situated in "place-based spaces for learning", be utilized in networked learning across geographical settings?
    - Which forms of boundary crossings are required?
    - How can such boundary crossings be supported in practice?
    - What would be relevant learning designs for *networked learning with computational things* at different educational levels?
- How can networked learning be utilized for learning computational thinking with computational things?
    - Which forms of boundary crossings are required?
    - How can such boundary crossings be supported in practice?
    - What would be relevant learning designs for *learning computational thinking with computational things through networked learning* at different educational levels?

- What concepts of materiality are useful in conceptualizing computational things?

Intended Audience

Delegates interested in computational thinking and in supporting the learning of computational thinking utilizing material, programmable artefacts - and in discussing how this focus relates to networked learning, theoretically and practically.

Participant Engagement

We shall bring several computational things (e.g. Lego Mindstorms, Kubo robots, Microbits kits, Arduino kits) for participants to get acquainted with and try out. We shall then make a poster session where participants in groups develop ideas for learning designs with *networked learning with computational things* or *learning computational thinking with computational things through networked learning.* Groups will be asked to circulate to other posters and comment on the developed designs.

Participant Outcomes

Participants will go home with ideas for learning designs with *networked learning with computational things* or *learning computational thinking with computational things through networked learning*. They will also go home with theoretical reflections on how abstractions can be concretized through material, programmable things, and how this potentially may hinder transfer to other situations.

Workshop Alignment with Conference Themes

The conference themes include *Transfer and transformation of knowledge, practice and networked learning* and mentions Computational thinking as an emerging issue. This workshop will look at the situated processes of computational thinking with computational things and discuss the role of networked learning in transfer of these processes to other contexts.

Workshop Process/Activities (please provide an indication of how long each activity will last)

1. Introduction to the workshop, including practice examples of learning computational thinking with computational things (the computational things are passed around), presentation by conveners and examples from the audience, 20 min.
2. Poster session, step 1: self-formed groups (4-6 people per group) develop ideas for learning designs, facilitated by convener questions. Design notes/drawings on poster. 30 minutes
3. Poster session, step 2: Circulation of groups to next poster. Comments on design, facilitated by convenor questions. Notes on poster. 10 minutes
4. Poster session, step 3: Circulation of groups to next poster. Comments on design, facilitated by convenor questions. Notes on poster. 10 minutes
5. Poster session, step 4: Groups return to own poster. Read notes. Prepare plenum comments on design. 5 minutes.
6. Short plenum presentations of designs & comments on design. 15 minutes.

References

Carvalho, L., Goodyear, P., & de Laat, M. (Eds.). (2017). *Place-Based Spaces for Networked Learning*. New York: Routledge.

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