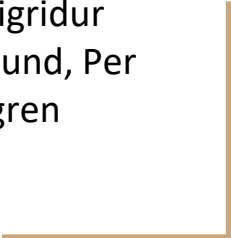




Digital Learning:

Continuous Professional
Development of Physicians

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Agenda

- Introduction
- Motivation and background
- Conducting the research:
 - Phase 1: planning and initiating
 - Phase 2: execution and data collection
 - Phase 3: analysis, evaluation and dissemination of results
- Results
- Concluding recommendations and next steps

Introduction

- This project research a **continuous professional development (CPD)** program for Swedish pediatricians (physicians specializing in medical care for children).
- The project is **interdisciplinary** and involves researchers and practitioners, with expertise in computer science, informatics, CPD, and medicine, and takes **a participatory approach** (Kemmis 2009), based on **modern adult learning theories** (Taylor & Hamdy 2013).
- Building on previous experiences (Holmgren et al. 2021, Vallo Hult et al. 2020) we added the component of **digital learning**, by shifting the CPD course from traditional onsite lectures and case-based group discussions to **online learning through video conference tool** (Zoom).
- The main focus of this project is to develop, design and evaluate a *digital* CPD program that incorporates informal and experiential aspects of learning for use in clinical context

A changing pediatric care

- Pediatric care is increasingly subspecialized and knowledge-intensive
 - Improved results and "new survivors"
- Emphasis on allergies, obesity and neuropsychiatry
- Psychosocial stress and vulnerability in children today
- And then we suddenly faced a pandemic

All pediatricians need continuous training to meet today's clinical challenges and offer children the best possible care

Research motivation

- In light of the recent pandemic COVID-19, digital workplace learning has accentuated from being a minor part, to becoming full-scale.
- Based on that, a better understanding of the new skills and competencies required for digital learning is needed, while also reflecting on how we can understand the shift and its consequences for learning at work.
- While a large body of literature exists on formal learning and e-training, aspects of self-directed and informal learning in the digital age are still under-researched

Research aim

- i) to explore physicians informal learning (e.g., collegial communication, collaboration and knowledge sharing) when shifting to digital learning as part of a CPD course;
- ii) to identify features that enable and constrain interaction and networking;
and
- iii) to evaluate the effects of digital learning on the overall learning objectives and outcomes.

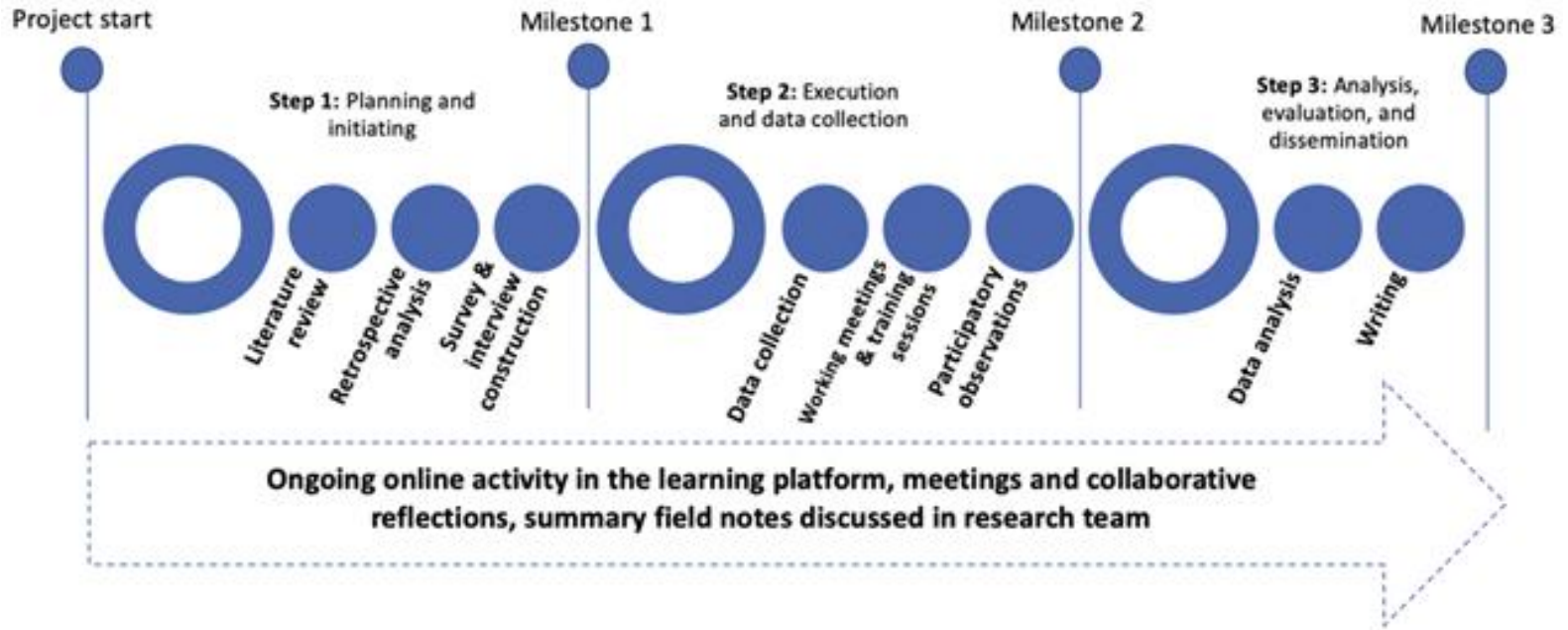
The steps taken to investigate the aims

- Analyze formative course evaluation data to measure the experiences of digital learning, with focus on informal learning aspects.
- Identify methods and pedagogical principles that can be used to capture and inform the design to better support informal learning in digital learning settings.
- Enhance our understanding, through qualitative data, of the experiences of digital learning, and especially informal aspects, in a healthcare context to inform learning also in undergraduate programs in health and informatics.

Conducting the research

Participants	Data collection	Description
Program participants from two cohorts	Formative course evaluations, semi-structured focus interviews and open question surveys	Course participants fill out mandatory, anonymous, standardized evaluations at the end of each course day. Voluntary participation in interviews and workshops.
Researchers, teachers, program participants	Participation and observation, log files	Researchers, teachers, program participants engagement in the learning platform and online lectures during and between the course days.
Researchers and teachers	Working meetings and training sessions	Researcher and teacher meetings related to the progress, practical issues and planning and administration of the learning platform.
Researchers	Fieldnotes	Documentation of reflections, impressions, and observations made by the research group.

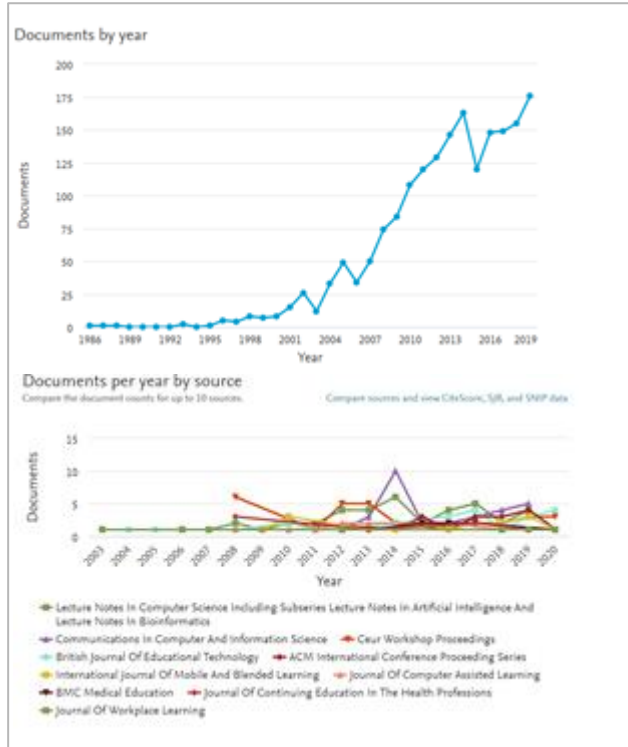
The project plan: three phases



Phase 1: Planning and initiating

- Focus on **understanding and conceptualizing the problem**, which included **literature review**, and **retrospective analysis** of previous course evaluations and design considerations.
- The literature review (theory) and analysis of course evaluations and log-files was used to **inform the creation of open-ended survey questions** in the formative course evaluations, and **semi-structured interview guide**.

Phase 1: Literature re



Analysis of search results by year and source

Workplace learning	"Workplace Learning", "Informal learning", "Learning at work", "Work-based learning", "professional development"
Digital work	"Digital work" "Digital workplace" "Digital workforce" "digital work environment" "digitalization of work", "remote work", "mobile work"
Digital learning	"Digital learning", "Technology Enhanced Learning", "virtual learning", "online learning", "mobile learning", "distance learning" e-learning, e-training
Healthcare	Healthcare, physician*, doctor*, medical*
Search query:	((TITLE-ABS-KEY ("Workplace Learning" OR "Informal learning" OR "Learning at work" OR "Work-based learning" OR "professional development")) AND ((TITLE-ABS-KEY ("Digital work" OR "Digital workplace" OR "Digital workforce" OR "digital work environment" OR "digitalization of work" OR "remote work" OR "mobile work")) OR (TITLE-ABS-KEY ("Digital learning" OR "Technology Enhanced Learning" OR "virtual learning" OR "online learning" OR "mobile learning" OR "distance learning"))))

Phase 1: Literature review strategy

- The initial search in Scopus **resulted in 1,981 references**, which were analyzed for overview (descriptive statistics described above).
- The **top 50 articles** were scanned, and limited by source (reviews), and by year (2010-2020)
- **41 articles were scanned on the title and abstract level**; and further narrowed to focus on healthcare and physicians, as a way to get more specific search results.
- Finally, the saved documents from Scopus, PubMed and an additional search in Google Scholar were **exported to EndNote** (reference management system).
- The final set of publications, limited to peer-reviewed articles, conference papers or book chapters in English, were categorized based on **author(s) and year**; publication **outlet**; document **type and domain**; **main findings** and call for **future research**.

Phase 1: Results from literature review

- Much research adopts an **instrumental view** on digital technologies, focusing on aspects such as how IT can **support and enable learning**.
- There is often an **either-or view of online learning** and collaboration as replacing physical meetings, rather than complementing each other.
- Digital workplace learning entails **more than access to new IT**, especially for physicians where **colleagues and social norm** influence attitudes and use.
- In sum, this confirms the relevance of our project and aim; to elaborate on **pedagogical methods** that can help design digital workplace learning that incorporates also **informal and experiential aspects** of learning.

Phase 2: Execution and data collection

- The focus in step 2 was on **data collection and observation** during the course
 - adapting and extending existing survey constructs to include the **new dimensions of digital learning**.
 - reflecting on **use behaviors** during the video lectures and group discussions in breakout-rooms in zoom
 - collecting unidentified data, stored in **log-files from the learning platform** (How often course participants log in, at what times, how often they access specific modules and download material etc)
- Main interest was placed on variables that describe **engagement and interactions with the platform** and the learning material.

Phase 2: Course evaluations

- **Standardized survey with seven questions** for all course modules
 - “satisfaction” and “willingness to recommend it to a colleague” (likert scale).
- **Open-ended questions** to capture participants’ appraisal of strengths and weaknesses
- Additional survey questions specifically targeting **strengths and weaknesses of online learning** (via Zoom).
- The survey was distributed in electronic form, and time was set aside to complete the survey at the end of each course day.

Phase 3: Analysis, evaluation, & dissemination of results

- In step 3 we used the participants' assessments to **compare and contrast** the online learning with previous years experiences
- We focused on **assessment data from the course, and the formative evaluations** of the learning modules
- The concept of attempting to combine learning with the creation of collegial networks with a view to influencing the learning environment is linked to **social learning theory** (Taylor & Hamdy 2013)
- Applying this to principles **for digital learning** allowed us to **identify and illustrate** new dimensions of learning

Phase 3: Course evaluations

Participants' satisfaction with the individual learning modules
(1 = not at all, 6 = yes, definitely)

Bakjurskursen	(ZOOM)	
	Kurs III	Kurs IV
Neurologi	5.4	5.5
Barn på IVA	5.7	5.2
Transplantation	5.2	5.2
Medel	5.4	5.3

Allmänpediatrik	(ZOOM)	
	Kurs I	Kurs II
Immunodefekter/ Periodisk feber/ Infektioner		5.8
Immunodefekter/ Reumatologi	5.8	
Infektioner	6.0	

Would you recommend the learning module to a colleague in the same
position as you? (1 = not at all, 6 = yes, definitely)

Bakjurskursen	(ZOOM)	
	Kurs III	Kurs IV
Neurologi	5.8	5.9
Barn på IVA	5.8	5.6
Transplantation	5.4	5.8
Medel	5.7	5.8

Allmänpediatrik	(ZOOM)	
	Kurs I	Kurs II
Immunodefekter/ Periodisk feber/ Infektioner		6.0
Immunodefekter/ Reumatologi	5.9	
Infektioner	6.0	

Each learning module was evaluated according to the participants' 'satisfaction' and 'willingness to recommend it to a colleague'. Responses were analysed using descriptive statistics and reported as a mean

via zoom

CONS:

of qoutes

- **Worse discussions, better in face-to-face settings** 19
- **Missing the personal and informal meetings** 26
- I get more tired
- Technical problems 9
- More difficult to keep the focus 8
- 1

PROS:

of qoutes

- **Saves time/no travel time**

Illustrative quote from a participant

You don't want to miss the informal parts and getting to know each other. But for selected modules and group discussions, a bit into the program, online could save travel time and possibly provide opportunities for in-depth study in some topics.

-- excerpt from course evaluation

Emerging themes

	Fysisk	On-line?
<u>Knowledge</u>	Yes	Yes
Practice change	Yes	(Yes)
<u>Skill, ability, competence and performance</u>	Yes	???
<u>Confidence</u>	Yes	??
<u>Attitudes</u>	Yes	??
Career development (Kirkpatrick level 4)	Yes	?
<u>Networking, collaborations and relationships</u> (Kirkpatrick level 4)	Yes	???
User outcomes (Kirkpatrick level 4)	Yes	(Yes)
Intention to change	-	(Yes)
Organisational change (Kirkpatrick level 4)	Yes	(Yes)
Personal change	Yes	??
Scholarly accomplishments (Kirkpatrick level 4)	-	(Yes)

Categorising the broad impacts of CPD: a scoping review

Allen LM et al. Medical Education 2019; 53: 1087–1099

Medline 2007-17: 2750 → 191 manuscripts, USA (41%), doctors (55%)

Conclusion

We identify the following target criteria for success and measurement of these, in relation to the project:

1. Survey and interview data have been used to identify digital learning variables shown to correlate with the success in meeting the objectives of the learning modules.
2. Qualitative content analysis was used to categorize and thematize strengths and weaknesses of digital learning experiences, measured through open-ended formative course evaluation questions and focus group interviews.
3. Validation of the findings, in the form of lessons learned were formed, and measured by iteratively implementing, adjusting and refining the design of the learning modules to the digital form.
4. Anchoring of the results of the project has been done through formal recognition in clinical practice, and for informing other programs in higher education.
5. Contribution to the research literature on digital learning and continuous professional development has been summarized in a draft of a publication of project findings which we plan to submit to a peer-reviewed journal later this fall.

Implications and recommendations for **Digital Learning**

In sum, structure, coordination and clear instructions are even more important; preparations are crucial:

- i) provide zoom training sessions for faculty and participants
- ii) have a moderator to keep track of times, breakout-rooms and chat questions
- iii) vary lecture formats and use built-in functions for interactions (polls and reactions)
- iv) it's a head start when participants have met in person prior to the digital discussions

The road ahead

- Our next steps include finalizing our paper drawn from experiences of working on this initiative
- The paper will be submitted to a journal later this fall
- We will continue to collaborate and this initiative has strengthened our collaboration substantially and for that we are truly grateful





Supporting material



The project as a whole

Resultatet av projektet

- en sammanhållen fortbildning

Specialistläkare som deltagit i de två programmen: $(67+40) = 107$

(Ett 30-tal "lärare" och övriga specialiteter/professioner oräknade)

16 heldagar/2 år (107 x 16 = 1712 deltagardagar)	~ 4.7	"övningsår"
Förberedelsedagar	~ 4.7	"inläsningsår"
Totalt, aktivt deltagande	~ 9.4	års "aktivt deltagande"

Integrerar: "Kliniskt arbete i lärandet – Lärande i det kliniska arbetet!"

Kurslängd 2 år (2 x 107 = 214 "kurs-år") ~ 200 "kurs-år"

The Kirkpatrick Model is probably the best known model for analyzing and evaluating the results of training and educational programs. It takes into account any style of training, both informal or formal, to determine aptitude based on four levels criteria.



Source: from Kirkpatrick, 1996

The learning portal:

<https://larportalen.vgregion.se/course/view.php?id=547>

Example of course evaluation: <https://forms.office.com/r/2BHp4ukHSv>

2. Hur bedömer du utbildningen som helhet?

[More Details](#)

 Insights

30

Responses

5.6

Average Number

3. Skulle du rekommendera utbildningen till en kollega i en situation liknande din?

[More Details](#)

 Insights

30

Responses

5.8

Average Number