Digital competence in higher education
Design based research to bridge the gap between policy, teaching and research?

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Outline

1. Introduction
2. Digital competence as transferable skill
3. Bridge teaching and research?
4. Case studies as examples

“(…) Context is not always everything, but it colors everything” (Pajares 2006, p. 342).
Digital competence – a “moving target”? 

Digital competence: In order to 2nd order
The "State" or the "New-town"
The "Core" or the "citystate"
Digital natives vs digital immigrants
The next generation
The Millennial generation
The digital "Matthew effect"

Digital competence within education (Norway)

The national digitalization strategy (KD 2017)
Digital skills as the fifth basic competence in all subjects since 2006
Professional digital competence in teacher education (UHR 2017)
Recent White papers about higher education from the Norwegian Government (2016, 2017)

Bergen Digital Literacy Scale

- The SMIL-study (Krumsvik et al. 2013), N=17 529 pupils & 2523 teachers
- The factor analysis was conducted with an oblimin rotation, as this allows the factors to be correlated (Russell 2002)
- The five questions came out as one factor explaining 60.0% percent of the variance.
- The digital index include how pupils perceive own digital competence, elementary ICT skills, basic ICT skills, subject related ICT skills, digital learning strategies and their overall digital competence.
- Together the index represent a mean of these five types of skills on a scale ranging from 1 to 7 where 1 = no skills and 7 = very good skills.
- A Cronbach alpha value of .82 indicates that internal consistency of the digital competence index is high.

Digital index include how pupils perceive own digital competence, elementary ICT skills, basic ICT skills, subject related ICT skills, digital learning strategies and their overall digital competence.
Is it possible to “unpack” digital competence in higher education?

Can design based research bridge some of the gap between policy, teaching and research within this area?

How can digital competence improve educational quality?

Design experiments and design research
(Collins, Joseph & Bielaczyc 2004)

- The term “design experiments” was introduced in 1992, in articles by Ann Brown (1992) and Allan Collins (1992).
  Design experiments were developed as a way to carry out formative research to test and refine educational designs based on principles derived from prior research. More recently the term design research has been applied to this kind of work (p. 15).
- The need for approaches to the study of learning phenomena in the real world rather than the laboratory.
- The need to derive research findings from formative evaluation (p. 16).
- Nine principles (Wang & Hannafin 2005)
Research designs, DBR and digital competence

Level 1 Randomized controlled trials (with concealed allocation)
Level 2 Quasi-experimental studies (using matching)
Level 3 Before-and-after comparisons
Level 4 Cross-sectional, random sample studies
Level 5 Process evaluation, formative studies and action research
Level 6 Qualitative case study and ethnographic research
Level 7 Descriptive guides and examples of good practice
Level 8 Professional and expert opinion
Level 9 User opinion

(Pawson 2006, s. 49-50).

Design based research: different data sources

Design based research (DBR) and digital competence

Skodvin, O. J. (2013)
The need for “a epistemological step back”: What is the learning objective and research question?

<table>
<thead>
<tr>
<th>Theory</th>
<th>Practice</th>
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<tbody>
<tr>
<td>Processes</td>
<td>Learning outcome</td>
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<td>Surface</td>
<td>Deep</td>
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<td>Authentic experience</td>
<td>Abstraction</td>
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What is the learning objective and what is the best research question to examine this learning objective?

FLIPPING OR FLOPPING”….? «CHALK AND TALK»….? «TELLING AND SHOWING”….? «LEARNING BY DOING»….?

EXAMINE PARTS OF THE TEACHING DESIGN (SINGLE CASE) OR THE WHOLE TEACHING DESIGN (MULTI CASE)

Example: Flipped classroom in teacher education (pilot)
The main aim of the design based research (case study) is to examine if, and eventually how formative assessment can enhance the educational aspects of a PhD-course within transferable skills (literature review-course)

Case study 1:

The case study: PhD’s and transferable skill (3rd cycle)

1. "Flipping or flopping" (Preparation for the course, articles, video-clips, etc.)
2. "Chalk and talk" (Plenary, literature reviews main elements)
3. "Telling and showing" (Peer discussion, case/videocases)

The DBR-framework of the course

1 month before the course --- The 2 course days --- 1,5 month after the course

1. "Flipping or flopping" (Preparation for the course, articles, video-clips, etc.)
2. "Chalk and talk" (Plenary, literature reviews main elements)
3. "Telling and showing" (Peer discussion, case/videocases)
4. "Learning by doing" (Reflection attached to own thesis, academic paper)
Pedagogical framework: Flipped learning design

Theoretical framework: Formative assessment (Hattie & Timperley 2007)

Feed up, feed back and feed forward (Hattie and Timperley 2007) in digital learning communities

Literature review on Ph.D. level
Have you read the recommended literature for the course?

1. No
2. Yes
3. Partly

Have you watched the 6 video clips before the course (“Flipped learning”)?

1. No
2. Yes
3. Partly

Digital elements (flipped classroom) in PhD-courses

“The videos are a useful way to get an introduction to the topic before reading the literature in more detail. I have already applied some of the tips to my own review/work (Peter)
Peer discussions and e-formative elements (Flinga) in the PhD-course

Obligatory paper, Assessment part 1: feed back

Obligatory paper, literature review at PhD-level by Professor Rune Johan Kramvik & associate professor Fredrik Mark Rokenes

Assessment, NV

This is an impressive, well-written and nearly complete narrative review that clearly shows how you are capable of positioning your doctoral work in the forefront of knowledge in your research field. You clearly identify a knowledge gap in the literature that justifies why you want to conduct a literature review. We want to applaud you for being very thorough and transparent with the method both in the retrieval and the review stages of your review. The tables, figures and Appendices support and inform your review and your argumentation, and we especially like that you designed a flow chart to show the different stages of the retrieval stage.

Obligatory paper, Assessment part 2: feed forward

"Thank you so much for the feedback in my paper! It is educational and encouraging. I will use it actively further on when revising my paper" (Mark)
Why design based research to “unpack” digital competence?

- Bridge the gap between teaching and research
- Monitoring quality of own and students teaching
- Practice oriented
- Professional digital competence
- High teaching relevance
- Student active research
- Starting point for larger research studies
- Improving existing teaching

Summary

1. What is the learning objective and what should be assessed? Where, when, how....
2. Digital competence and digital didactic
3. Increasing the teachers and student repertoire
4. Design Based Research to bridge the gap between teaching and research


