A framework for online support of undergraduate interdisciplinary research

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C Integration of insights > Interdisciplinary

B Disciplinary Research Questions

A Interdisciplinary Research Question

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Interdisciplinary Research Process
(Interdisciplinary research I and II – Capstone)

At LAS, UU, students collaborate in groups of 3-4 on interdisciplinary research, based on the Interdisciplinary Research Process, described by Repko and Szostak (2017).

This research aims at investigating preferences for online and offline interdisciplinary research supervision.

A survey is done amongst second year students (22) and third year students (15) of LAS. In addition, findings are presented from interviews with 2 students and their supervisors after completing their interdisciplinary capstone.

I would like to use an online tool/environment for…:
(1=strongly disagree, 5=strongly agree)

	interdisciplinary research I	interdisciplinary research II - Capstone
Progress interdisciplinary process	3,6	2,8
Information different steps	4,2	3,5
Communicate groups	2,8	2,4
Communicate own	2,8	1,8
Guide integration	4,1	3,2
Visualize integration	4,3	3,3
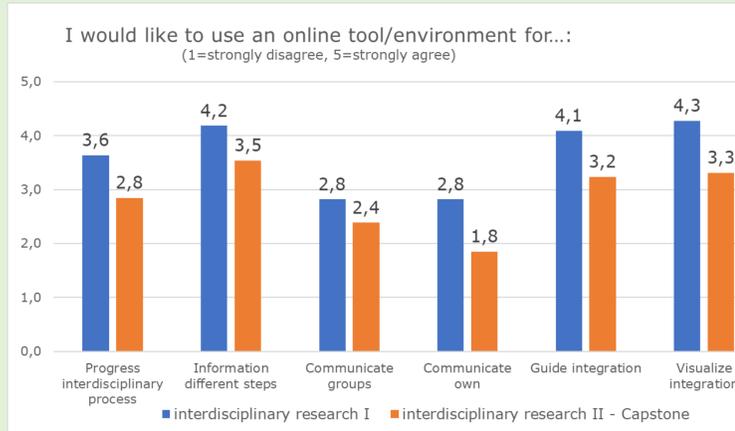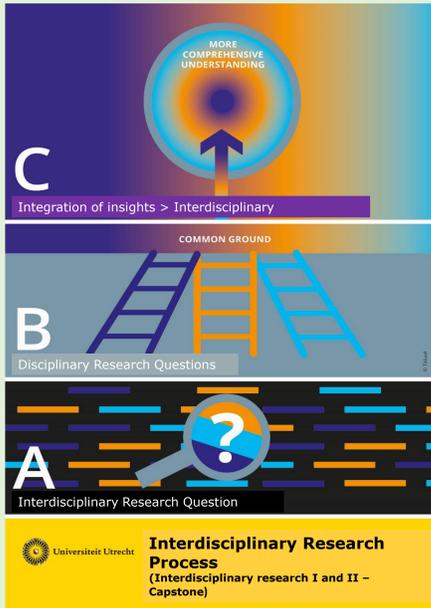
Quotes on online/offline interaction:

Making use of existing digital tools: *"We had some bad luck that we could not spend so much time with the three of us (…). That was what nice about google drive. We had a relatively organized drive, which our supervisor also could access."* (student A, Liberal Arts and Sciences)

Learning a new tool: *"I think such a (feedback)-tool does not provide additional value as you have to learn the new tool as a teacher. Which is possible, but also students have to deal with the new environment."* (Supervisor A, Liberal Arts and Sciences)

Value of meeting with each other: *"Especially with the integration it is impossible to do that without talking to each other. To share specific disciplinary insights with each other.(…) It is very useful to sit with each other and write down all the insights."* (student B, Liberal Arts and Sciences)

- Less experienced students (interdisciplinary research I) are more prone to use an online environment as compared to LAS Capstone students.

- Especially in the group discussion/brainstorm in phase C (integration), face-to-face interaction is found to be important to discuss ideas and encourage the creative process.

- Both students and supervisors work with existing tools for collaboration and communication during the interdisciplinary research process (google docs, email, whatsapp). For a blended environment to work it can be beneficial to use tools that students and teachers already know.

- Important touchpoints for interaction can be defined as: finding an interdisciplinary team, planning the process, writing the document, supervision feedback, supervision discussion and group discussion. Next, a blended and an online framework are shown that integrate these touchpoints.

Blended Framework and Touchpoints for online/offline interaction

Phase A Interdisciplinary research question
Phase B Disciplinary grounding
Phase C Integration of insights
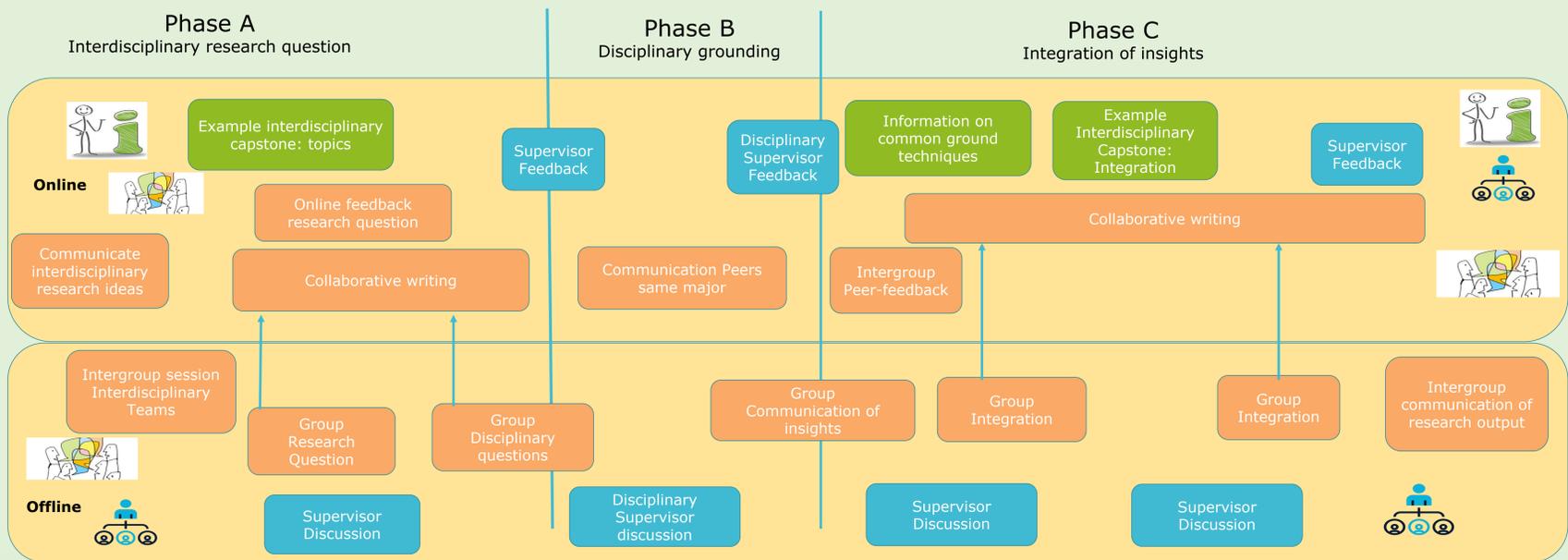
Towards an online framework for teaching global interdisciplinary research
Different interdisciplinary touchpoints should be considered when developing the interdisciplinary research process online

Activity	Examples	Opportunities	Challenges
Finding an interdisciplinary team	Online learning environment (i.e. blackboard), Social media (i.e. Facebook)	Students have time to generate a pitch of their research topic. Students have time to think about how their disciplines can contribute to a certain problem.	Someone should monitor the process of making groups. It is important that enough students start at the same time to allow for multiple groups
Structure process and planning	Wiki[1], online learning environment	The structure allows students and supervisors to monitor activity of different steps of the interdisciplinary research process.	The online environment should be easy to learn and to use. If multiple tools are used at the same time, students can get lost.
Supervisor Feedback	shared documents (i.e. google docs), group chat	Timely feedback and easy processing of feedback by students	Workload of supervisor. Still have to make agreements on when to provide feedback.
Supervisor Discussion	Video conference[2], shared documents	Supervisors have access to different versions and insight in progress of students	Challenge to guide creativity and problem solving. Visualizations should be made digital.
Group discussions (i.e. sharing insights, integration)	Wiki[1], shared documents, video conference, knowledge mapping[3]	Asynchronous activity and all group members have easy access to all documents.	Dependent on the tool whether creativity and problem-solving can be encouraged. The value of meeting to allow for discussion/brainstorm should be emphasized.
Writing the document together	online chat, forum, shared documents	Easy access for both the supervisor and the students	Documents and structure should be easy to understand for both students and supervisors.

Conclusions and Future Directions

- Different tools are available that can aid teaching interdisciplinary (global) research, but especially online it is important to provide a clear structure to help students with the interdisciplinary research process.

- Research into online collaborative tools that encourage visualization.

- Online collaboration provides opportunity for learning analytics techniques to provide insight into interdisciplinary learning.

- More research needs to be done into intercultural collaboration in an online interdisciplinary context.

[1]. Biasutti, M. and El-Deghaidy, H. (2015). Interdisciplinary project-based learning: an online wiki experience in teacher education. *Technology, Pedagogy and Education 24*, 339-355. [2]. Jaldemark, J., Lindberg, J. (2013). Technology-mediated supervision of undergraduate students' dissertations. *Studies in Higher Education 38*. 1382-1392. [3]Okada, A. and Buckingham Shum, S. (2006). Knowledge mapping with Compendium in academic research and online education. *In: 22nd World Conference, International Council of Distance Education, 03-06 Sep 2006, Rio de Janeiro, Brazil.*